

SEISMICITY OF IRAN

A thesis submitted for the degree of
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by

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ABSTRACT

The problem of the systematic study of the macroseismic and instrumental seismicity of Iran is one which has not been much investigated in the past. One of the reasons is, no doubt, the apparent scarcity of both microseismic and observational data and the complexity of the distribution of seismic activity in this part of the Alpo-Himalayan zone.

However, much pertinent information has been accumulated, in particular macroseismic data and Part 3 and Appendix IV of the present thesis summarises and discusses the seismological aspects on which a fundamental understanding of the problem must be based. These include the discussion of the reliability of epicentral determinations prior to 1960, the use of macroseismic data in relocation studies, microtremors, and the unreliability of focal depth determinations in Iran.

Part 5 of the thesis, had a two-fold object: to relocate epicentres prior to 1950 and to study these relocations taking into consideration macroseismic data. In all 297 relocations were obtained, covering the period 1913-1949.

In Part 7 an attempt is made to unify relative magnitudes of events in Iran. This unification is achieved using distances of (P) and (S) onsets as well as the number of stations at which events were recorded; in all 2,195 earthquakes have been used.

During the research various ancillary investigations were undertaken which, as they are somewhat outside the scope of the present thesis but nonetheless of some interest, were incorporated in appendices.

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Introduction

No definite work on the general seismicity of Iran has been published to date even though several authors have examined particular aspects of the problem : Wilson (1930), Sieberg (1932), Gutenberg and Richter (1949), Peronaci (1958), Ambraseys (1968), Niazi (1968), Nowroozi (1971, 1972), etc. The main reason for this lack of a general study has been the shortage of basic material both seismological and tectonic which has not been so far systematically collected. The present thesis is an attempt at collecting the data in the seismological field and presenting some possible methods of analysis. The bulk of the work consists of the instrumental data as taken from the original sources, as well as the historical data for the pre-instrumental period and macroseismic information complementary to the instrumental data. The use of original sources as opposed to second hand sources greatly increases the accuracy of the data when compared to pre-existing compilations, and special studies of parameters such as magnitude have, in many cases, increased the value of the available data. The reader is referred to the introductions to the various sections for a more complete picture of the work undertaken.

The data thus collected have²⁴ been used as a basis for the analysis of several aspects of the seismicity of Iran. A study is given of the geographical distributions of epicentres based on ISS data between 1913 and 1960. The seismic activity is then examined in detail for various regions of the country between 1961 and 1971. For the earlier period between 1913 and 1949 all epicentre locations have been recalculated. Finally, a special study was made of the microtremor activity in a region of the province of Azarbaijan.

~~Magnitude determinations were considered to be of special importance in~~

this seismicity study, and earthquakes for which magnitudes were not available or were unreliable were examined separately. Four different approaches were used : analysis of the records at one particular station (Tabriz); comparison of magnitudes reported by different international centres (ISC, USGS, and MOSCOW), analysis of ISS data for the estimation of approximate magnitudes; and examination of the surface wave duration at the seismological station of Strasbourg. It is believed that this work produced some essential information for the further seismicity studies.

The scope and contents of this thesis were of course limited by the time available to the author for this study. Much further work is still required before the seismicity of Iran can be properly understood. It is hoped that the present study may constitute a framework for future contributions on the subject.

1. Structural History

The interior core of the earth is separated from the exterior portion or mantle by a sharp discontinuity about 2,900 km. below the surface. Earth-quakes originate only in the mantle, from near the surface to the depths not exceeding 700 km. Below the depth of about a few hundred kms. the material may be considered homogenous for the geophysical purposes. The surface of the earth exhibits two different structures, the Pacific and the Atlantic, as well as a number of distinct types different in their geographical history and each associated with characteristic patterns of seismicity. From the geological history one can identify a limited number of stable masses, which have undergone little deformation in the latter geological periods. The geographical distribution of the seismicity of the earth exhibits a number of principal zones, one of them being the Mediterranean and Trans-Asiatic zone with the Alpidic belt. The Alpidic belt consists of a succession of accurate structures, extending from Burma across Asia, through the Alpidic structure of Mediterranean Europe and into the Atlantic probably as far as the Azores. Iran is a "broadened part of the Alpidic belt" in the middle of this zone.

Geographically, Iran is contained between latitudes 24° - 40° N and longitudes 43° - 64° E. The country is a high land referred to as the Iranian plateau. Two great mountain ranges, the Alborz on the north and Zagros-Makran on the west and south border central Iran. Historically, the Iranian mountain ranges have long been known as part Alpine-Himalayan system of mountains. Various authors have studied the structural history of the country : Stahl (1911), Bobeck (1929), Baier (1938), Schroder (1944), Furon (1941), Gassner (1955, 1964), Khain (1964) and in the tasks of special studies of the authors of Iranian National Oil Company and Geological Survey. In 1968, Stocklin reviewed the work carried out to date, and Takin (1972) interpreted some of the

results in terms of plate tectonic ideas. The Neotectonics of Iran have not yet been studied and until this work is done the relationship of structure with earthquakes cannot be properly understood. A few papers attempt however to study the geological framework of some large earthquakes (Gassner, 1969, Falcon 1967). More recently, reports on catastrophic earthquakes often study the seismotectonic aspects in considerable detail (Unesco, Geophysical Institute Tehran, Geological Survey Tehran, etc.). Work is now starting on the present day tectonic activity and its relationship with earthquakes (Tchalenko, 1973).

The present day activity of some of the major faults has been studied by Wellman (1966) on the basis of aerial photo mosaics. He distinguishes the Zagros, Shahrud, Doruneh, Naiband and Buyin-Zara Faults. Further work is required to confirm some of these structures in the field.

2. Instrumental Data

2.1 General

Up to the end of the 19thC., earthquake lists are based entirely on historical and macroseismic observations. Gradually, instruments were introduced in some scientific centres and for the convenience of the present table 1901 is taken as the start of the instrumental period (see Tables 2.1 and 2.2). The records of the early years have until now been used mainly to detect the date and time of the events, the location of which was obtained by non-instrumental means. However, as our knowledge of seismic waves improves, it will eventually be possible to return to the study of these early records for more information.

As the instruments improved and the number of stations increased, it became possible to locate epicentres in unpopulated areas and in the sea, and in this way build up a better picture of the seismicity of a region.

The Table presented here lists only the purely instrumental determinations, to the exclusion of the determinations which rely on macroseismic data. In this sense it is an instrumental investigation into the seismic activity of a part of the earth's crust, Iran and surrounding areas. The events are given chronologically and the Table is thus a continuous record of the activity of the region during the last 72 years. The information given for each earthquake includes date and time, epicentre, focal depth, magnitude, seismic wave observations (number of station in the range minimum and maximum epicentral distance), standard deviation and sources of information. These points will now be described in more detail :

2.1.1 Date and Time : As opposed to the historically and macroseismically determined events, the date and time of an instrumentally determined earthquake

is accurately known. The year is given once for each page of the Table, and the month, abbreviated to the first three letters, is represented for each event. The date is given in two digits. The time is given by seven digits which are as follows : the first two represent the hour, the next two the minutes, the next two the seconds, and the last (after the decimal point) the fractions of seconds. When the time is not known to this accuracy, as in the case where station reports have been used to detect an event, the last digits are omitted.

2.1.2 Epicentre : The epicentres are listed exactly as given in the source, with N indicating latitude and E longitude.

2.1.3 Focal Depth : Focal depths are listed when given in the sources, with the symbol N when referring to 'normal depth'. In a few cases when focal depths were not given in the source, they have been calculated on the basis of station reports. These cases can be recognised in the Table in the following manner : when the surface wave magnitude is followed by the letter L and the focal depth is greater than 30 Km.

2.1.4 Magnitude : Magnitudes are given as in the sources, with (s) indicating surface wave and (B) body wave. When a source quotes a value which is an average of several observations, the number of observations is indicated in brackets after the magnitude. Magnitudes followed by an asterisk indicate that the source used macroseismic data to estimate magnitude. As ISS listing does not provide magnitude determinations, magnitudes have been determined here by the method described in the Section 7. In the Table those magnitudes are followed by the letter L for surface wave magnitude and P for body wave magnitude, with the number of observations used indicated in brackets.

2.1.5 Seismic Wave Observations : Minimum and maximum epicentral distances in degrees and number of stations reporting are listed. They have been used in calculations of ISS magnitudes and they may also be of some other use in the future.

2.1.6 Standard Deviation : Standard deviations are listed to provide an indication of the scatter in origin time and epicentral-coordinate determinations. They do not indicate reliability or accuracy of a determination.

2.1.7 Sources : The symbols used to represent the various sources are explained in the Bibliography.

For each event all available sources are listed in the Table without any preference **given** to any particular one.

2.2 Epicentre of Earthquakes in Iran

The location of epicentres of earthquakes in Iran are of great importance in the study of the seismicity of the area in general; with accurate locations of the earthquakes it would be possible to distinguish the active regions of the area, and any particular earthquake problems. The present discussion is confined to the instrumental period alone. The list of epicentres is given in Table 2.1. It will be remarked that the determinations using different sources are often different, and in many cases the difference is so great that it cannot be ignored. In this sense Table 2.1 does not solve the problems of the best epicentres in the area but permits one to see the epicentre problems easily. The data ~~is~~ divided into three periods which can be characterised as follows :
are

2.2.1 1901-1912 : As the seismic network was very poor, only a few earthquakes are known in this period. The instrumental records are however important as they permit to detect the large earthquakes which occurred in Iran.

2.2.2 1913-1949 : 1913 is the date of the first issue of the 'British Association Seismological Bulletin' and the beginning of the regular official publication of instrumental data. The epicentre of the earthquakes in this period is of great importance in the present study. From the time that seismic networks have been in operation, a purely instrumental determination of epicentres has become possible. In the calculation it is necessary to use a model defining the early shape as well as travel time tables. Before 1930, the earth was taken as a sphere and travel times predicted the epicentre of the earthquakes. As both the earth model and travel time tables used were approximations, the epicentral locations often differed greatly from the true earthquake location.

The epicentres of the earthquakes from 1930 to the end of 1949 were calculated using travel time tables (Jeffreys-Bullen (J-B), 1940) and a geometrical model of the earth suggested by Gutenberg-Richter, 1934. Recent work confirms that the travel time model (J-B) is not absolutely correct. Consequently the epicentre locations even though improved, still often differ from true epicentres. Furthermore, a number of sources published epicentres determined with a few seismic stations only or even with a single seismic station. Also when a source used a large number of station readings there arose serious computing difficulties, which precluded a correct determination. In many such cases the epicentre of the earthquake is adopted to the one suggested by another source. Hence the epicentral determinations between 1913 and 1949 are not as reliable as one could expect. As new facilities come into operation it often becomes worthwhile to recalculate epicentres of this period (see Section 5).

2.2.3 1950 to Present : The epicentres after 1950 are located more precisely.

In this period the sensitivity of seismic instruments has increased rapidly and the seismic network developed in parallel. The accumulation of experience in calculation, the development in techniques, particularly computing facilities, permitted a remarkable review in travel time tables. The result was a great improvement in the epicentre location of recent earthquakes. Some epicentres between 1950 and 1965 were relocated by Nowroozi 1971. The epicentres of the area during this period could be used with some degree of confidence with the determination by Nowroozi and then with those of ISC and USCGS. The difference between the two sources are not serious. However when particular regions or a particular earthquake is studied further improvement in epicentral determination become necessary.

2.3 Focal Depth of Earthquakes in Iran

As the interests of the scientist in the study of the area becomes more specific, the Focal depth of earthquakes becomes an important parameter. The depth of earthquakes prior to 1950 is not known accurately except for a few cases, beyond the fact that most are shallow, i.e. between 0 and about 60 Km. depth. The poor reliability of depth calculations is mainly a result of several factors : inaccurate arrival time data due to inadequate instruments as well as reading processes, error in travel time tables already mentioned, determinations and imperfectly known crustal structural conditions. For a more precise estimation of focal depth it is necessary to re examine the original seismograms for p and pP arrivals. This has been done here for a few cases where magnitude calculations required a knowledge of focal depth by means of (pP-P) in agreement with travel time tables (Herring 1968).

2.4 Magnitude of the Earthquakes

Knowledge of the magnitude of an earthquake is essential for the study of regional seismicity. For many events the magnitudes have been calculated by different seismological centres; for other events for which magnitudes are not available, it was necessary to find an approximate value.

The list of earthquake^s given here shows the arithmetic^{al} average magnitudes of events for which more than one determination exists; the number of determinations by seismic stations is given in brackets after the magnitude. Surface wave determinations are marked by the letter s and body waves by B following the magnitude. When the station does not indicate the source of magnitude it is shown without a subscript. All magnitudes for ISS epicentres have been found by the method indicated in Section 7. Occasionally seismic stations report amplitude and period alone. In those cases values are used to calculate magnitude by the method of Karnik 1969, which conformed with the general concept of magnitude. Richter, 1935, Gutenberg-Richter, 1956 a,b. The focal depth correction applied, was $+ .008(h-20)$, where, h is the focal depth in Km. The station correction for available cases is as in the work by Karnik and for the others is found by the procedure indicated by him.

In the list given, nearly all the earthquakes have an assigned magnitude, thus making^{it} possible the study of regional seismicity over a longer period of time.

3. Geographical Distribution of Epicentres in Iran, 1913-1960, ISS

The location of earthquakes in Iran and surrounding areas (24° - 40° N, 42° - 64° E) between the years 1913 and 1960, as given by the Index Catalogues of Bellamy (1936 and 1947), Kew Observatory (1953 and 1957) and ISS (1949 to 1960), are illustrated in the following figures : Fig. 3.1:1913-1930; Fig. 3.2:1931-35; Fig. 3.3:1936-42; Fig. 3.4:1943-48; Fig. 3.5:1949-54; Fig. 3.6 : 1955-60; Fig. 3.7:1913-60.

In these figures the epicentre of each event is given by the centre of a circle; in the case of several events at the same location, a number indicating the number of earthquakes is adjoined to the circle. The size of circle used is everywhere the same and is arbitrarily chosen.

This representation provides a picture of the geographical distribution of epicentres in the area under study. The information obtained is not new but is a necessary background to any further study. It does not attempt to answer any particular problem about earthquakes in Iran. At the present time there is a need for more accurate and detailed studies. The data of ISS constitutes only part of the information about these earthquakes; the accuracy of this information is not questioned here, but will be examined separately, as it forms part of the more general problem of improving earthquake data. It is hoped that the work presented here, when combined with other information, may be a useful basis for a discussion of a number of earthquake problems. For example, one may consider the correlation of the ISS data with the data from other centres as this may improve the actual location of events and help in the understanding of the problem; or one may compare the frequency of events at different locations with the rate of energy flux; or one may study the geological and topographical conditions of earthquake distribution.

If one assumes that the ISS data is reasonably homogeneous in each period of observation, and that the number of events in a unit area during a unit of time, is significant of earthquake potential with respect to the whole area, the following remarks could be tentatively made :

1) In Southern and South-Western Iran (along the Zagros) the frequency of earthquakes is highest for the country and seems regular both in terms of time and of geographical location;

2) In Northern Iran (Khorasan-Turkmenia, Alborz-Southern Caspian Sea, Azarbaijan) the earthquake frequency is less high than in (1).

There also appears to be some regularity.

3) In East Iran the earthquake frequency seems less than in regions (1) and (2), but higher than in the central parts of Iran.

Captions for Figures

Figs. 3.1-7 : Centre of circle represents epicentre location.

Number indicates number of events at same location.

Fig. 3.1 Insert N number of earthquakes

$\sum N_i$ = Cumulative number of earthquakes.

Fig. 3.7 : Insert

N and $\sum N_i$ as shown in Fig. x

Lower insert shows number of earthquakes per $2^\circ \times 2^\circ$ area.

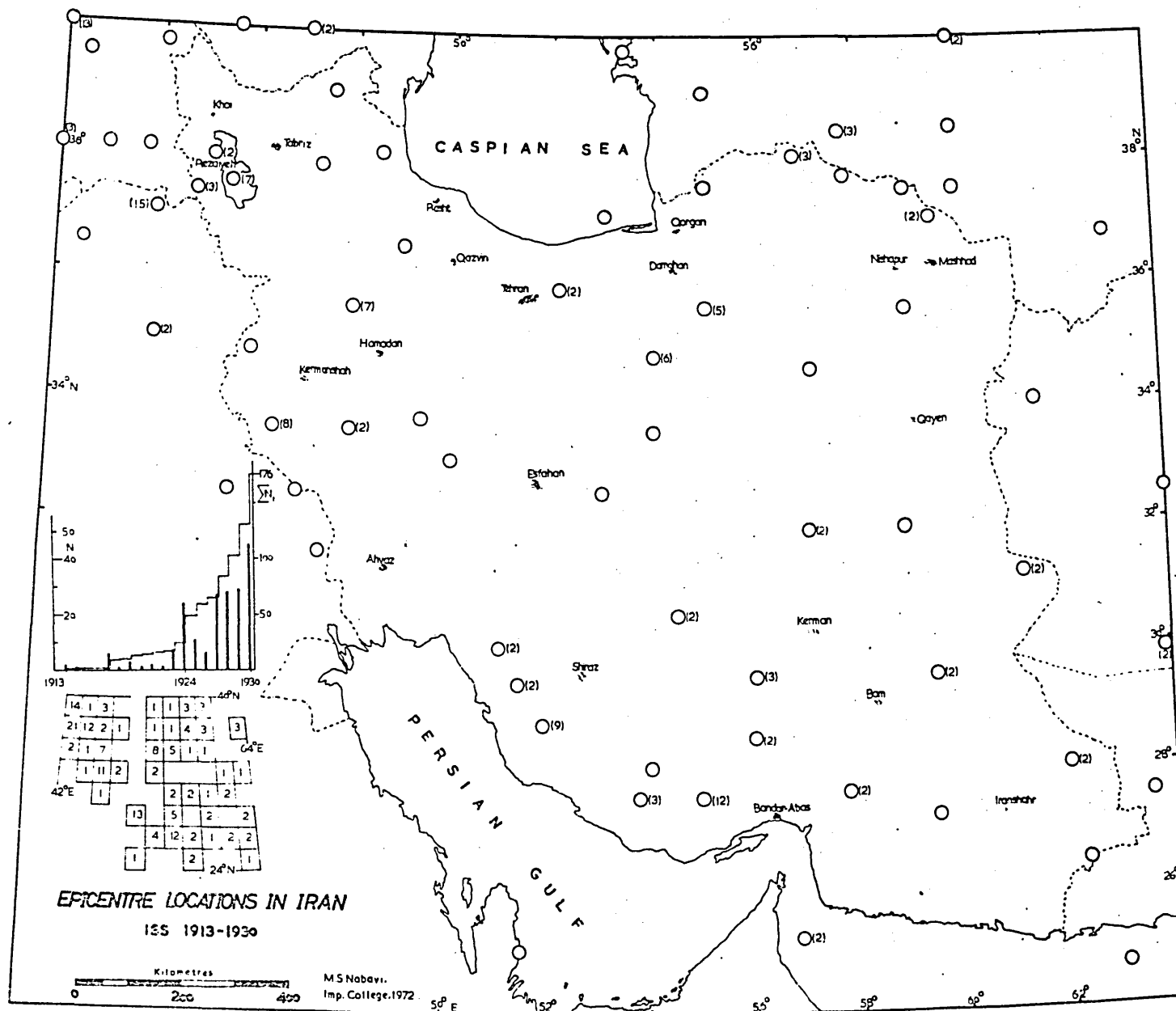


Fig. 1 3.1

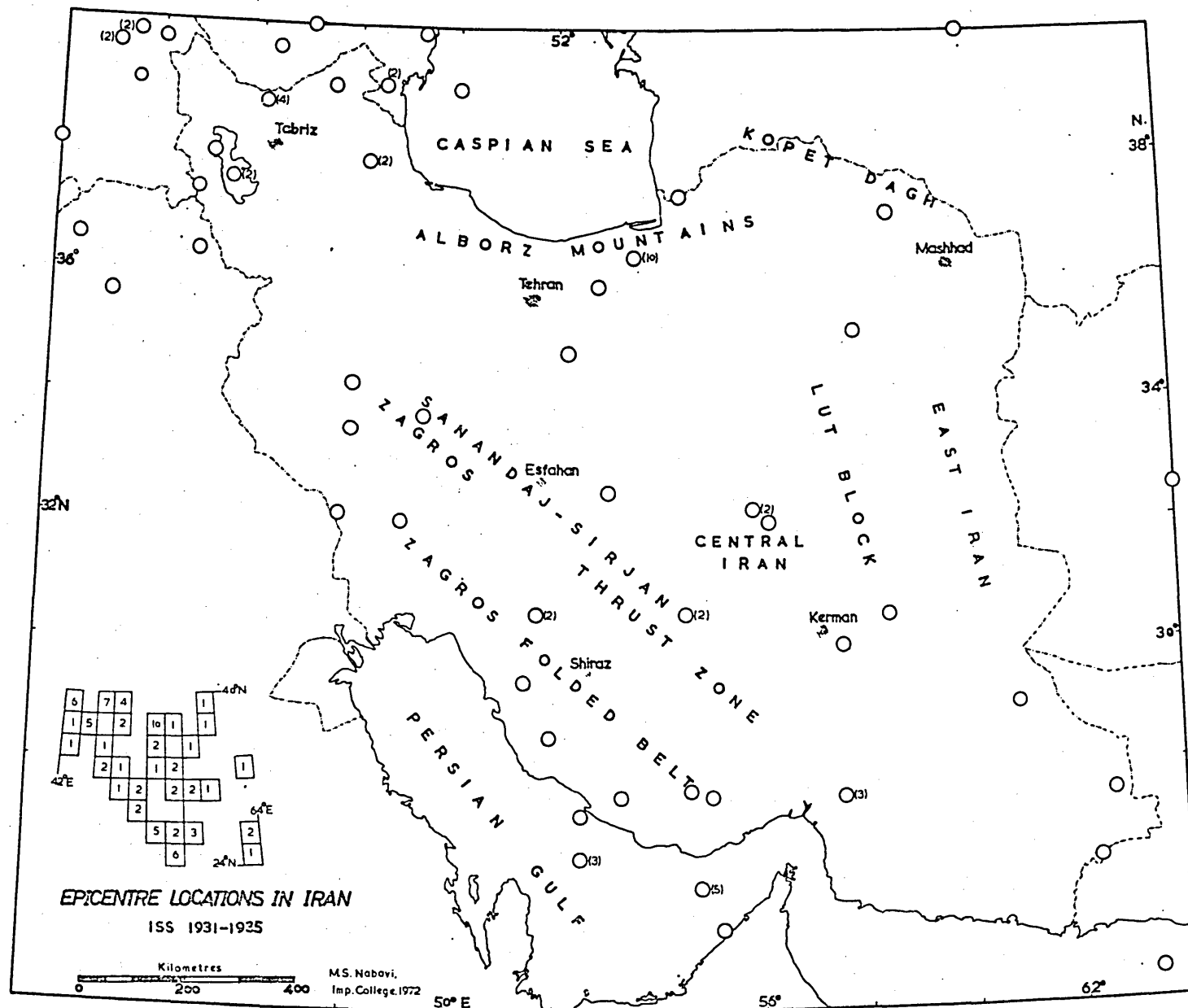
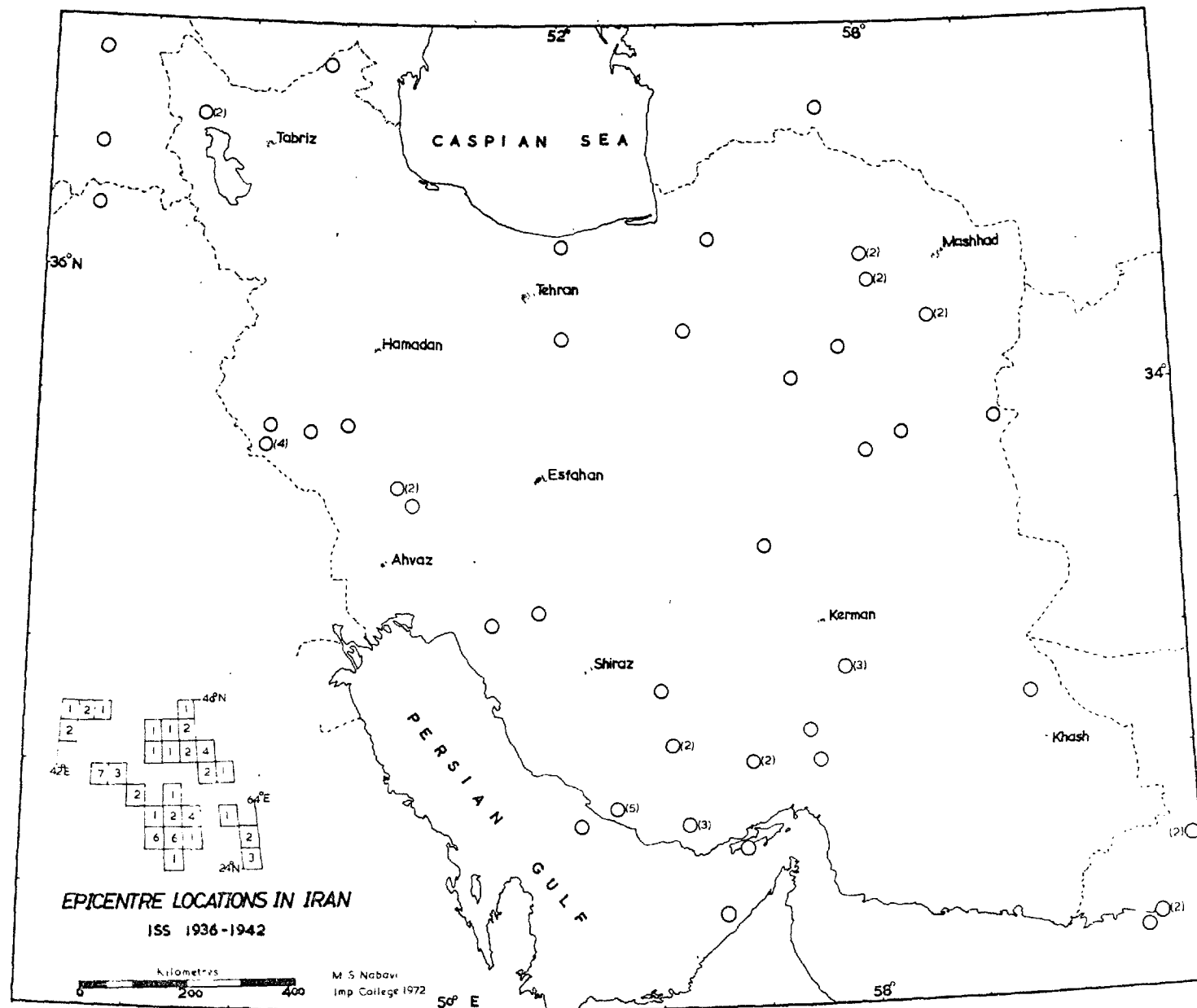


Fig. 3.2



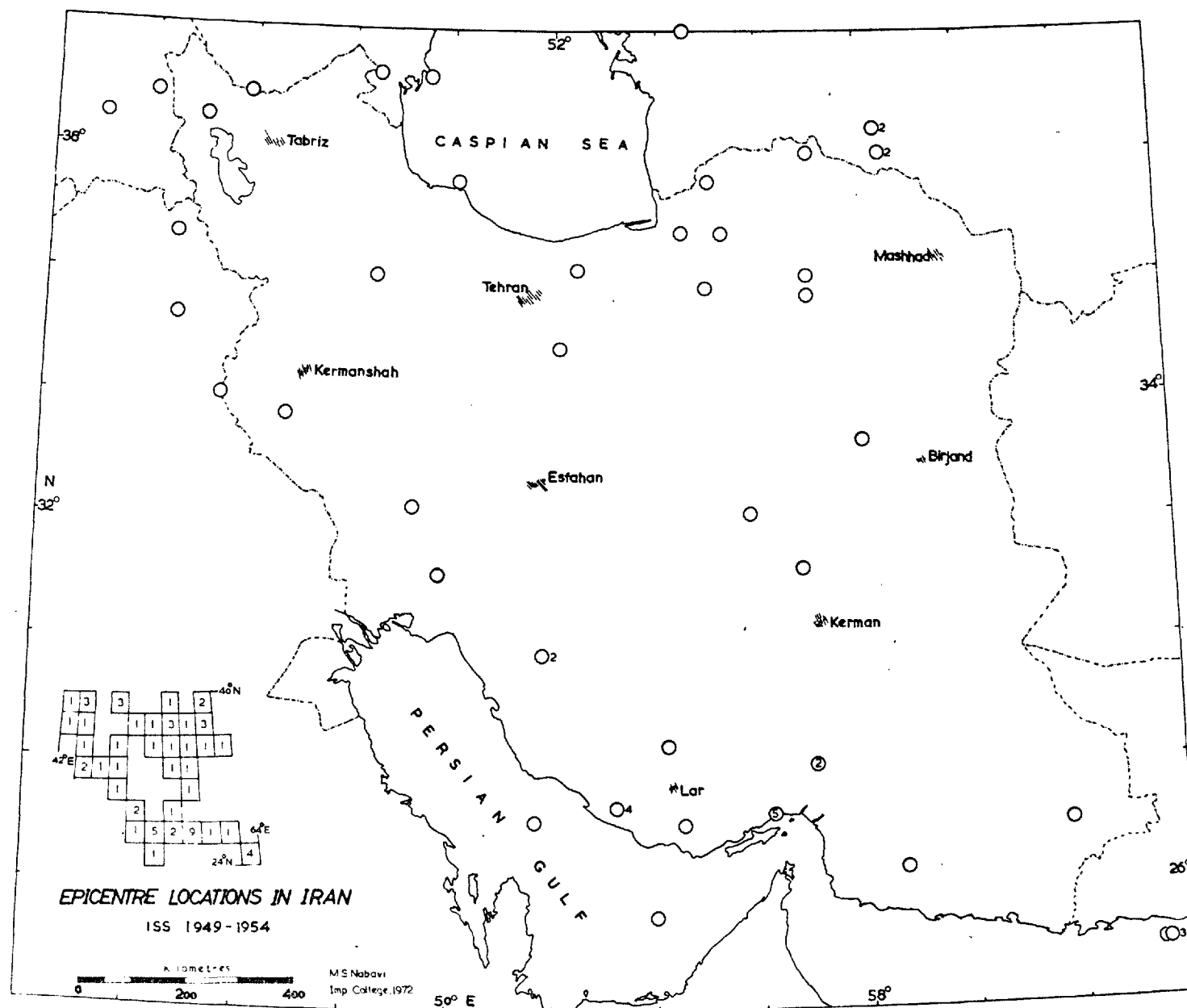


Fig. 3.5

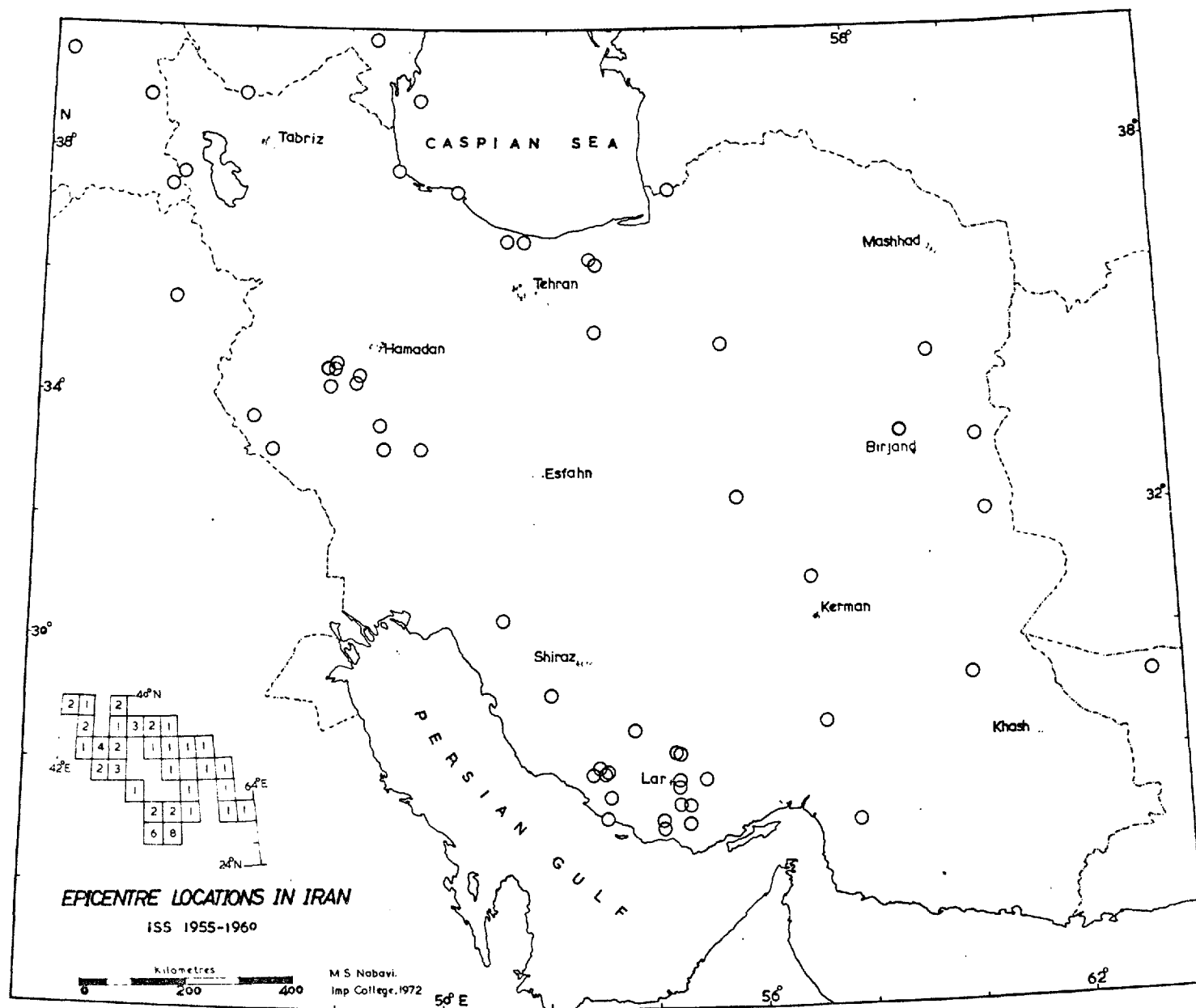


Fig. 3.6

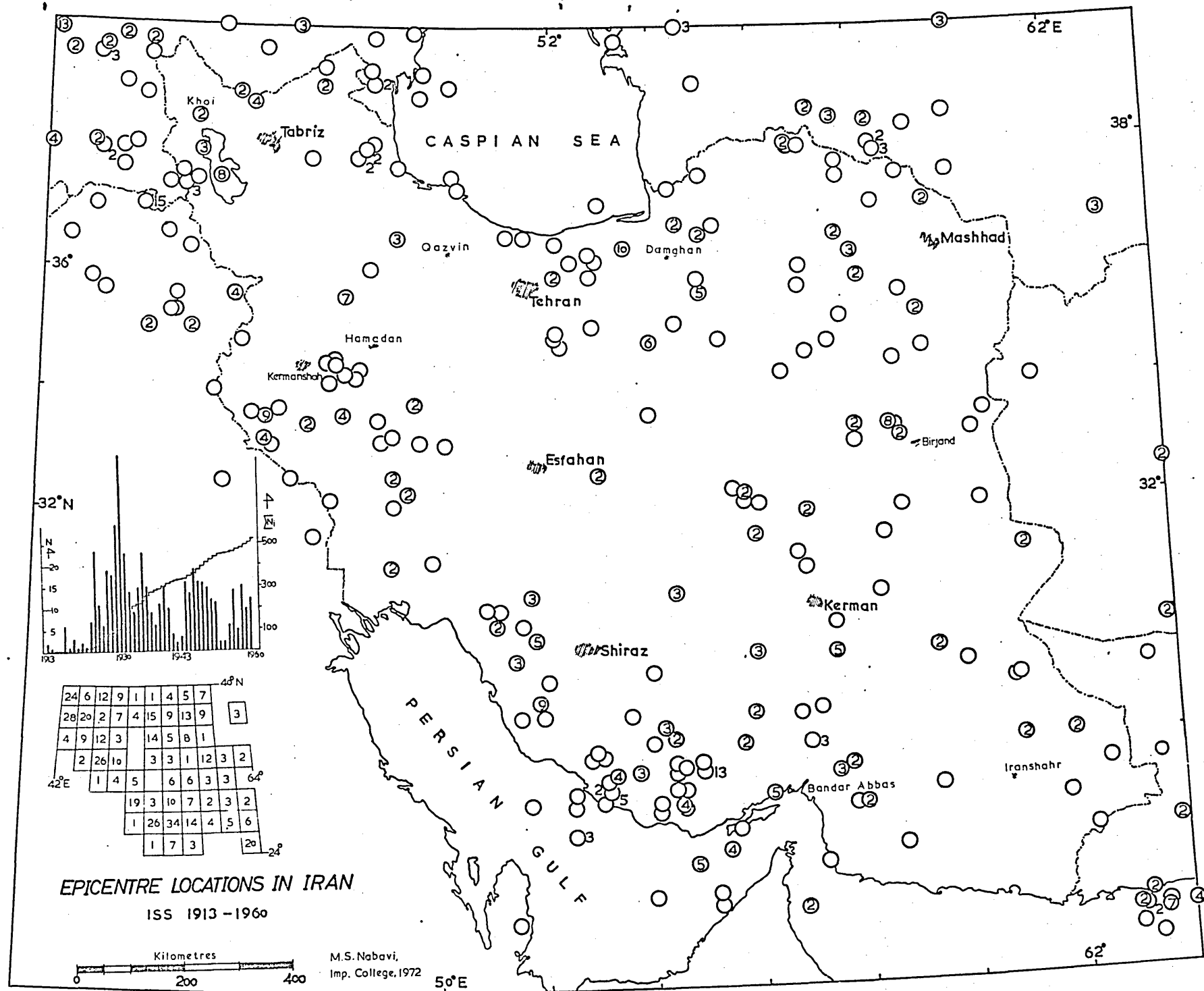


Fig. 3.7

4. The Seismic Activity of Iran between 1961 and 1971

Since the beginning of instrumental recording of earthquakes in Iran and in adjoining countries, it has been observed that the focal depths are almost always less than 100 Km. The majority of earthquakes have taken place in the crustal structure near the Mohorovic discontinuity. Shallow focus earthquakes are known to be mainly the result of tectonic processes. For this category of earthquakes, various authors use the term 'earthquake size' defined on the basis of the volume (V) of rock material participating in the earthquake: Beniof 1949, 1951 (a,b); Bullen 1953, 1955; Tsuboi 1956. The concept of earthquake volume was examined in a number of regions (Sath and Duda, 1964; Utsu and Seki, 1955; Utsu, 1961); and several different methods of assessing (V) have been proposed. Using this volume of (V), a number of relationships between magnitude (M) of respective earthquakes and (V) have been derived. These relationships differed from each other because of two basic reasons. On the one hand, both (V) and (M) were approximate measurements; and on the other hand these studies were made in different regions which were not all structurally comparable. Similar studies are as yet lacking for Iran, even though this type of information is needed for the study of seismicity and seismotectonics. It is for this reason that the data from 1961 to 1971 was examined, in particular the areal extent of aftershocks of the larger earthquakes. Let us examine the area obtained by representing magnitude (M) on the basis of the empirical relationship : $\log D = 0.5 (M) - 1.3$ where D is the diameter of a circle in Km. with the centre located at the earthquake epicentre. The earthquake parameters were chosen from the USCGS in general and for a few cases from ISO and Nowroozi 1971 (Table 2.1). For the period 1961 to 1971 and for different regions of Iran the data is shown in the following figures :

Fig. 4.1 - shows the seismic activity of an area from $34-40^{\circ}\text{N}$ and $43-53^{\circ}\text{E}$, including north west Iran during the period July 1961 to June 1971. As the figure shows, a large earthquake has been located near Tehran and a number of other earthquakes are distributed around the west coast of the Caspian Sea, in the north west and southern area, while the region of Zanzan seems to be quiet. The region of north western Iran seems to be active again after a relatively low activity since 1930. There is some evidence for seismic activity in the Zanzan-Qazvin region before September 1962 (see 3).

Fig. 4.2 is a selected area from Fig. 4.1, in the $(34-37^{\circ}\text{N}, 48-51^{\circ}\text{E})$ starting with the great earthquake of September 1, 1962 to the end of December 1962; it shows the pattern and growth of activity in the area. It can be seen from this figure that the activity was aligned in an east west direction, parallel to the fault scarp reported by a number of authors.

Fig. 4.3 shows the same area as Fig. 4.2 during the later period January 1963 to June 1971; it is obvious that the stored strain energy is being released over a very large area rather than being restricted simply to the epicentral region. However the structural implications of this pattern of energy release are not the subject of this discussion.

Fig. 4.4 shows the area adjoining Fig. 4.1 to the south in the region $29-34^{\circ}\text{N}$ $44-53^{\circ}\text{E}$. The area has been divided into three subsections; the western section, Arabia, is absolutely quiet except along its northern edge, and similarly with the eastern portion (part of central Iran) which is remarkably quiet but the central part along the Zagros Mountains is very active; this zone is delineated by the seismicity width of about 80 to 120 Km.

Fig. 4.5 shows the active zone of Fig. 4.4.

Fig. 4.6 shows the southern part of Iran and the southern part of the Zagros

($26-29^{\circ}\text{N}$, $53-58^{\circ}\text{E}$) and indicates that today this is the most active region of the area under study. Earthquakes occur in this area very frequently but their magnitude is not as large as that of the Buyin Zara earthquake or of the Dasht-Bayaz. The distribution of seismic activity is illustrated in this diagram with respect to that space and time, although the latter is not discussed here in any detail. However, this distribution of activity has been approximately the same for the last 48 years.

Fig. 4.7 shows an area taken from Fig. 4.6 bounded by $26-29^{\circ}\text{N}$, $53-57^{\circ}\text{E}$ which includes an earthquake of magnitude 6.8 which occurred on June 11, 1961, and also the seismic activity preceding and following the event through June 1961. The aftershocks activity was concentrated to the east of the epicentre of the main shock and may be related to the earthquake of April 11, 1972 at Qir which lies about 160Km. to the north west.

Fig. 4.8 is a continuation of Fig. 4.6 to the south west of Zagros covering the area $25-29^{\circ}\text{N}$, $58-63\frac{1}{2}^{\circ}\text{E}$. It is a part of southern Iran, which appears to be quiescent, distinct from its western neighbour as shown by the seismicity for the same period July 1961 to June 1971 of the same area (Fig. 4.6). The structure of this region and the southern Zagros seems to be different from the seismological point of view.

Fig. 4.9 ($29-32^{\circ}\text{N}$, $57-62^{\circ}\text{E}$) shows the eastern part of Iran and its seismic activity is plotted for the period July 1961 to June 1971. This part of the country is absolutely quiet except in the neighbourhood of the Zagros.

Fig. 4.10 ($32-36^{\circ}\text{N}$, $57-61^{\circ}\text{E}$) shows the area of eastern Iran (Dasht-Bayaz) and the activity of the area which began with an earthquake of magnitude $M=6.0$ on April 1st 1962 and continuing to August 29, 1968. This area shows an activity to the north, between Qain and Birjand. The released energy (ergs) has been plotted as a function of time for the period of observation.

Fig. 4.11 is the same as Fig. 4.10 and shows the seismic activity which starts with an earthquake on August 30 1968 and which is followed by the destructive earthquakes of Dasht-Bayaz on August 30 and Ferdaus on September 1 and up to June 1971. The figure shows that the epicentres of this activity are aligned in an east west direction with a possible ⁿbranch to the north west at the western limit of activity. This alignment seems to be in good agreement with the observed faulting of the area of the Dasht-Bayaz earthquake reported by many authors (see BSSA, 59, 1969, 1758). From this figure it can be seen that the activity following the main shock is concentrated in a line between Ferdaus and Dasht-Bayaz. The Dasht-Bayaz-Ferdaus region seems to have suffered other large earthquakes before 1968, but probably not at the same epicentre (see Tables 2.1).

Fig. 4.12 illustrates the seismic activity of the north-east part of Iran for the decade July 1961 to June 1971. From the pattern of the time and space distribution of the epicentres during this period it can be seen that the area has been active, and that the activity is concentrated in the southern Kopet-dag Mountains, in northern Khorassan.

Fig. 4.13 has been taken from Fig. 4.12 starting with main earthquake of the area of July 30 1970 to June 1971. It shows that the later activity migrated to the south west of the epicentre of the main shock.

Fig. 4.14 ($29-36^{\circ}\text{N}$, $53-57^{\circ}\text{E}$) including Turud and Yazd, shows scattered activity in the area but of small magnitude.

Thus, by comparing the seismicity of various areas with the activity over the past ten years it has been shown that it is impossible to assess the seismicity of the region with such a short period sample. It appears necessary to have well documented information for the area for several centuries in order to make an accurate assessment of the seismicity of the area. For example

great earthquakes such as Buyin-Zara and Dasht-Bayaz have not been repeated during the past 70 years. The Turud area, in this period has been completely quiet yet a large earthquake (6-7 magnitude) occurred there in 1953.

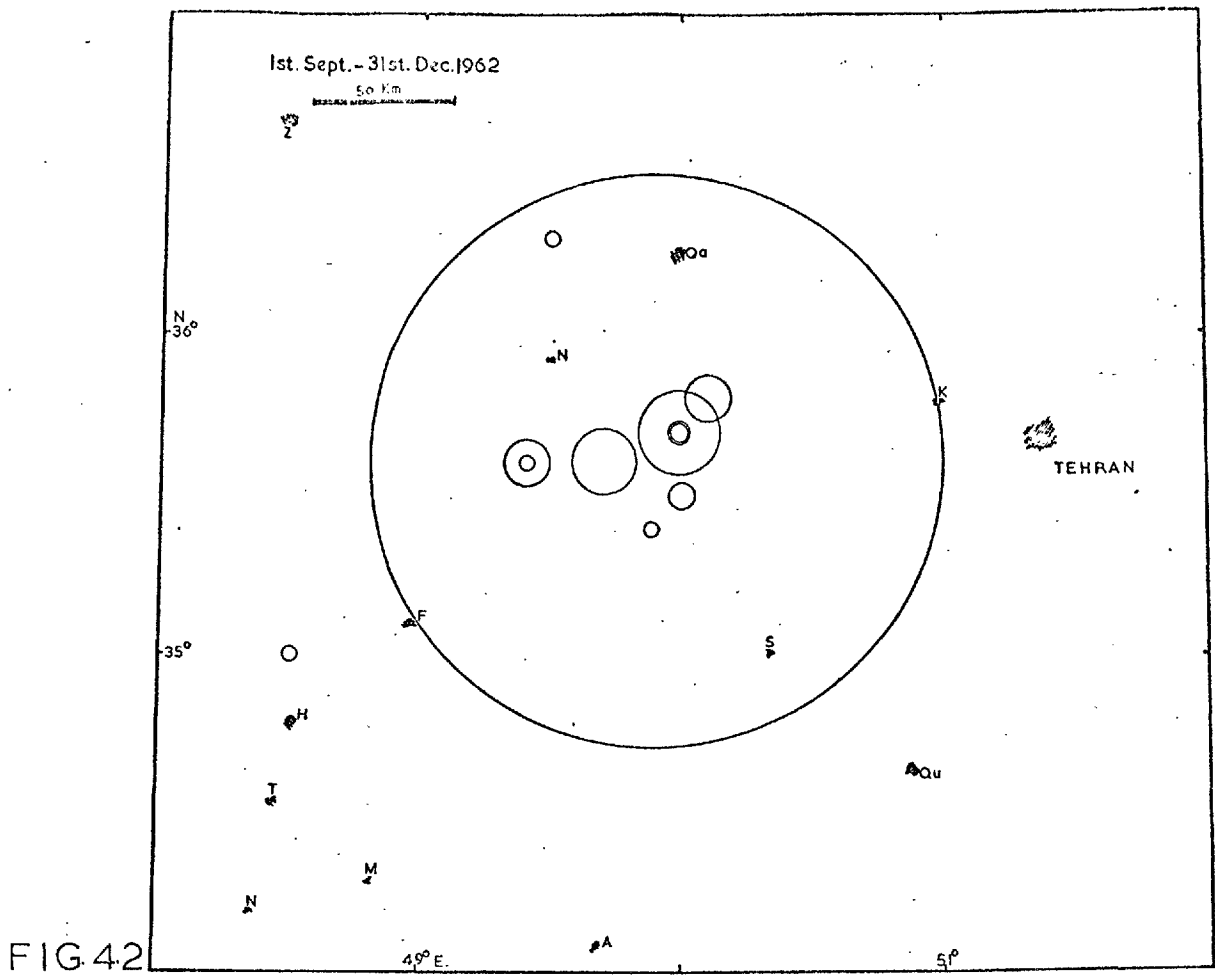


FIG 42

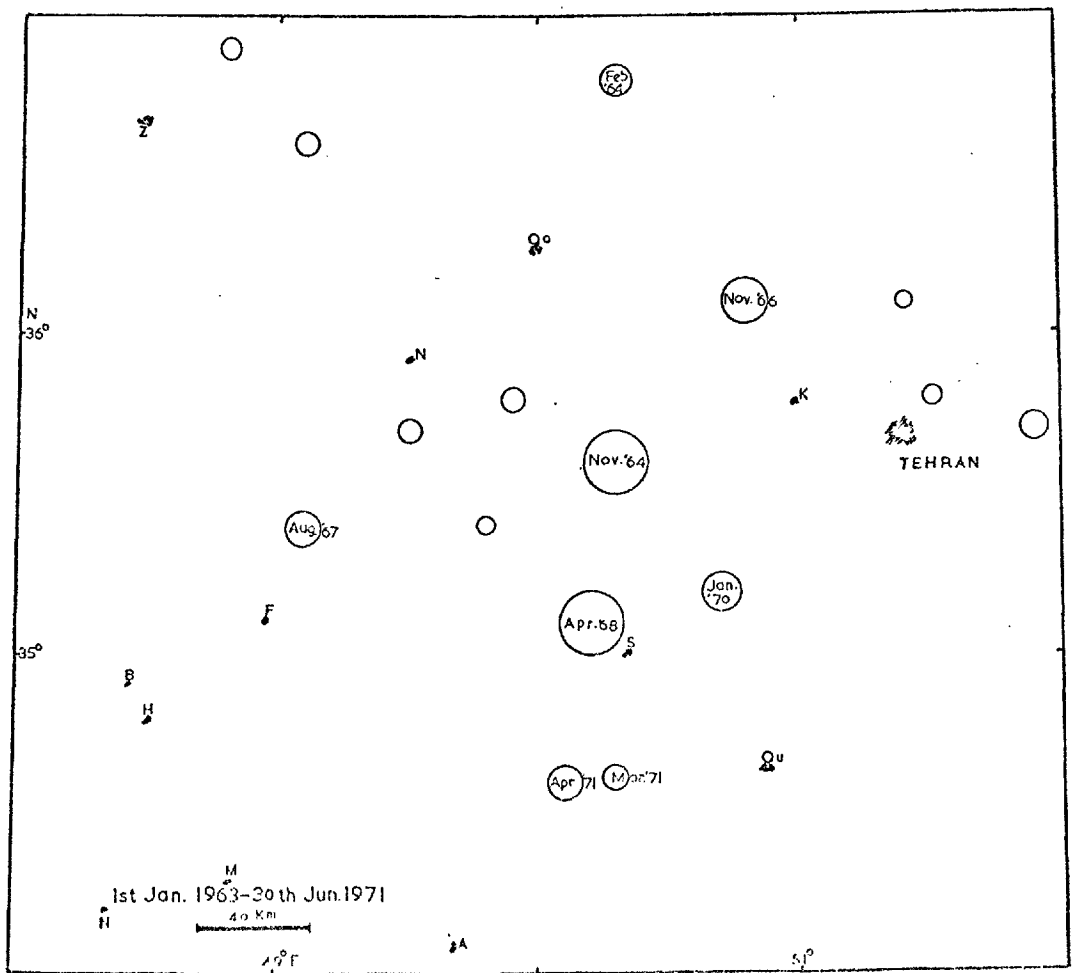


FIG 43

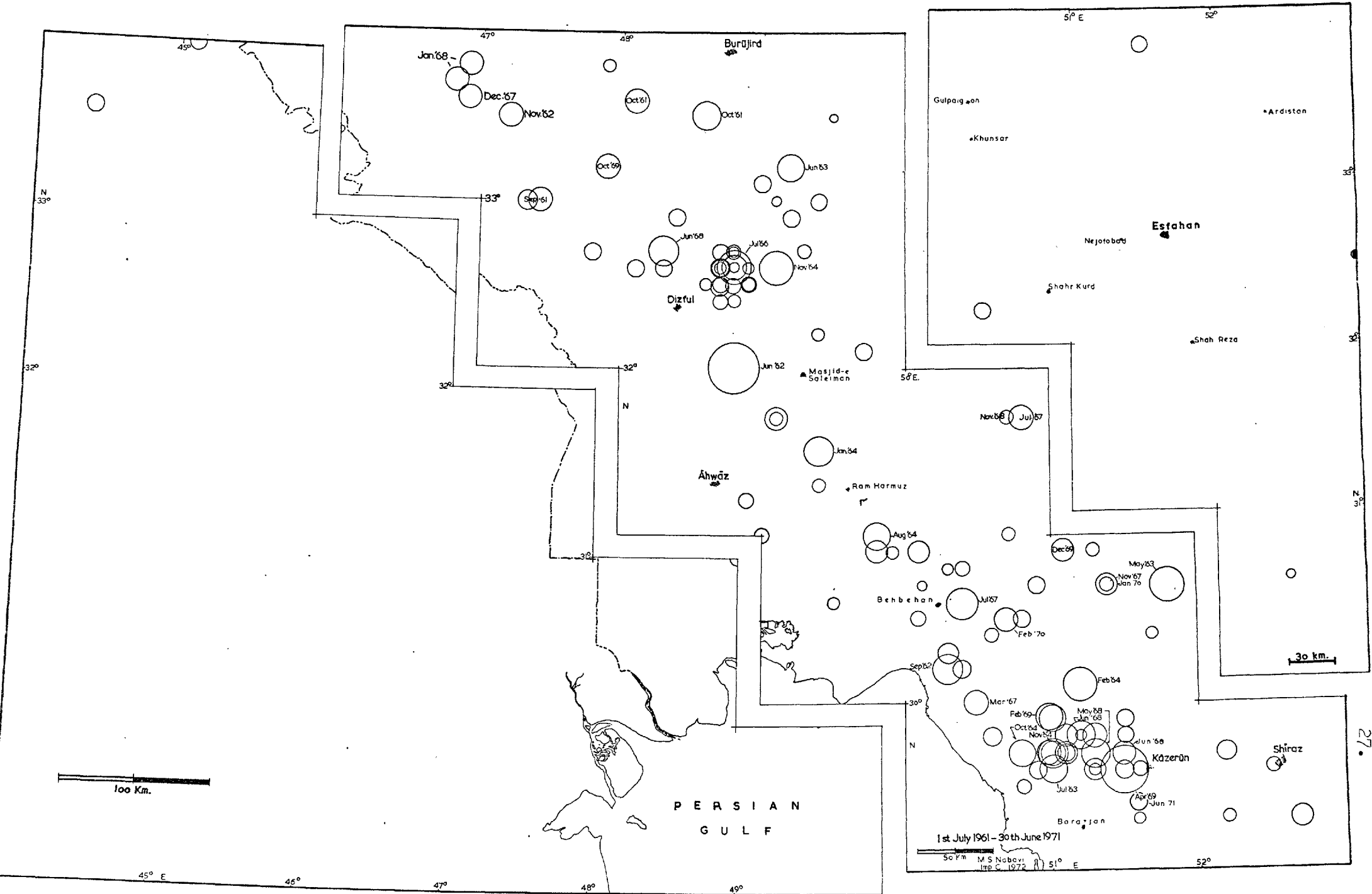
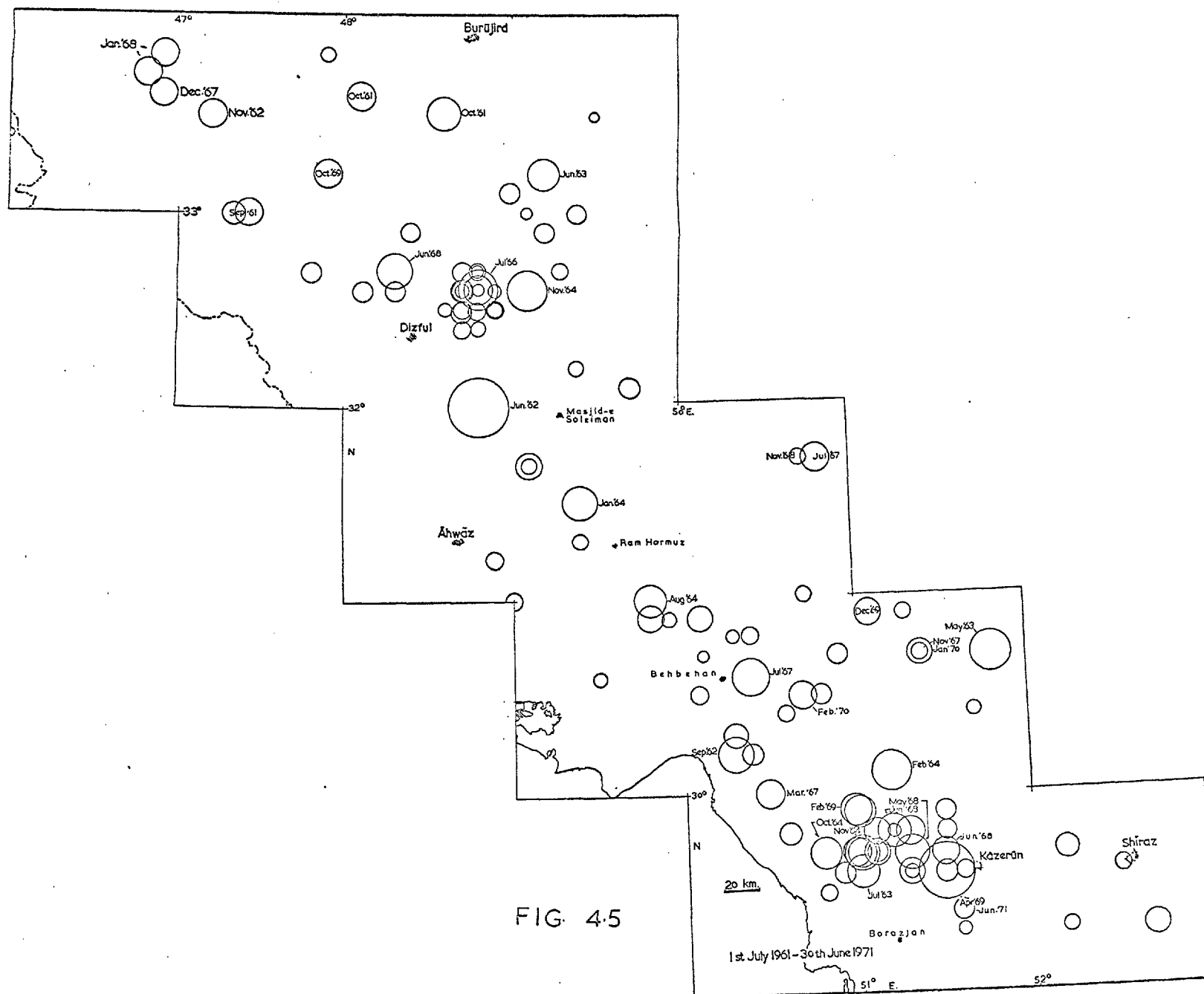


Fig. 4.4



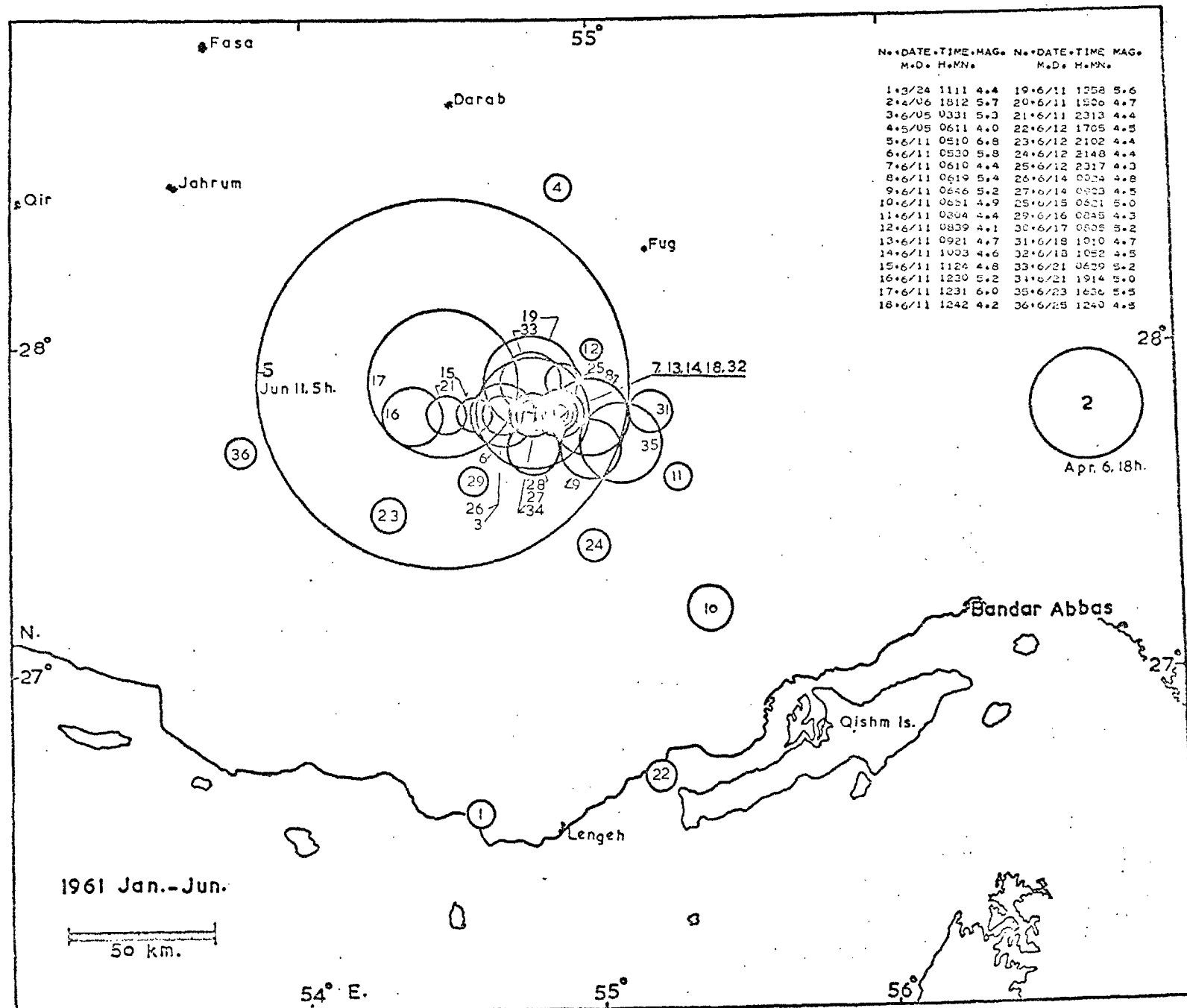


FIG. 4.7

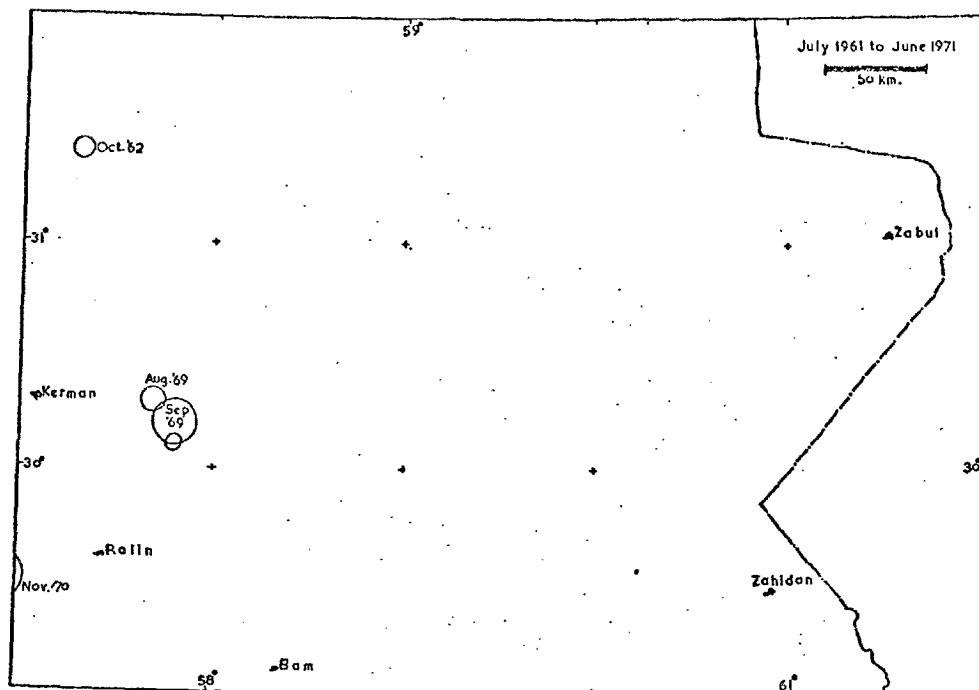


FIG. 4-9

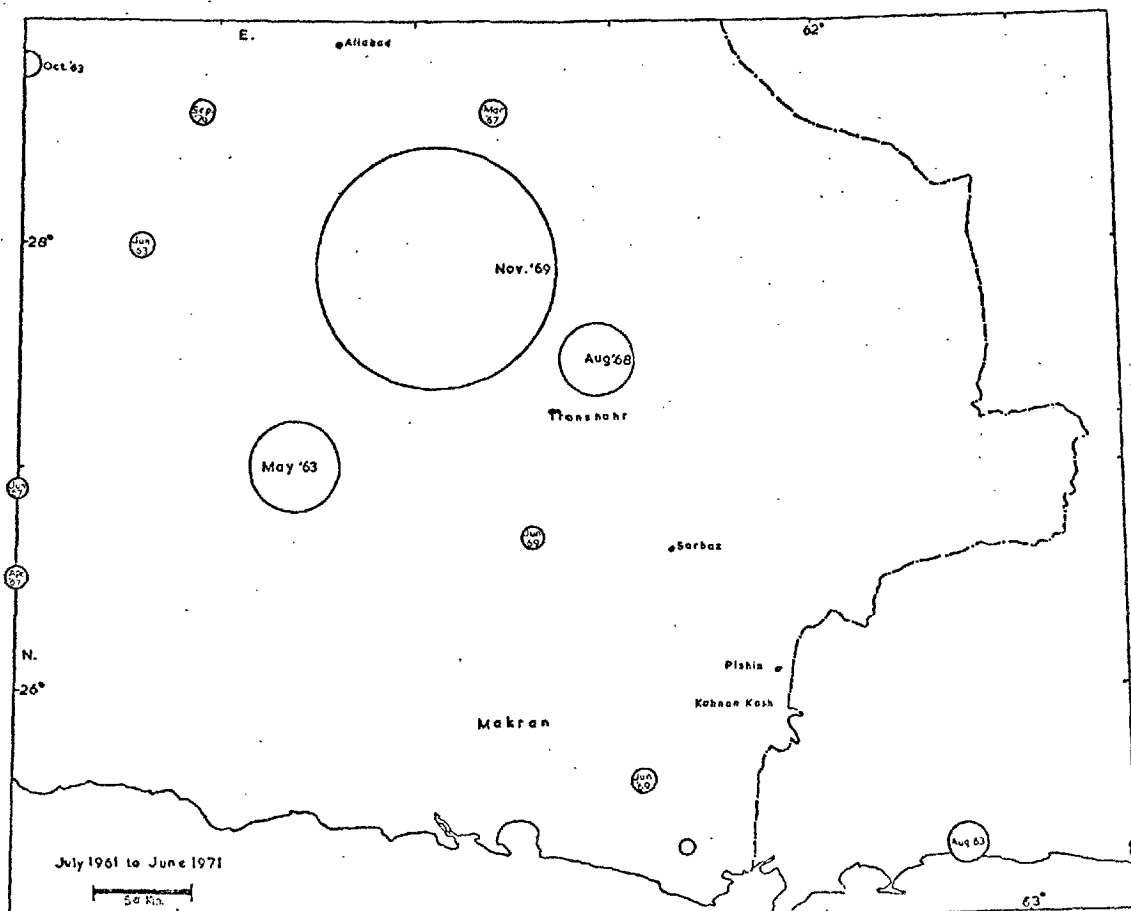


FIG. 4-8

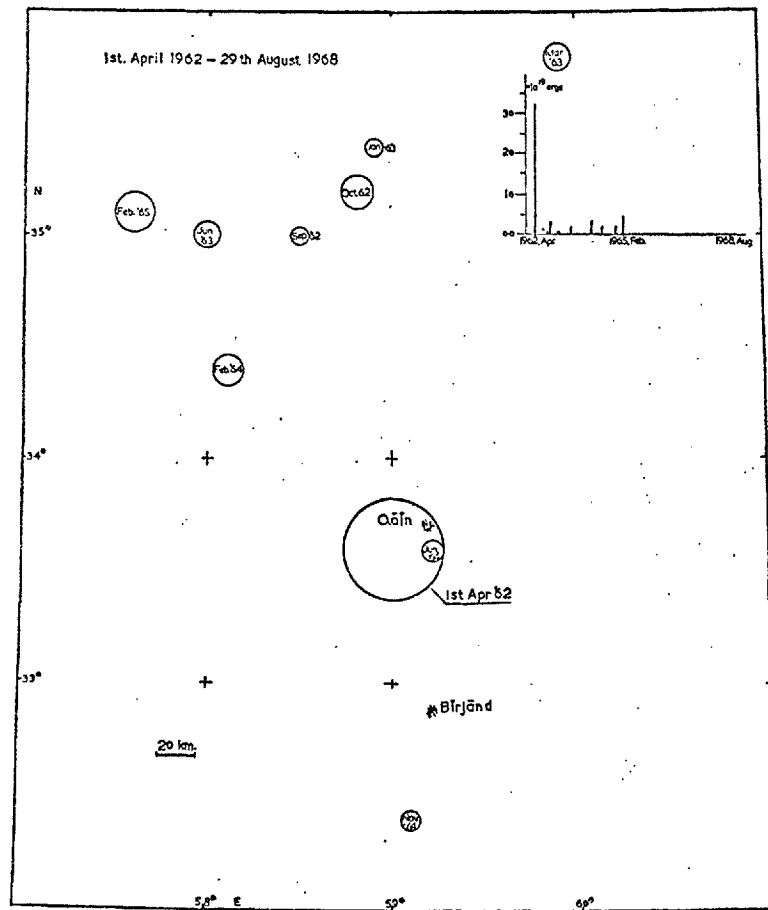


FIG. 4-10

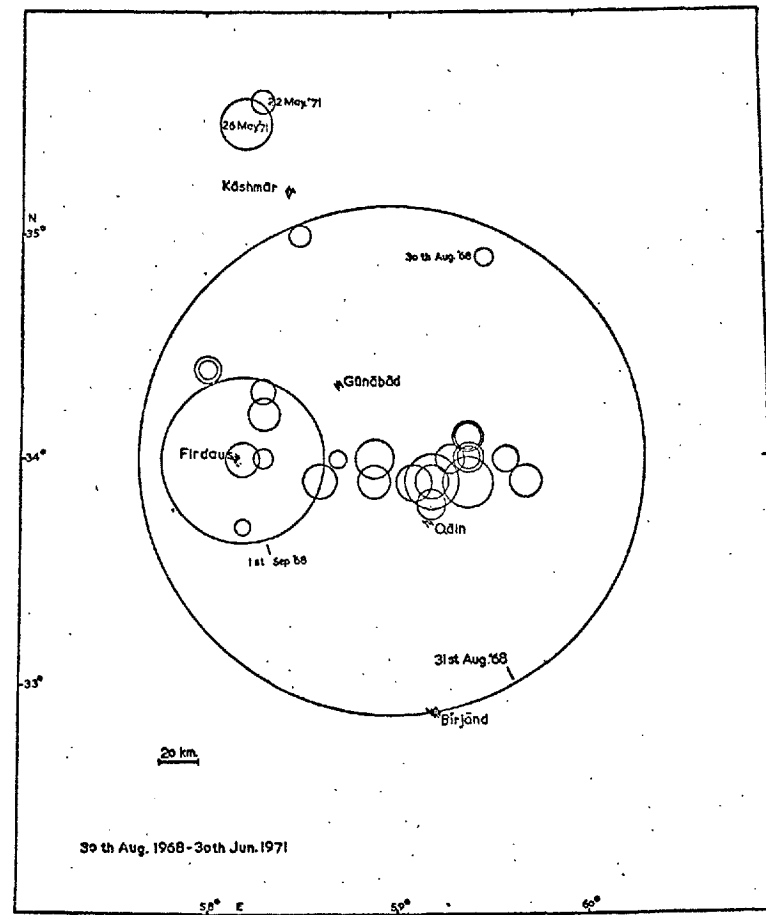


FIG. 4-11

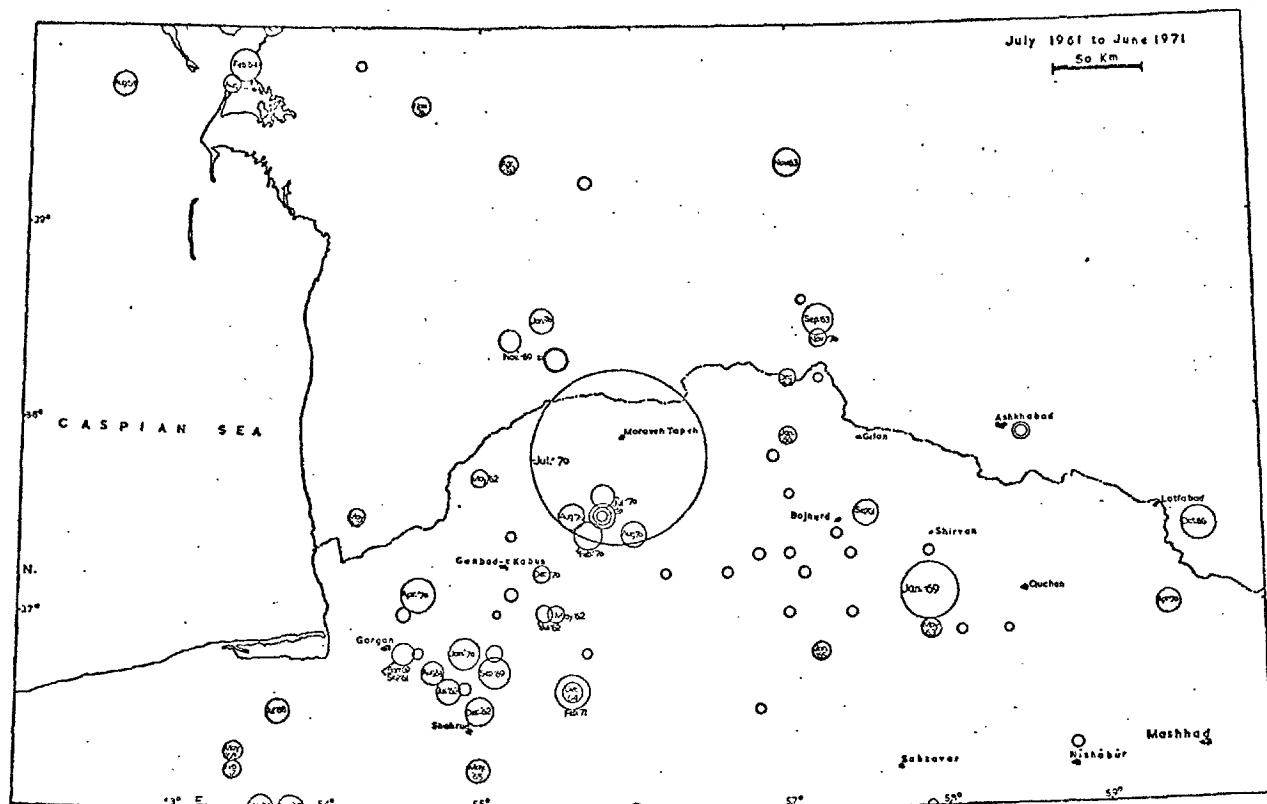


FIG. 4.12

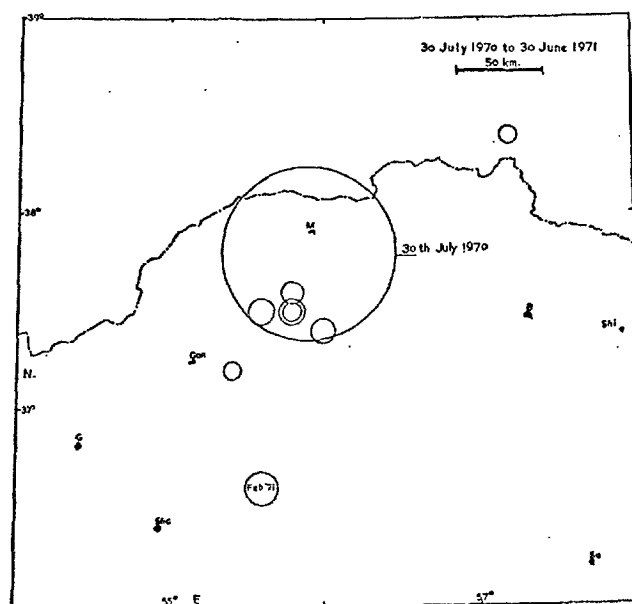


FIG. 4.13

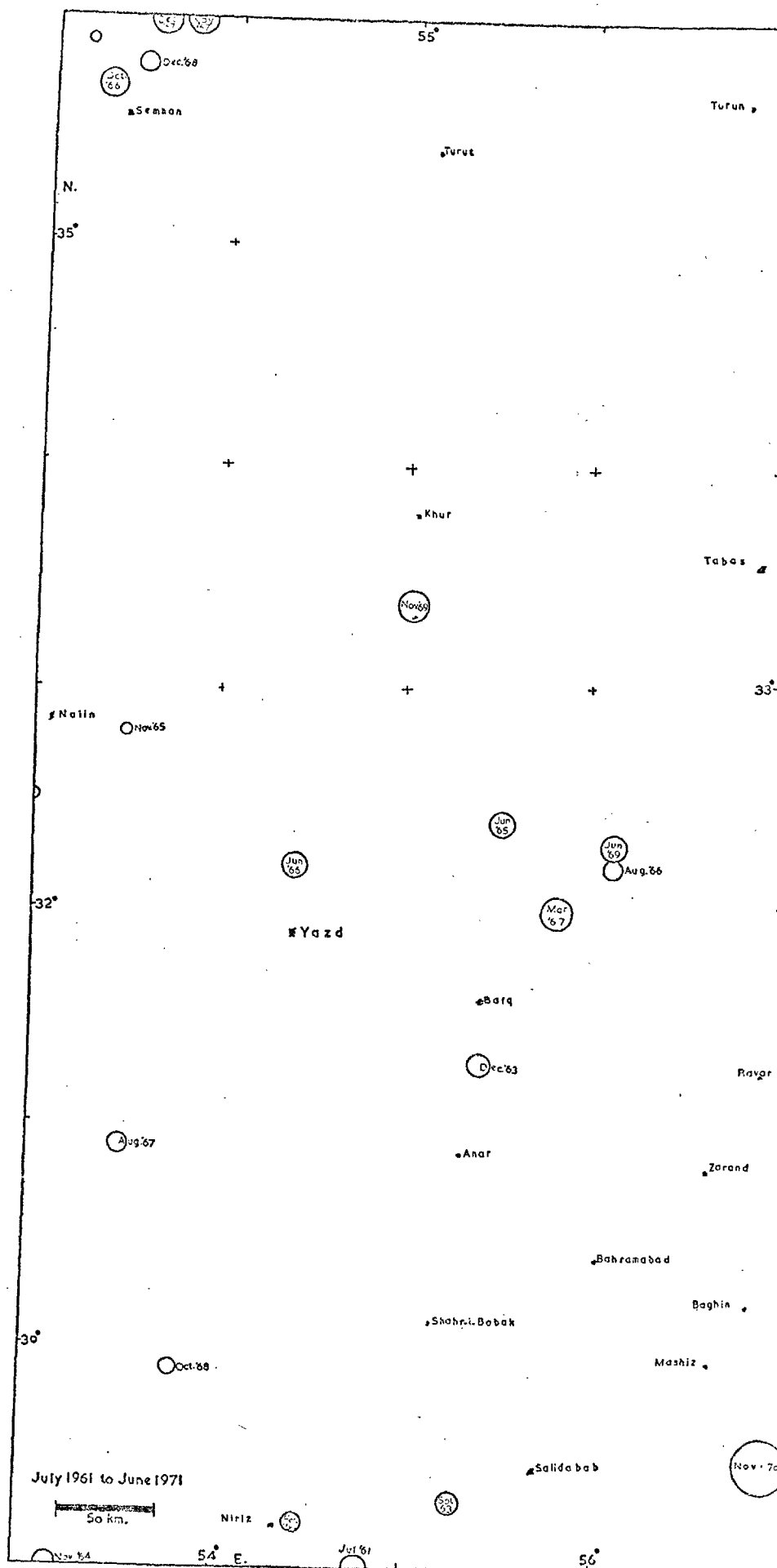


FIG. 4-14

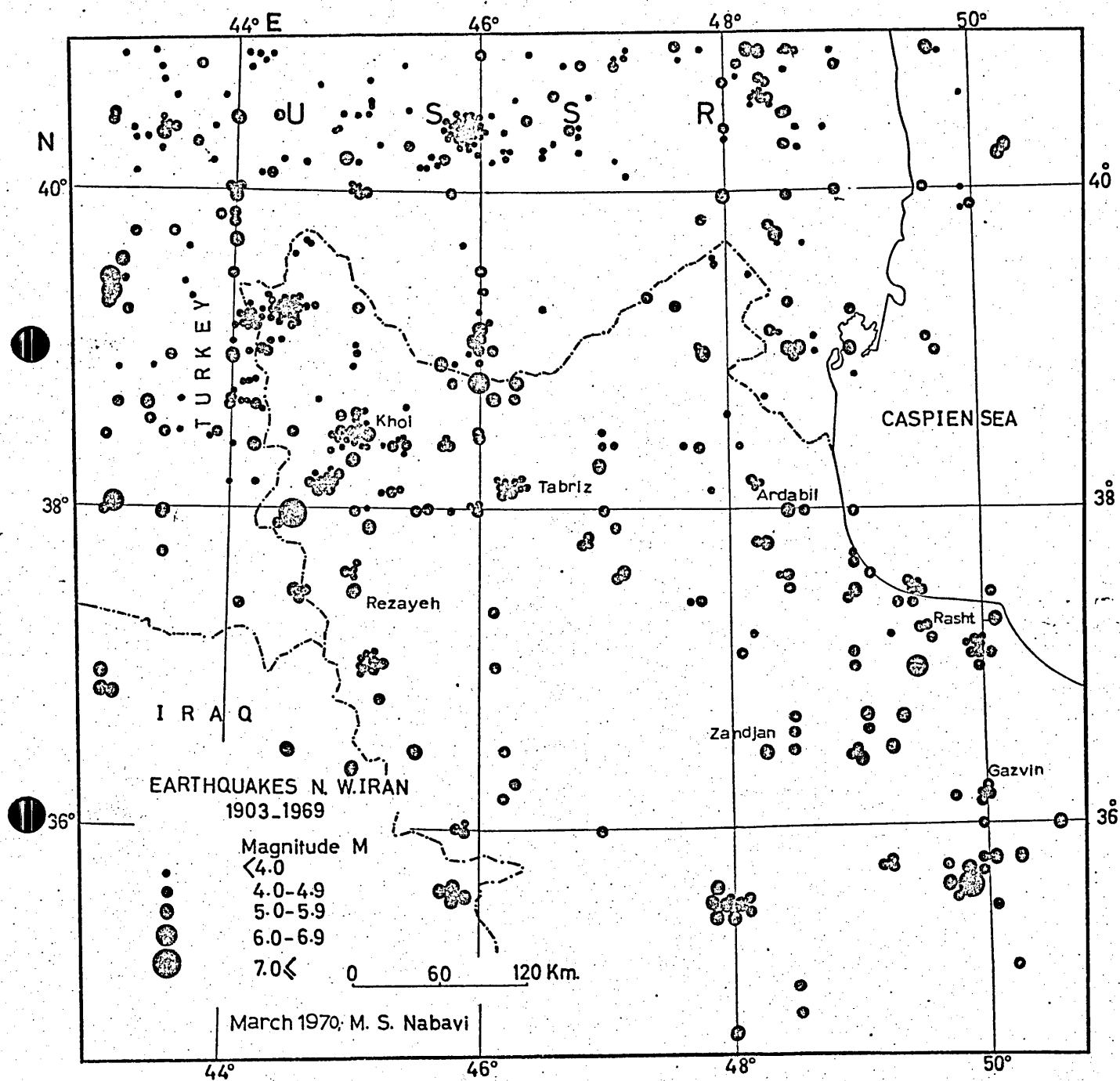


Fig. 4.16

5. Epicentre Location of Iranian Earthquakes for the Period 1913 - 1949

Numerous authors (see Herrine, 1968 a,b,c; Lilwall, 1969) have shown in the last decade that due to inaccurate travel time tables the location of earthquake epicentres has been very approximate. The true epicentral location of Iranian earthquakes is a problem to be resolved only by a precise study of the seismicity of the area.

However, in recent years, location techniques have improved appreciably as a result of many factors including the introduction of fast digital computers, the expansion of seismic networks, the increased sensitivity of instruments, the more accurate and reliable timing systems and lastly, the adoption of better travel time tables and processing techniques of the seismological centres.

A relocation program was undertaken by Nowroozi (1971) for the earthquakes in the area under study which occurred between the years 1950 and 1965. However, it is thought that the published location of Iranian earthquakes prior to 1950 are very inaccurate. Thus it was possible using the station readings reported by ISS and the new travel time tables in use at ISS to relocate the earthquakes from 1913 to 1949.

This work involved transferring ISS data for 451 earthquakes on to Hollerith cards (~ 8,000 cards) and resulted in new epicentral determinations for 297 of the events. These are presented in Table (5). The data for the remainder was so poor that no satisfactory solution could be obtained.

It should be recognised that this list is not necessarily absolutely correct due to the limitations of the timing systems and the, at times, poor quality of the data. However, the new presentations of the large events is in good agreement with macroseismic information.

The results can be appreciated by the reference to figures 5.1, 5.2 where a comparison of the new and old epicentral locations has been presented. The lateral shift (D in Km) in position has been plotted against the number of stations (N), and also against azimuth, (A , in degrees). It is obvious that the location of small events (N small) has been extremely altered whereas that of the larger events reported by many seismological centres was in agreement with our calculations within $\pm 10^\circ$.

It was found that small events occurring about the same time as a destructive earthquake should be assigned the same epicentral location on the assumption that they were aftershocks.

In the second figure the discrepancy in distance systematically varies with azimuth reflecting the non-uniform distribution of the reporting stations.

Events occurring in different periods as indicated on the diagrams were plotted with different symbols; there appears to be a slight systematic improvement in the locations for the later period.

These results cannot be considered final as a more exacting study of each event, and each station report could be expected to further improve the location. In particular, if the residuals of selected stations are calculated for large well located events, these can then be applied as corrections to the arrival times of the smaller events, and the epicentre relocated more accurately. Such a study is considered to be beyond the scope of this report.

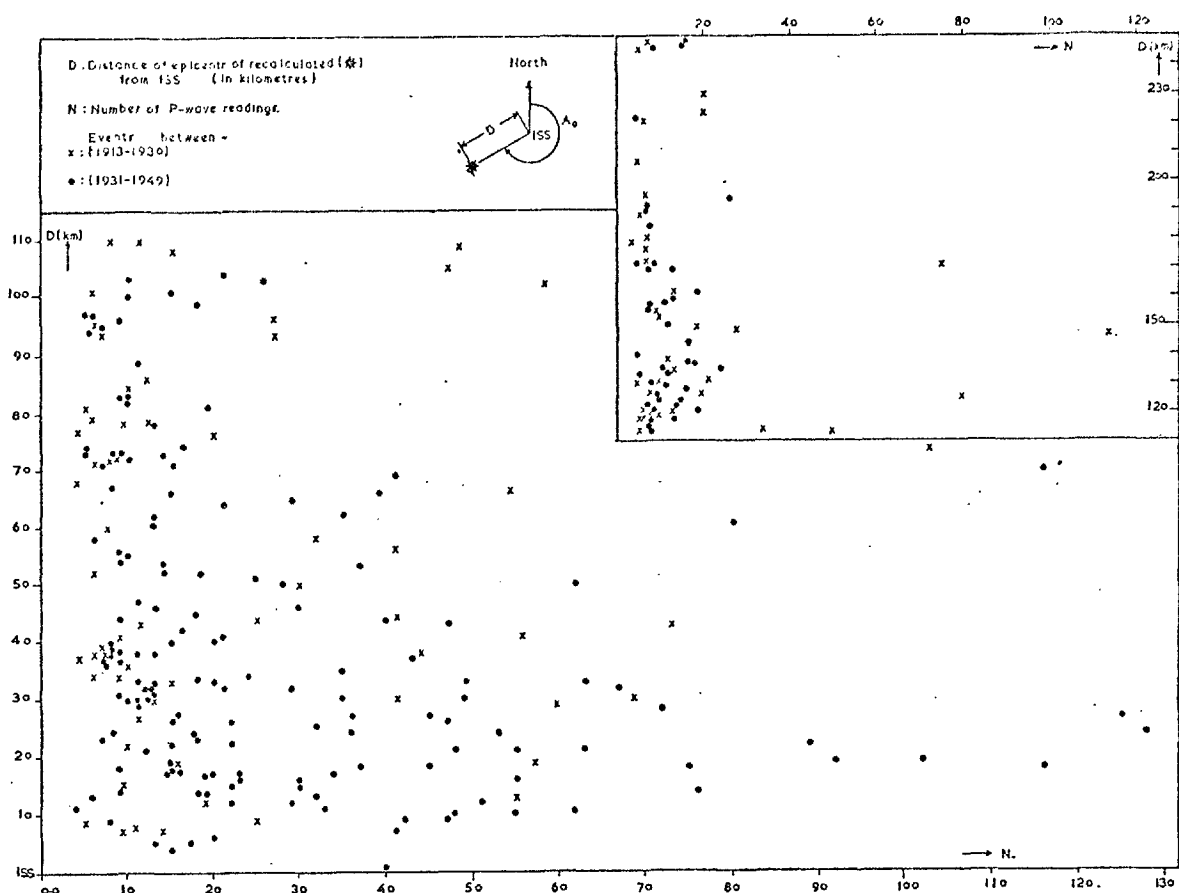


FIG. 5.1

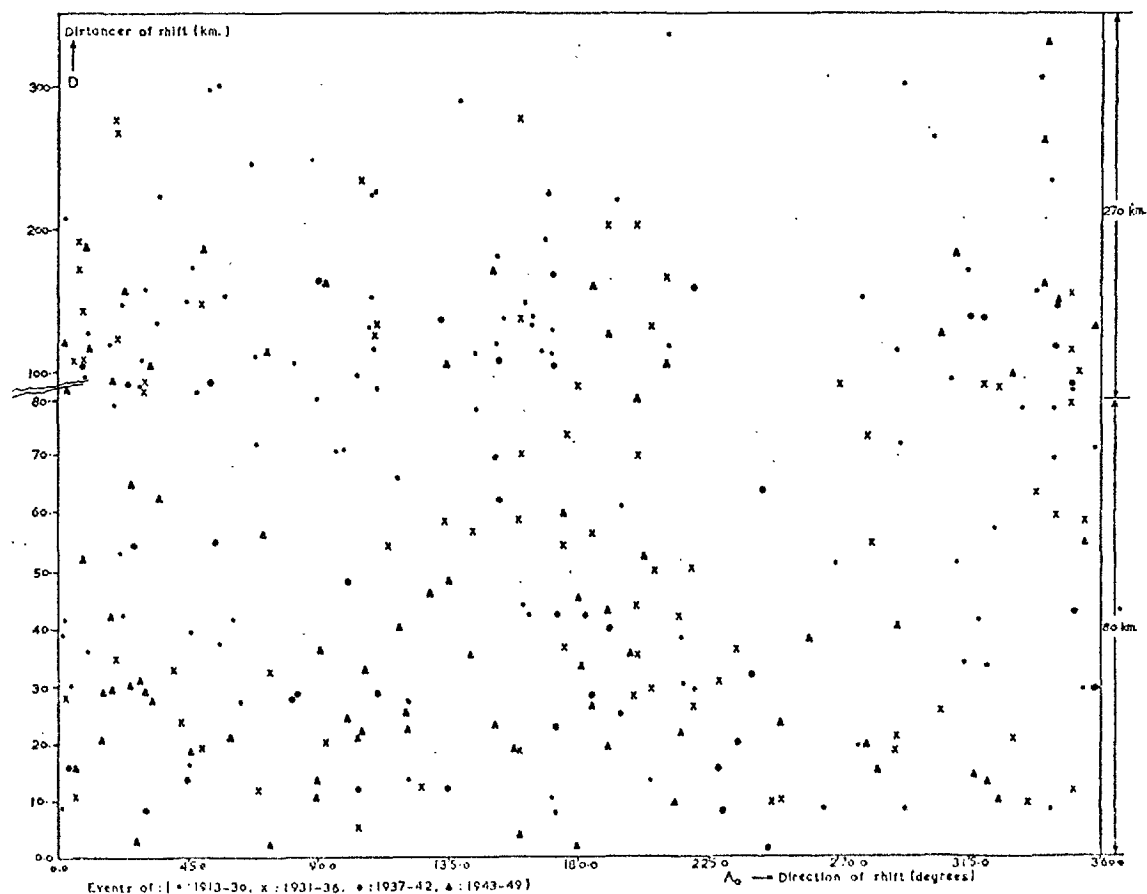


FIG. 5.2

6. Microtremor Activity in Northern Azarbaijan

During the last few years, the Iranian press has reported frequent microtremors in Azarbaijan. The location of each event is usually given by the name of the nearest settlement (village or town). The actual epicentre of the event is, however, not expected to be far away. After August 1965, the standard seismic station in Tabriz (TAB) recorded most of the reported tremors. The following procedure was adopted to estimate the epicentral region on the basis of single station supplemented by reports from other nearby stations and macroseismic information:

1. Read on TAB, P and S wave arrival time.
2. $(t_S - t_P) \times 8.4$ epicentral distance in kilometres.
3. Approximate origin time from travel time tables.
4. Reports from other seismic station : P arrival time for (KER, SRI, TEH).
5. Epicentral distance for other stations.
6. The epicentral region of the event is suggested by the agreement of (1-5) and macroseismic information.
7. Magnitude of these events were approximated using short period seismograms from Tabriz (TAB). Using the procedure suggested by Gutenberg-Richter (1956 a), a number of microtremors can be recognised as originating in a particular region. These microtremors can then be analysed statistically by studying the number of events $N(M)$ with magnitudes greater than M and the frequency of events $n(M)$ with magnitude $M \pm dM/2$. The relationships are as follows :
 - i) $N(M) = 10^{a + b(8 - M)}$
 - ii) $n(M) = 10^{a' + b'(8 - M)}$
 after Gutenberg-Richter (1944).

The procedure and analysis described here have been applied to case of the microtremors which followed the earthquakes of 29 April 1968 (1) and

14 March 1970 (2), both located in the Khoy-Maku region. The shocks considered are listed in Table (6.1) and Table (6.3). The values found for b and b' in two were as :

$$\begin{array}{ll} 1. & b = 1.04 \pm 0.05 \\ & b' = .68 \pm .14 \\ 2. & b = 0.96 \pm 0.03 \\ & b' = 0.62 \pm 0.12 \end{array}$$

From figures 6.1, 6.2 it is seen that on the basis of magnitude-frequency relations the two earthquakes considered in the Khoy-Maku region are very similar. However, in each case there is a marked difference between b and b' . This difference is mathematically and experimentally discussed by Syuhiro (1966). The discussion of this problem is beyond the scope of this work, but it is recalled that these difference increase with (dM); Miamura's work (Miamura, 1962) on detailed regional seismicity can also be consulted. The procedure given here for the location of microtremor activity can provide useful data for such research as well as many other studies in different countries.

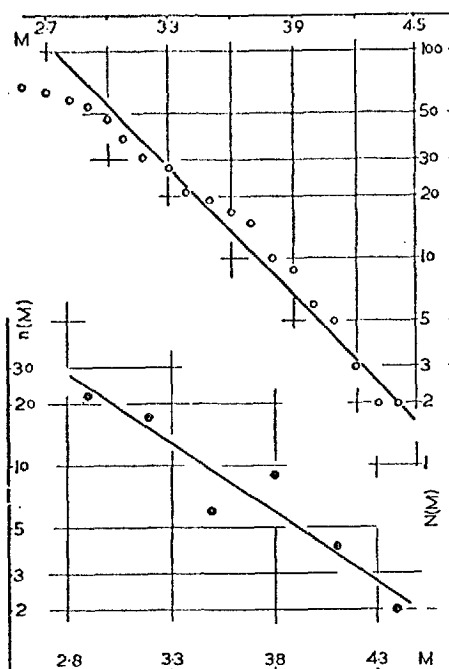


Fig.6.1, Seismic activities of Khoy-Maku region, between April 29 and June 22, 1968, after a main shock on April 29, 17 h. 01 m. 57.6 s. (GHT).

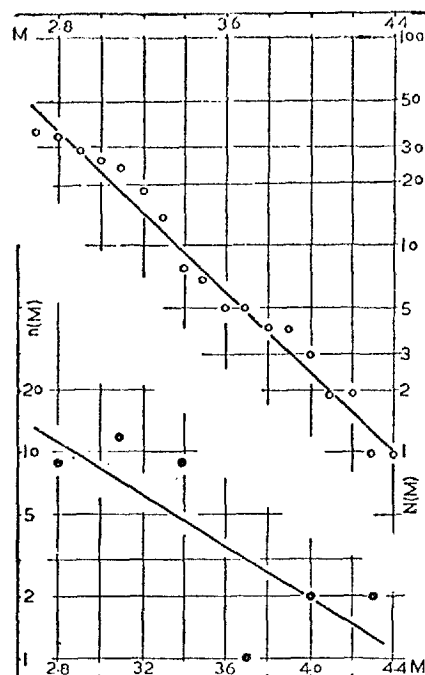


Fig.6.2, Seismic activities of Khoy-Maku region, between March 14 and April 6, 1970, after a main shock on March 14, 01 h. 51 m. 44.4 s. (GHT).

7. Special Study of Earthquake Magnitude

Scaling of earthquakes has been one of the early problems in earthquake studies. A number of parameters have been suggested such as magnitude (Richter, 1935). There have been many critical discussions about this scale concerning improvements in its determination. The object of this study is to present a brief note about the magnitude scale as follows :

7.1 The magnitude of shallow focus earthquakes as obtained from the USCGS is compared with the Tabriz seismogram readings. The events between January 1966 and June 1969 are illustrated in figures (7.1 to 7.8). In the figures each point represents a single event.

A number of straight lines has been fitted to the data using the method of least squares. The constants of the equations are summarised in Table (7.1) where b is the slope of the line and c its zero ordinate.

It is assumed that the following relationship holds :

$$M_B - \log \frac{A}{T} = b \lg_{10} D + c$$

in the case of body waves, and

$$M_S - \log \frac{A}{10} = b \log \frac{D}{10} + c$$

in the case of surface waves

A = double ground amplitude in microns as a function of instrument response and type of seismic wave.

T = period in seconds.

PZ' = P wave read from vertical component of short period seismogram.

PH' = P wave read from horizontal components.

PP_Z = PP wave read from vertical component of long period seismogram.

L_Z, L_H = vertical and horizontal components of surface waves from long period seismograph.

D = epic. distance

7.2 Magnitudes of the earthquakes of Iran have been taken from the centres of ISC, MOSCOW, and USCGS for the years between January 1964 and June 1967. They are shown in Figures 7.9-7.14 where each point represents the magnitude of a single event from two different sources. A straight line has been fitted to the data by the method of least squares and the equations are summarised in Tables (7.2) where b , is the slope, and a , the zero ordinate. Those events indicating large deviation from the fitted line are listed in a separate Table (7.3). It should be noted that the a and b values are quite different from those expected $a = 0$, $b = 1.0$. Reasons for this deviation are beyond the scope of this discussion.

7.3 Magnitudes of some earthquakes in Iran were obtained from the publications of various centres for the years prior to 1968.**

Gutenberg-Richter (1949) suggested that the maximum epicentral distance at which an earthquake was detected would be a measure of its magnitude class. They used earthquakes not exceeding the class c magnitude range. Karnik, 1969 referred to Rothé who took the number of station reports as a measure of the magnitude class of an earthquake. Only the earthquakes given by ISS or ISC, and occurring between 1918 and 1968, for which an instrumental magnitude has been determined were used in the analyses. The results are shown in Figures (7.15-7.20) where events in various magnitude ranges are plotted for specific periods of time. The time range (1918-1968) was subdivided into eleven intervals to reflect both the increase in the number of seismic stations throughout the

** Pasadena Seismological Observatory, Strasburg^o, Uppsala, BCIS, ISC, USCGS, MOSCOW, Matsushiro, and a number of other recognised seismological authorities, such as Gutenberg-Richter (1949), Karnik (1969), Savarenosky (1962), and Rothé (1969) and a number of other well known seismological centres.

world and improvements in instrumentation sensitivity. The cases indicate the number of stations represented (ISS, ISC) and the maximum epicentral distance.

Again a straight line was fitted to the data for each magnitude range without extrapolating beyond the observed ranges.

The results are summarised in figure(7.21) where areas underlain by the straight lines were obtained from the envelopes of the data in the previous figures. The diagram is divided into two period ranges so that the effect of improvements in both the station distribution and instrumental response with time are obvious.

Lastly for the higher magnitude ranges ($6-7\frac{1}{2}$) a figure has been produced to illustrate the increase with time in the number of stations reporting a specific earthquake from 1918 to 1960 (figure ⁷22).

Numerous conclusions can be drawn from this presentation of data regarding the seismological implications. However, for engineering purposes the major result has been to determine approximate magnitudes for those events in Iran, within this period range, for which no instrumental magnitude has been obtained.

7.4 Unfortunately, many earthquakes in Iran have not been assigned magnitudes by the seismological centres so a method was devised to determine an approximate value. In those cases for which magnitude was calculated, the surface waves duration was taken from the seismological reports of the Strasbourg Observatory and plotted against epicentral distance (degree) as shown in figure ⁷(23). The duration was given in minutes from the initial onset of Love waves

to the end of the seismic disturbance. There is an obvious correlation between duration and magnitude for the various magnitude classes as can be seen in the diagram. Attenuation accounts for the decrease in duration with increasing epicentral distance. Only shallow events were used in the analysis. The large scatter in the results could be due to a number of factors such as increased depth, non-uniform radiation patterns and variation in crustal structure. However, until these factors can be more precisely determined this method cannot be recommended for magnitude determination.

7.5 Magnitude-frequency relationship of earthquakes in Iran

The empirical frequency relationship between number of events (n) or (N) and their magnitude (M) due to Gutenberg-Richter (1949) was used to assess the overall seismicity of Iran (25° - 40° N and $43\frac{1}{2}^{\circ}$ - $63\frac{1}{2}^{\circ}$ E) for the period 1902 - 1972 i.e.

$$\log_{10} n(M) = a + b (8 - M) \quad (i)$$

or

$$\log_{10} N(M) = a' + b' (8 - M)$$

It is well known that in this relationship the value of a , which is the logarithm of the number of earthquakes of magnitude 8, depends on the extent of area and length of time taken into consideration, while the value of b is an invariant, reflecting the mechanical behaviour of the portion of the earth in which the earthquakes occur.

Fig. 7.24 shows the results obtained by fitting equation (i) to all instrumental data of Table 2.2 within a magnitude range between 4.5 and 7.4. Events in this table without a magnitude determination have been excluded from the calculations.

The magnitude-frequency relationship for individual events $n(M)$ of

magnitude $M \pm 0.25$ was found to be given by :

$$\log_{10} n(M) = 0.385 \pm 0.112 + (0.726 \pm 0.056) (8 - M)$$

while the relationship for the cumulative frequency $N(M)$ is given by :

$$\log_{10} N(M) = 0.241 \pm 0.051 + (0.811 \pm 0.026) (8 - M)$$

By extrapolation, the number of events of magnitude equal to or greater than 8 for the same period is :

$$10^{0.241 \pm 0.051}$$

TABLE (7.1)

WAVE READING	$b \pm d(b)$	$c \pm d(c)$	PERIOD SEC.	DELTA DEGREE	NO. OF READINGS	REMARKS
PZ	0.70 ± 0.10	4.68 ± 0.18			234	
PH	0.66 ± 0.15	4.80 ± 0.26			105	
PZ	0.82 ± 0.12	4.07 ± 0.22			116	
PH	0.92 ± 0.14	4.15 ± 0.24		10-115	48	
PPZ	0.96 ± 0.27	4.11 ± 0.53		10-115	35	
SH	0.96 ± 0.14	3.86 ± 0.26		10- 93	100	
LZ	1.30 ± 0.15	2.15 ± 0.28	20 ± 1	15-160	154	(1)
LZ	1.02 ± 0.13	2.48 ± 0.24	$21 < , < 19$	15-160	61	(3)
LZ	1.26 ± 0.10	2.18 ± 0.19	20 ± 4	15-160	215	(2)
LH	1.81 ± 0.27	1.00 ± 0.51	20 ± 1	20-145	67	(1)
LH	1.32 ± 0.12	1.87 ± 0.22	$21 < , < 19$	14-145	68	(3)
LH	1.53 ± 0.12	1.55 ± 0.22	20 ± 4	14-145	135	(2)

TABLE (7.2)

PERIOD	MAGNITUDE SOURCE	$b \pm d(b)$	$c \pm d(c)$	NO. OF READ.	REMARKS
1964 (JAN-DEC)	CGS ISC	$+0.585 \pm 0.109$	$+2.069 \pm 0.546$	36	
1965 (JAN-DEC)	CGS ISC	$+0.719 \pm 0.082$	$+1.301 \pm 0.400$	20	
1966 (JAN-DEC)	CGS ISC	$+0.673 \pm 0.069$	$+1.553 \pm 0.330$	29	
1967 (JAN-JUN)	CGS ISC	$+0.988 \pm 0.105$	$+0.019 \pm 0.520$	21	
1964 JAN-1967 JUN	CGS ISC	$+0.709 \pm 0.048$	$+1.399 \pm 0.235$	106	
1964 JAN-1967 JUN	CGS MOS	$+0.772 \pm 0.123$	$+0.889 \pm 0.614$	43	
1964 JAN-1967 JUN	ISC MOS	$+0.974 \pm 0.115$	-1.108 ± 0.572	45	

TABLE (7.3)

DATE Y. M. D.	TIME H. M.	EPICENTRE	MAG. GIVEN BY CGS ISC MOS	REMARKS
1964 FEB 12	08 19	39.0N 55.6E	5.2 4.6 4.4	
1964 MAR 20	03 15	27.9N 55.2E	5.8 4.7	
1964 DEC 22	04 36	28.2N 56.9E	5.5 5.6 6	
1965 JUN 18	13 49	29.7N 51.4E	4.6 5.0	
1965 NOV 10	10 03	27.0N 54.6E	4.1 4.3 5	
1966 JUL 27	15 30	32.8N 48.9E	3.9 4.5	
1967 JAN 29	07 56	26.5N 55.2E	5.0 5.1 5.7	5.5(BCIS)

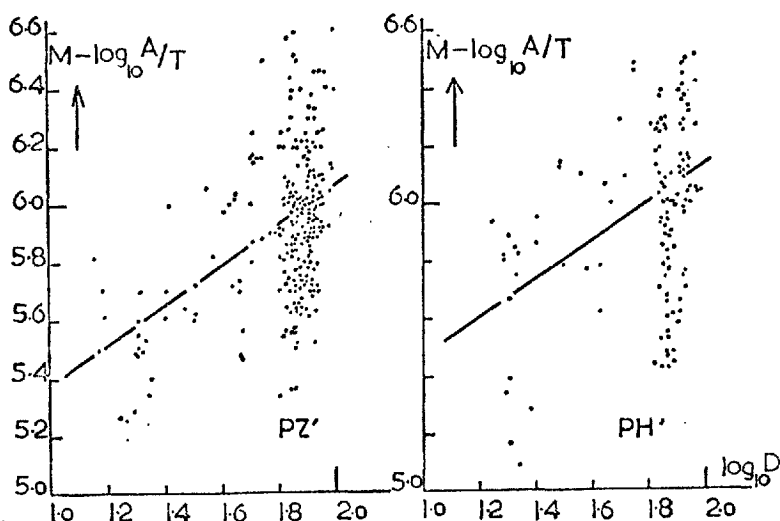


FIG. 7.1

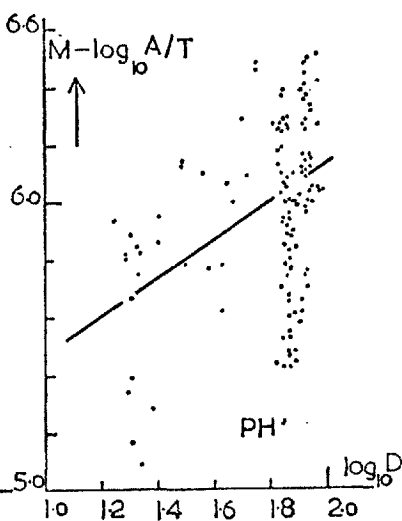


FIG. 7.2

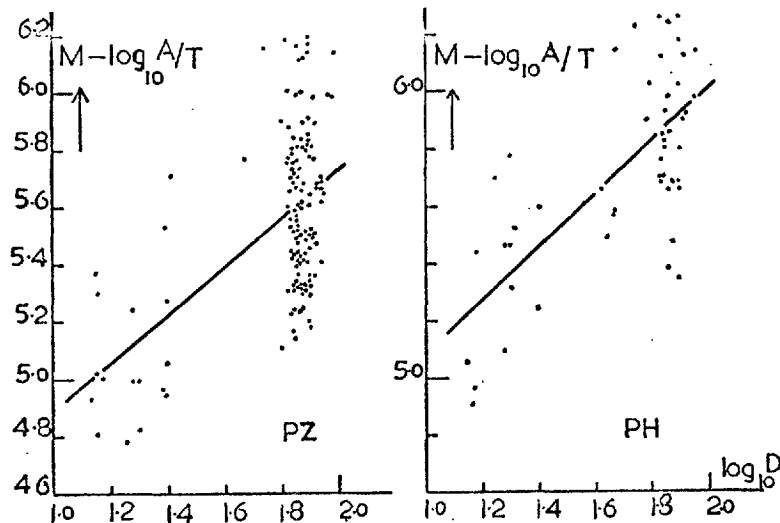


FIG. 7.3

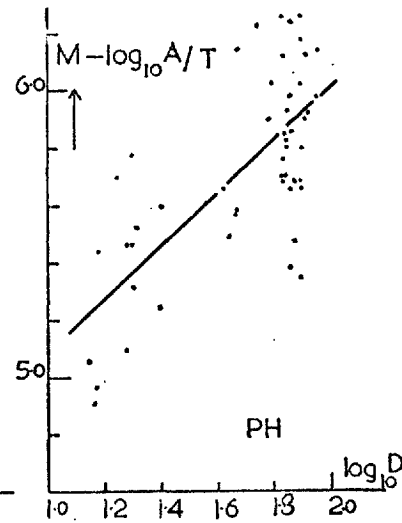


FIG. 7.4

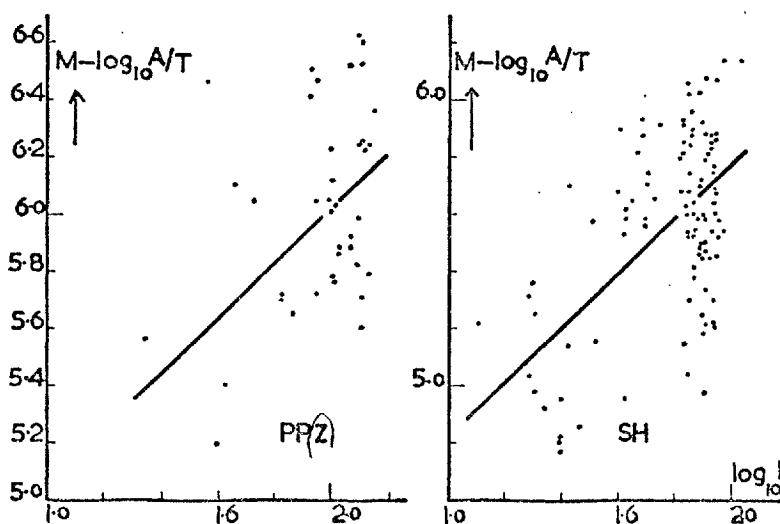


FIG. 7.5

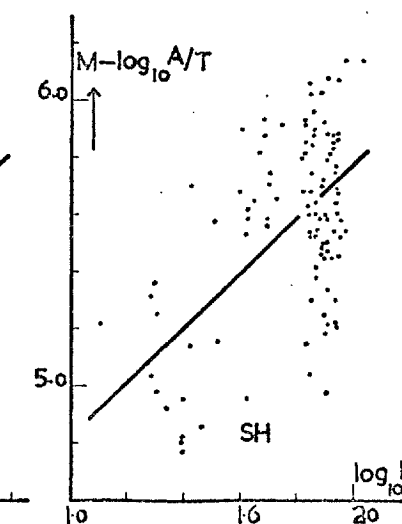


FIG. 7.6

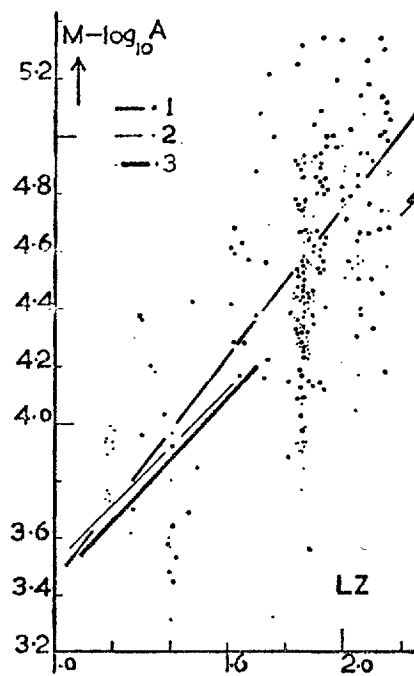


FIG. 7.7

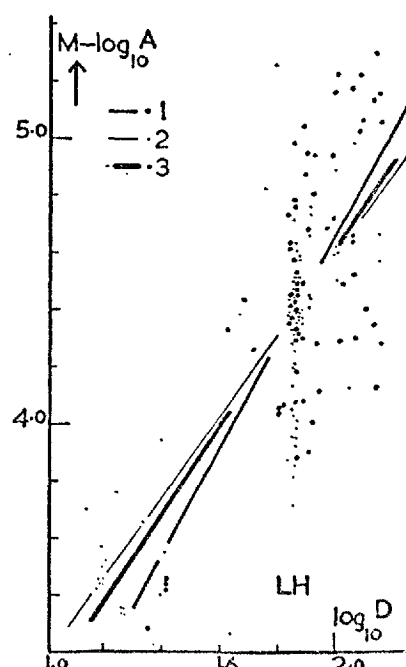


FIG. 7.8

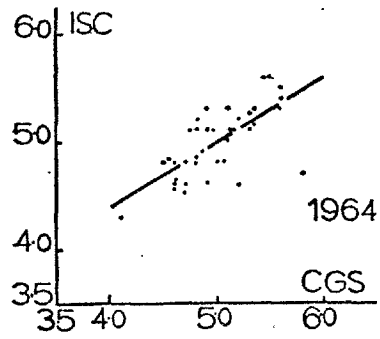


FIG. 7.9

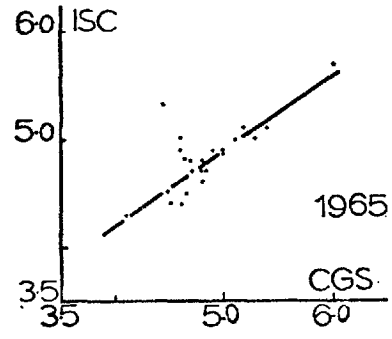


FIG. 7.10

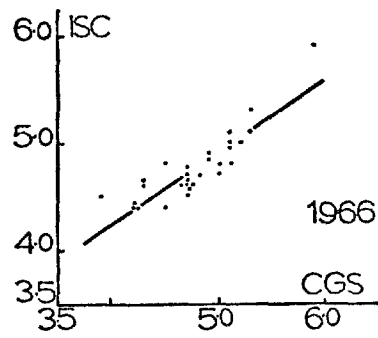


FIG. 7.11

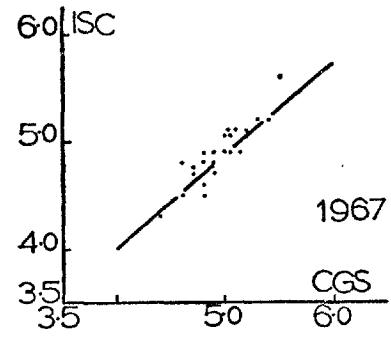


FIG. 7.12

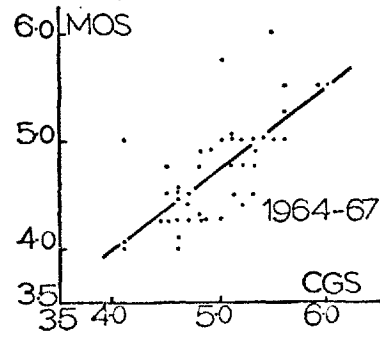


FIG. 7.13

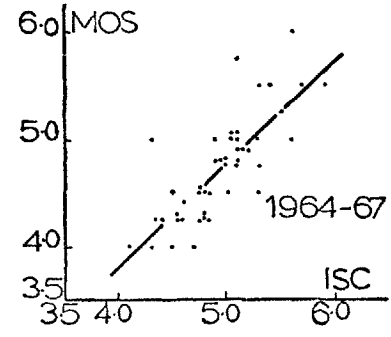


FIG. 7.14

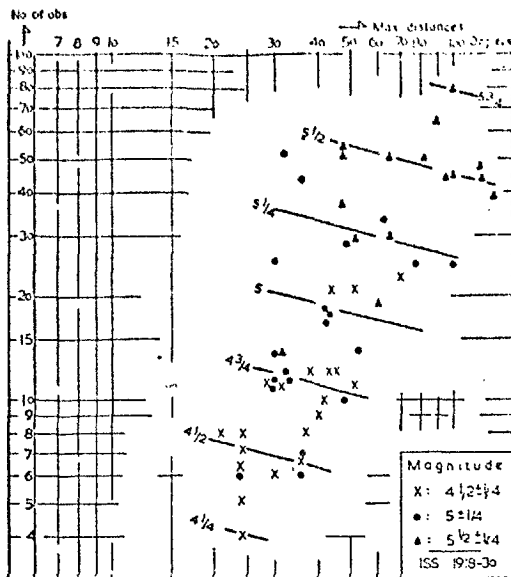


FIG. 7.15

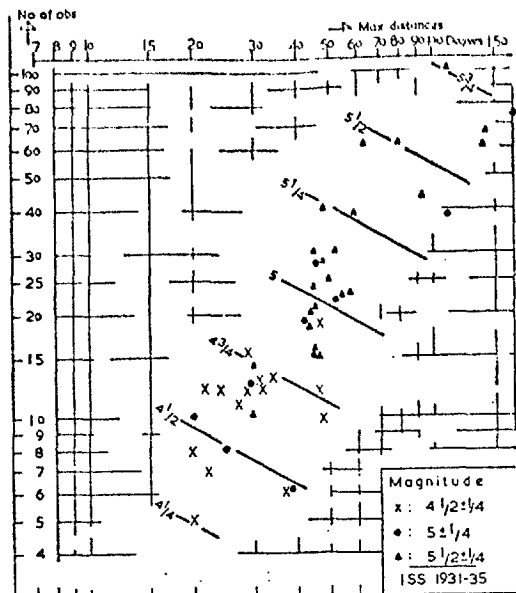


FIG. 7.16

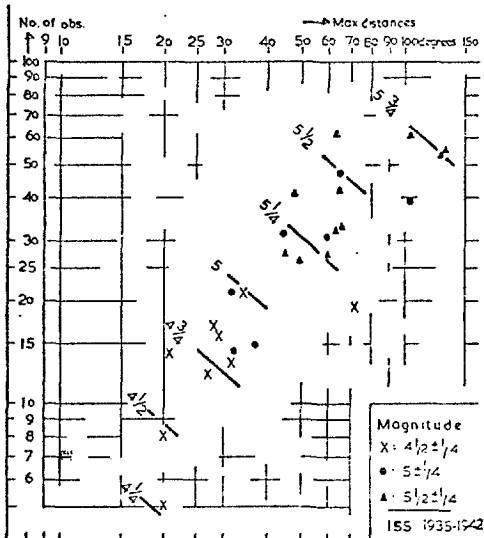


FIG. 7.17

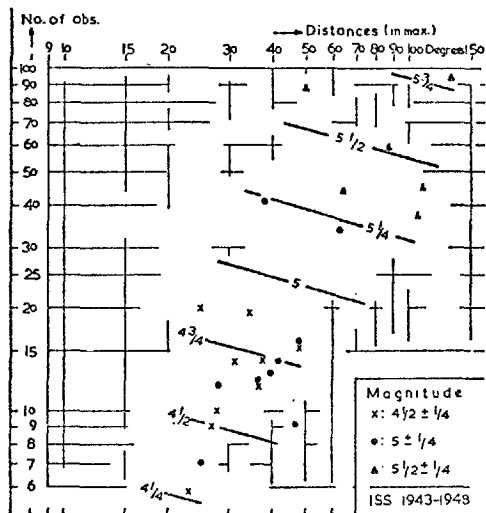


FIG. 7.18

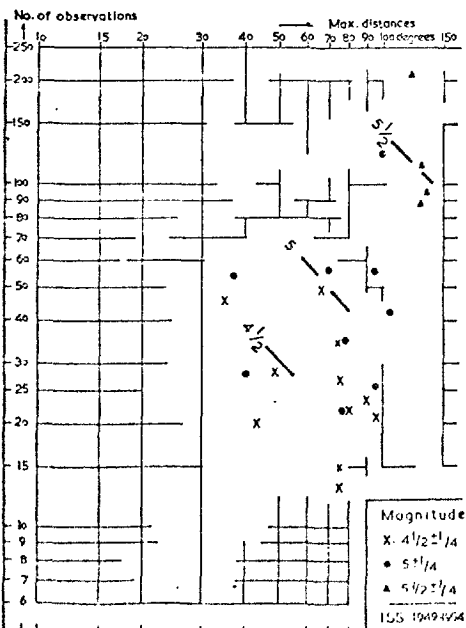
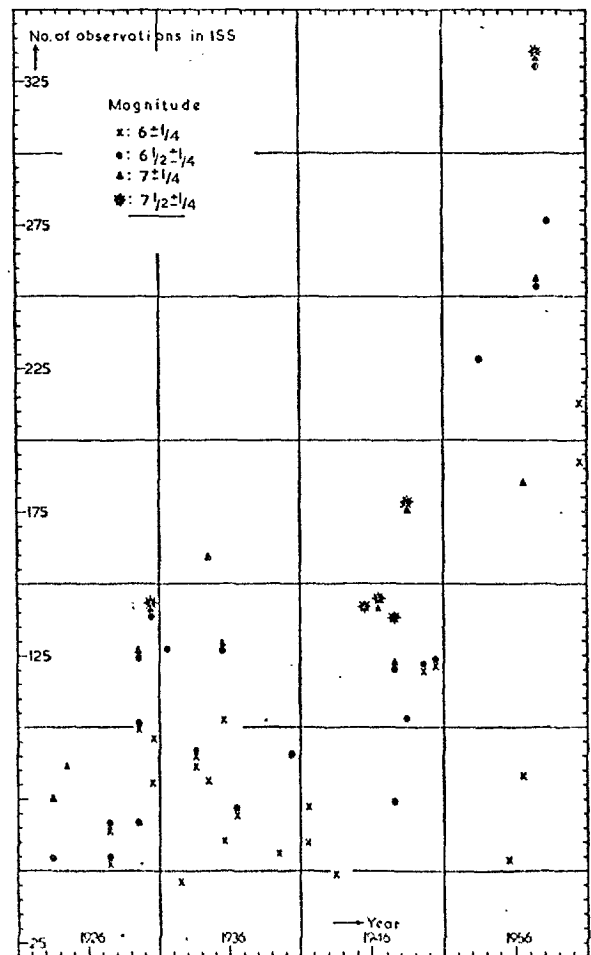
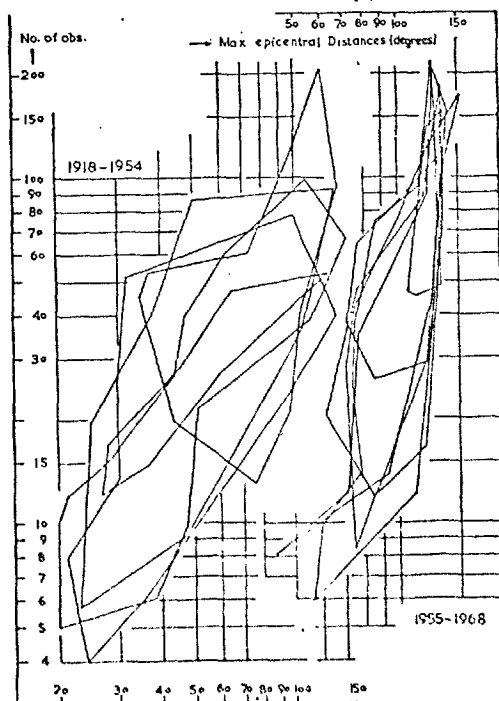
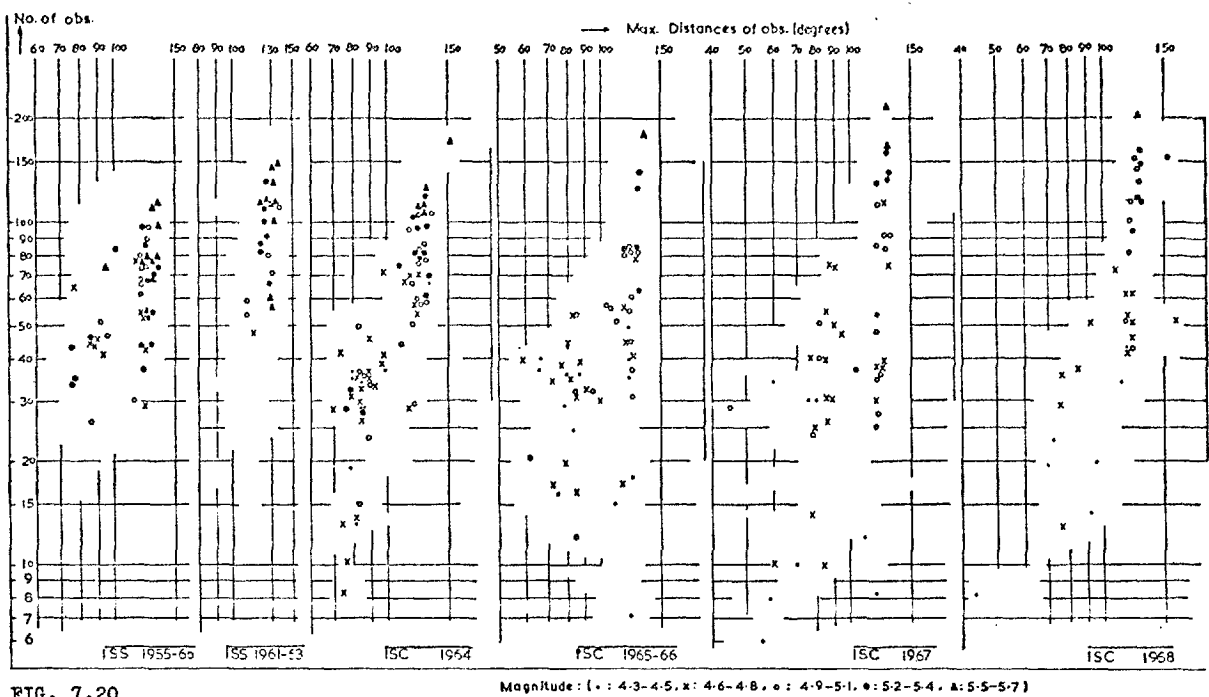


FIG. 7.19



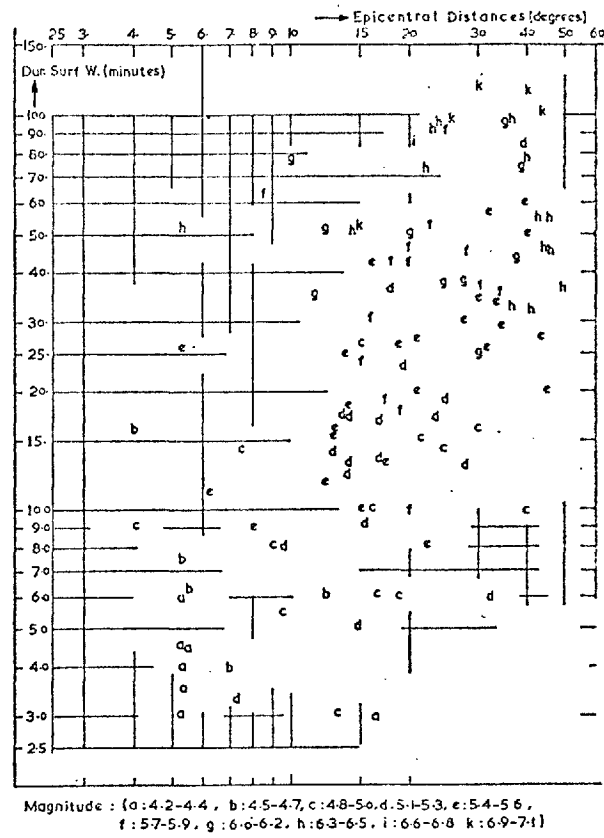


FIG. 7.23

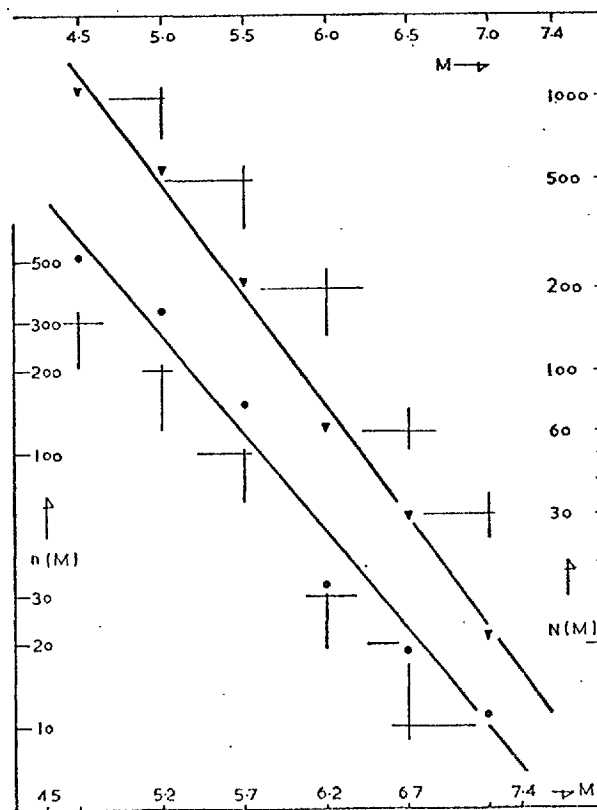


FIG. 7.24

Discussion

In the present work, the seismicity of Iran was studied on the basis of historical, macroseismic and instrumental data covering the period up to 1971.

The historical data covers the period 312 B.C. to 1900 A.D. and represents the results of a first attempt to extract pertinent seismological data from literary sources. These data are inhomogeneous in space and time and they have not been studied in detail. They do suggest regions, today quiescent, which may become active again in the future.

Macroseismic data, mainly extracted from press-reports, cover the period between 1901 and present, and they supplemented instrumental data, in some cases adding considerable information for events prior to 1950. As a matter of fact, these data are invaluable for earthquakes prior to 1950 for assessing epicentral co-ordinates during the first stage of iterative calculations.

Instrumental data were used for the relocation of 297 major events prior to 1950. For events after 1950 the relocations due to Nowroozi or due to USCGS were accepted, being accurate enough for the purpose intended. Comparing relocated epicentres with those initially reported by the ISS it can be said that, on the average, significant differences were found mainly for the northern part of the country, i.e. north of 34° . In these relocations, the focal depth was restricted to 33 Km.; it was found that the use of different depths produced a shift far smaller than that due to the acceptance or rejection of a large residual station. It was found also that the use of macroseismic co-ordinates improved final instrumental locations.

As a result of the present research, the number of earthquakes identified for Iran has been increased and some of these events have been studied in detail.

In this study and for the period 1913-1960, epicentre locations determined by ISS were used, and for the period July 1961-June 1971 by USCGS, and in a few cases by other sources.

However, the epicentres of earthquakes in Iran for the period 1913-1949 were relocated using ISS station reports as well as additional observatory data.

Also a number of recent microtremors originating in northern Azarbaijan were studied on the basis of local network data.

An attempt was made to unify and assign magnitudes to all major events in Iran. This attempt, which gives reasonable results, is based on the distance as well as on the number of stations that recorded a particular event.

It can be said that for earlier events the data ~~are~~ incomplete, their quality and homogeneity improving with time approaching 1960. The main factors lacking for most of the events studied are the focal depth and to a lesser extent the magnitude. For the period 1901-1912, for instance, it was found impossible to recalculate epicentres due to lack of instrumental data.

For the period 1913-1949, however, of all earthquakes in Iran, ISS has reported 457 events of which we were able to relocate 297 events. A number of relocated events, however seem to be in error as they do not agree in position with macroseismic locations. It is suggested that further work in

the relocation of the early events in Iran should take into consideration macroseismic information.

In the recalculation of epicentral locations of the early events a number of residuals were found to be of a random nature rather than systematic, reflecting the inadequacy of the timing system of the earlier stations. The use of weighted function in improving the confidence or relocation does not always improve the final result.

Epicentral locations of events after 1950 were found to be satisfactory. The same, however, does not apply for the focal depth of these events. It was found that for most of these shocks second arrivals were not interpreted with due accuracy; in some cases, these arrivals occurring a few seconds later, were due to different shocks.

For events before as well as after 1950, focal depth determinations for Iran are extremely unreliable. There are no near stations to use for control. With regard to published literature on Iranian earthquakes, (Nowroozi, 1971), although there is detailed discussion of mathematical errors and residuals, the physical reality of these are not discussed. We do not think one can doubt the physical reality of focal determinations as demonstrated by near stations. We do however question the physical reliability of a depth of focus determined only by distant stations ($> 10^0$). The control of depth in these cases is very poor, particularly when no detailed information about local velocities is available, which is the case for Iran. When focal determinations are made from distant observations alone, variations in velocity can have a great effect on position. All calculations made by various writers so far are based on J-B travel timetable. Yet we know that, particu-

larly in regions where intermediate shocks occur, significant deviations can arise, as shown by the mis-locations by standard techniques of known explosions in the Aleutians.

It is perhaps significant that pre-1958 events show foci from distant (ISS) observations which are a few seconds later and lie systematically to the north of shallower events, known as such from their macroseismic effects. In other words, they are displaced along the ray path to the greatest concentration of pre-1958 stations by an amount closely compensated for by the difference in origin time.

For all events in Iran, the residuals from least squares procedures give estimates of consistency of observations for the given model, and small uncertainties in the velocities used can cause large uncertainties in the focal position. We therefore do not agree with Nowroozi's depth determinations when he implies that a formal standard error of his depth solution has physical significance. It is also significant that postulated rupture velocities are close to the p wave velocity in the top 60 kilometres of the Earth, which suggests that all these solutions have done is to make compensating adjustments between the origin time and depth.

Concerning magnitudes, although the present work offers a considerable improvement, there are still difficulties to be resolved by further work, particularly with the magnitude of synchronous events of great distances.

Turning now to the seismicity of Iran as a whole, the country lies along the alpine belt, between the stable areas of Arabia in the southwest and the Turan Plateau (USSR) in the northeast. Focal depths generally decrease from about 100 Km in the regions bordering Arabia to near surface events in the

north and northeast. The present study suggests that in general there is a uniform background seismic activity covering the whole country with larger events superimposed along certain, not well defined alignments of high seismicity. Nowroozi (1972) suggests well defined alignments of high seismicity which he interprets to reflect boundaries of original plates. But we can find no such well defined alignments (see 3. and 4.). Instead, we find very wide zones, presently more active than their surroundings, in the Zagros in northern Iran, Khorassan and in the southeastern Iran. These zones are very wide and growing with time, suggesting the participation of a large proportion of the surface of Iran in developing tectonic environment.

Nowroozi (1972) identifies plate boundaries on the basis of present day seismicity. But even so one of these boundaries he shows to follow an alignment between the Elburz and the Zagros consisting of the following events :

1924-11-8(2), 1924-11-10(2), 1924-11-11(1), 1924-11-12(1),
1927-6-15(1), 1927-10-13(1), 1948-6-17(1), 1948-6-30(1) ,
up to 1962. But these events fall within a very restricted area rather than along an alignment (see Figure 3.7 and Tables 2.1 and 5).

It is obvious that data of a few decades of seismic activity do not suffice to reveal the seismicity and its tectonic implications in Iran. For this purpose a much longer period of observation is needed, in which historical data should be also considered.

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AAC	AACHEN, GERMANY	**
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AK	AMBRASEYS ET AL., 1971	23.
APA	APATITY, NORTHERN RUSSIA	**
ATH	ATHENES OBSERVATORY	29.
AS	ABDALIAN S., 1963	2.
BAG	BAGIO CITY (W), LUZON, PHILIPPINES	**
BAK	BAKU, AZERBAIDZHAN	**
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BH	BOZORGNIA H., 1962	42.
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BOM	BOMBAY	**
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BRK	BERKELEY, CALIFORNIA	43.
BS	BRITISH ASSOC. ADV. SCI.	44, 216, 217.
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APPENDIX I

Historical Earthquakes of Iran

The historical earthquakes of Iran are essential for the study of the seismicity of the region (Ambraseys 1968). The collection of historical information on earthquakes has been the subject of many authors. For example Mallet (1852-3-4), Perrey (1842-64), Fuchs (1866-72), Oldham (1876), the large catalogue of Montessus de Ballore (see Geographical Journal, Jan. 1910), Mushektof and Orlof (1910), Milne (1912), Wilson (1930), Sieberg (1932), Rezanof (1956). All these works differ in some respects from one another. Recent workers on the seismicity of Iran have used this historical information for various studies: seismicity, tectonics, etc.

The list of historical earthquakes presented here, which has been collected during the past ten years, is aimed at showing what material is available, without in most cases entering into a critical analysis of this information. Date and place names have been kept as in the original sources. The abbreviation AH by the date of the event indicates the date according to the Muslim calendar, which began on 16 July 622 AD and has 354 days. Intensity estimates in the works of Milne (1912) and Mushketof and Orlof (1910) are explained in Appendix No. III.

- 280-312 BC; Shahr-Rey; A destructive earthquake, (KH).
- 643AD; In 23 AH, an earthquake occurred in Khorassan. It lasted 70 days, (SM).
- 716 AD, 98 AH; A strong earthquake was felt in the whole world. It lasted for six months, (SM, AA).
- 749 Jan. Mesopotamia, there was a destructive earthquake, causing strong landslides in the mountains and perhaps some faulting in some parts of epicentral area (PA, 23, 1, 13).
- 775 AD; Mozan and Daralagoza (39° 45'N, 45° 20'E), III, (MJ).
- 802 AD; Mazanderan. About 70 villages were destroyed; Semnan and Damghan severely damaged. Morie (1812) (Press reports), (AC)
- 803 AD; Khojat Mountains, Khojat near Tabriz? II, (MJ, MØ).
- 816 AD, 201 AH; A violent earthquake in Khorassan, (SM).
- 818 AD, 203 AH; In Khorassan, Mavar-al-Nahr, and particularly at Balkh, Jozjan, Fariab and Talqan; A number of violent earthquakes occurred. These earthquakes lasted for 70 days, causing heavy damage in the above mentioned places, (SM).
- 840 AD, 226 AH; The strong earthquake of Ahvaz, lasted for five days. At the same time as the earthquake there was a strong wind, (SM).
- 850 AD, 236 AH; At Rey occurred an earthquake where 45,000 people were killed. It is quoted in the book of "Tabsorat-al-Vam", (KH).
- 854 AD; Tovin ; Dabil; were destroyed by an earthquake and 2,000 people were killed, (AS).
- 855 AD, 241 AH; At Rey a violent earthquake occurred. This earthquake was followed by a number of others (aftershocks) forty days afterwards. Numerous people were killed and many houses were destroyed, (SM, KH).
- 856 AD, 242 AH; A violent earthquake occurred in Qoms, Sham, Fars, Khorassan and Yaman, and 45,000 people were killed at Qoms, (SM). Referred to by Tarikh-e Yagubi who says that "in the year 242 AH several earthquakes occurred in Qoms, Nishabur, and so on, which killed many people at Qoms"; and referred to by Tarikh-al Kholafa writing as Soyouti who says that in the year 242, a great earthquake occurred, Tunes and dependencies, Rey, Khorassan, Nishabur, Tabaristan and Esfahan, which were the mountain was broken and the ground was cracked so large that it was possible to take a man, (KH). Qoms is a region between Khorassan, Tabaristan and Kavir-e Lut. Damgha is one of the important cities of Qoms and the two other main towns of Qoms are Semnan and Bastam (HU).
See also: (PA), 13, 1, 69).
- 856 December 3-30. The earliest earthquake in North-Central Iran mentioned is by As-Soyuti, who maintains that in Sha'ban AH 242, violent earthquakes shook, among other places, Damghan, Shahr-Rey, Qum and Kashan; he adds, without specifying the locality, that mountains were shattered by the shock and that the ground opened up extensively in many places. This statement is also made by Haj'ji Khalifa; El Macin adds that near Qum, 45,000 persons were buried under the ruins and

that the shock was felt in Damghan. Abu'l Faraj ascertains that in the region of Qum thousands of people perished in the ruins and also that Damghan suffered by the earthquakes. In the list of damaged towns Sieberg (1932) adds Bastam, but he quotes no authority. It is very likely that what we have here is a series of earthquakes which shook Iran by the end of 856 AD; it seems probable that one of them occurred in the dependencies of Qum, and another in Damghan. At the time, the dependency of Qum extended as far north as the Elburz mountains, including Tihiran. In this instance, as in others, the fact that historians refer by name to a dependency should not be interpreted that its capital was necessarily involved, (AC).

- 856 AD; The earliest known major earthquake in the vicinity of the Ferdows-Qayen area occurred in December 856 AD. According to early chronographers this earthquake destroyed many towns in Khorasan from Neyshabur in the north to Qayen in the south where 45,000 people perished. It is very likely that there was, in fact, a series of earthquakes which affected Khorasan by the end of 856, one of them very near Qayen. Some of the earlier writers allude to extensive ground deformations as being associated with this earthquake, but they give no details as to where these occurred, (AD).
- 856 Dec 3 to 857 Jan 1; Khorassan, Alamana, III; Mallet gives Hamadan also Syria, (MJ).
- 858AD, 244 AH; Tabriz; ruined by an earthquake (SM, NM, SZ)
In the year 244 AH, the city destroyed by an earthquake, it was rebuilt by "Khalifeh Abbasi", (MH, SR). Minoreski called to be one of the strongest earthquakes of Tabriz, (MK, SR). Referred to "Ovliya Chalibi" said that, was a great earthquake, which completely demolished the city and killed a number of 40,000 people, (NH).
- 863 AD, 249 AH; At Rey, a violent earthquake occurred. This earthquake caused heavy damage; many people were killed and the survivors ran away out of the city, (SM, KH). (The statement by both authors is exactly the same; the author (SM) had not given any source but the author (KH) referred to Anb-al-Asir in his writing as "Tarikh-al-Kholafa").
- 863 AD, 249 AH; Qazvin and Tabriz. An earthquake occurred, (SM).
- 863 AD; Caucasia, neighbourhood of Erivan, II, (MJ).
- 864 January 15 - February 12. Shahr-Rey was shaken again in Dhul'l Hijja AH 249. This time the shock destroyed many houses and the population of Rey fled into the country (As Soyuti). We were unable to find a confirmation of this statement in earlier writers, (AC).
- 869 AD; 256 AH; During 256 - 270 AH, number of earthquakes occurred in Iraq, (SM)
- 869 AD; Dvin or Tovin, III, (MJ).

- 871 AD, 258 AH; At Simareh, a strong noise followed by a short and strong noise was heard by the people. Then an earthquake occurred. The major part of the city was destroyed. Almost 20,000 people were killed, (SM).
- 872 June 21 From Tabari we learn that on a Saturday of Sha'ban AH 258 (10 Sha'ban) the valley of Saimarreh was shaken by strong earthquakes and that Dar-i-Shahr was severely damaged. On the following day a stronger shock destroyed the largest part of the town together with its walls and larger buildings, killing 20,000 people in the Saimarreh region. The damage extended to Sirwan and perhaps to Tang-i-Sikam on the Rudbar River Valley. Mas'udi attests that Makh-Sabadan has suffered in the past from earthquakes, some of which were destructive as far north as Sirwan and Gebal (Fakih), (Schwarz 1961). It has been suggested by Harrison and Falcon (1937), Harrison (1946) and Stein (1940) that evidence of even older earthquakes than those described by the earlier Arab geographers can be found in the Saimarreh valley in the colossal slide from Kabir-kuh on fertile ground made up of sediments of the lake which was formed by the damming of the river in early times due to a landslide from Kabir-kuh about miles northwest of Tang-i-Fanni. Dar-i-Shahr is now in ruins near $33.16^{\circ}\text{N } 47.41^{\circ}\text{E}$. It had been occupied till the 13th century and it was known as Shahi or Darreh-Shahi (Mustawfi, Abu'l Fida-G). Saimarreh is near by $33.19^{\circ}\text{N } 47.36^{\circ}\text{E}$, (Harrison, 1946b).
- Sirwan now known as Siraw-kalan, and by Arab geographers as Sirawan or Makh-Sabadan (Abu'l Fida-G), is situated $33.54^{\circ}\text{N } 46.87^{\circ}\text{E}$, (AC).
- 881 AD, 268 AH; Baghdad; An earthquake occurred, (SM).
- 893 AD, 280 Shaval; Tabaristan, Rey; At night an eclipse of the moon occurred and afterwards a black wind started followed by a strong earthquake, (SM)
- 893 AD, Russia, Dvin or Tovinn III (MØ, MJ).
- 893 ? 894 India. Under the year 893 AD in the catalogues of earthquakes, a very severe shock is stated to have occurred in India. The capital is said to have been destroyed, and 180,000 men to have perished; preceded by an eclipse of the sun, etc. etc.* 'And as authorities for this statement, Abul Faraj and Al Macin are quoted. I have, however, been unable to find any reference to this earthquake in the only edition of Abul Faraj to which I have access, (Pocock's Translation, Oxford, 1663); nor can I see any account of it in Al Macin (Erpenius' Translation, Leyden 1625). But, on referring the question to my friend Mr. Blochmann, he furnished me with the following references: In the Tarikhul Khulafa, or History of the Caliphs, it is said: "And during this year (AH 280) a letter came from Daibul that there was an eclipse of the moon during the month of Shawwal, and that the next morning the world was in darkness, which continued till about 4 o'clock in the afternoon; and there blew a black wind, which lasted till a third of the night had passed away, and the wind was followed by a great earthquake which caused the whole town to disappear. The

* Quoting Oldham 1883, Memo. Geol. & Surv. India, 19(3), 165.

number of people which were dug out from the ruins was 150,000 men." Again, in 'Alkamil-fi-l Tarikh by Ibn-ulathir (possibly the largest historical work of the Arabians), it is said: "And in the Shawwal of this year (AH 280) there was an eclipse of the moon and the people of Dabil and the whole world awoke in darkness. And the darkness lasted for a long time, and when it was 4 o'clock in the afternoon there blew a black wind¹, which continued to a third part of the night. And when the third part of the night had come, there was an earthquake, and the town was destroyed, so that only about 100 houses remained, and after this the earth shook five times more and the total number of people that were found killed below the ruins amounted to 150,000." (Tornberg's edition of Alkamil, Vol. VII, p. 323.)

There is here a perfect agreement as to date. Indeed it seems probable that both writers derived their information from the same source. The month of Shawwal, in the year of the Hijra 280, commenced 90 days before the 13th of March, 894 AD, that is, on the 14th December 893. Hence the earthquake must have been at the close of the year 893 or in the few first days of 894 AD.

But these two authorities differ in the name of the large town said to have been destroyed, one calling it "Dabul", the other Dabil. Now, Dabul, according to Yaqut's Geographical Dictionary (a famous Arabic work), lay "on the coast of the Indian Ocean. It is a famous town and the waters of Lahor and Multan reach it, and flow into the Bahr-i-Hind" (Indian Ocean). This is the ancient town of Daipul. In all probability this was the town visited by this severe earthquake, still it is very strange that the narrators refer to no sea-wave having covered the land. According to the same authority, Dabil is, 1st a town in Armenia, near Arran¹ (between the Euphrates and Tigris) and 2nd a sandy district in Arabia between Yamamah and Yaman. This would render it probable that the earthquake was in Armenia, although there seems nothing to lead one to conclude that this Dabil was a town of such importance or size as to contain more than 150,000 inhabitants,' (Oldham 1883).

893 March 23- 894 March 12. In AH 280 six earthquakes shook Ardabil in the course of the year killing 100,000 people in the dependency of Ardabil; As-Soyuti found this information in Ibn Kassir's work. On the authority of En el-Zahabi he mentions another earthquake that occurred just before Shawwal of the same year (893 December - 894 January 10) which destroyed Dabil, where 180,000 people died under the ruins; this latter earthquake was accompanied by darkness and "black wind" and was preceded by an eclipse of the moon. Oldham (1976) infers that this may have been a drifting shower of volcanic ashes, a statement which suggests a volcanic eruption. In As-Soyuti's Tarikhul Khulafat however, we find that the name of the city destroyed by this earthquake is Daybil, a city according to Yaqut in outer India at Bahr-i-Hind, and not Dabil.

Although there is a perfect agreement as to the date and description of the second earthquake mentioned by As-Soyuti in the statements found in Al-Macin, Abu'l Faraj, and ibn-al Athir, the former two refer to the city as Daybil or Daibul, while the latter, as Dabil. Undoubtedly there is here some confusion about the actual name of the city destroyed by the earthquake in Shawwal. It is very probable that the darkness and the "black wind" that accompanied this earthquake were in fact after-effects of a volcanic eruption, in which case Ardabil should be the actual place where the major effects of the 893-894 seismic paroxysm took place, (AC).

- 898 January 28 - 899 January 16. Haj'ji Khalifa mentions in passing an earthquake for AH 285 in Shahr-Rey and in the region between Gilan and Gorgan (Tabaristan); he gives no details. Wilson (1930) indicates a destructive earthquake on the authority of Mallet (1850) and of Haj'ji Khalifa. Neither of them give sufficient data on which the effects of the shock could be assessed, (AC).
- 901 AD 289 AH; Baghdad, a series of earthquakes occurred, (SM).
- 910 AD, 298 AH; Kufeh, Baghdad, the houses were destroyed by an earthquake, (SM).
- 942 AD 331 AH, Nesa (Khorassan, near Darrah-Gaz), A violent earthquake took place there, many people were killed and many villages were destroyed, (SM).
- 956 AD 345 AH; Destruction of Divan-Khaneh-e Hamadan by an earthquake, (SM).
- 956 April 15 - 957 April 3. As-Soyuti refers to an earthquake in Iran in AH 345 which caused great damage to Hamadan where many buildings were destroyed. Here again it was not possible to find any mention of this event in earlier or later writers, (AC).
- 957 AD, 346 AH, Persian Gulf; The water level decreased by about 80 Bagh and many islands appeared, (SM).
- 957 AD, 346 AH; A number of great earthquakes occurred in Rey and Talqan, which ploughed the ground, (SM).

In the 346 AH, "in Iraq-e Adjam an earthquake occurred, causing fissuring in a mountain and lifted up a village, it was supposed to remain suspended for a short moment and then fell down with all the inhabitants; the ground was in trouble so that it started smoking with a bad odour," (SM).

Referring to Abn-al Asir "a violent earthquake occurred at Rey and vicinity at the beginning of Zil-Hajjah up to end; which destroyed many buildings and killed numerous people". The evidence was detailed in the book of "Shaz-Rat-al-Zahab" referred to "Montazam-al Abn-al Juzi", (KH).

- 957 April 4 - 958 March 24. Quoting As-Soyuti (a) "in the year AH 346, in the region of Shahr-Rey and its dependencies, occurred a dreadful earthquake; the calamity extended as far as Khalwan,* the greater part of which was engulfed and the earth vomited up the bones of the dead, and waters burst forth. A mountain in Shahr-Rey was cleft asunder, and a village with its inhabitants was suspended between heaven and earth during half a day, then it was swallowed up. The earth was rent in a mighty chasm and fetid waters came forth from it and volumes of smoke. The town of at Taliqan sunk into the earth, and there escaped of its inhabitants only about 30 persons, and 150 of the villages of Shahr-Rey were swallowed up". This narration of ibn-al-Jauzi is given by As-Soyuti in his work *Kasf as-salsalah* slightly altered "an earthquake in Iran", he says, "at Shahr-Rey and about that town; it lasted forty days, then discontinued for some time, but it again returned; the earthquake extended to Taliqan (Talkhan) in particular; at Shahr-Rey 150 settlements sunk into the ground and a mountain sunk and an enormous chasm opened from which water and smoke gushed out". Another version is found in As-Soyuti's Paris MS in which he says that the 150 villages of Taliqan belonged to Rey and that a mountain at Rey also "sunk".

Talaqan, Taliqan or Talq'an is the region along the Talaqan-rud valley north of Qazvin, flanked to the south by the Reshtch-ye-Taleqan approximately at 36.2°N - 50.8°E (Mustawfi, ibn-Hauqal, Abu'l Fida-G). There is another Taliqan in Khurasan between Marv-ar-Roudh and Balkh (Wazirabad).

In connection with the events of AH 345 Mis'Kawaihi says that "in AH 346 in Rey and its neighbourhood, there was a series of earthquakes causing vast numbers of deaths" and he adds that "seagoing folk asserted that the sea that year sank 8 fathoms, showing hills and islands of which they had never known nor heard before". As-Soyuti (a) also mentions that in AH 346 the sea sunk 8 cubits and that there appeared within it hills and islands and things such as had never been seen. Abu'l Faraj is more explicit; he says "the year before (i. e. AH 346) the Great Sea diminished and it shrunk into itself for a distance of about three hundred cubits, many rocks and islands were laid bare which had not been known before". Similar statements are made by ibn-al Athir and Abu'l Fida. This earthquake poses three problems which need to be resolved before its importance can be assessed, (1) Was the Taliqan area in Djabal (Jabal) or the town of Taliqan in Khurasan involved, (2) Since the various writers do not specify the name of the sea, was it the Caspian or the Persian Gulf, and (3) Is there any connection between the lowering of the level of the sea and the earthquakes?

It seems almost certain that it was the area of Talkhan rather than the town of Taliqan or (Talq'an) that the authors had in mind; As-Soyuti specifically refers to an area, and his Paris MS indicates that the

*Hulwan or Halvan (34.17°N - 46.05°E) is a ruined site south of Sar-i-Pul Zuhab and Karind (Mustawfi, (AC).

/ Ambraseys (1961) erroneously refers to the town of Talikan in Kurasan.

villages of Taliqan belonged to Shar-Rey; as a matter of fact Mustawfi gives 360 villages as belonging to Rey, among which those of the Djabal region to which Talkhan belongs.

Those of the writers who mention the lowering of the level of the sea refer to the place where this occurred as the "Sea" or the "Great Sea", and it is not clear whether it should be the Caspian Sea or the Persian Gulf. Reiske (1789) is inclined to think that it is the Persian Gulf, and Budge (1932) finds both locations probable. We believe, however, that here it should mean the Caspian Sea. It is very probable that the changes in the level of the Caspian, one of which might have occurred in 957 AD, had led Omar El'Aalem in the Xth century to his theory of a general lowering of the waters of the Caspian. Omar's observations were based on the aspect of the coasts of the Tabaristan district which indicated the desertion by the sea of its ancient bed (cf. Hoff, vol. 1, p. 406; Bobrov, 1961; Richter, 1961).

None of the writers seem to connect directly the lowering of the Caspian sea-level with the 957 AD earthquakes. These two events, at least grammatically, are treated as separate. On the other hand, there is evidence to suggest that with the exception of Mis'Kahwaihi, all the writers refer to the damage of Rey and of Khalwan as the effect of one earthquake, which seems more probable. This divergence of opinion brings out the tendency of writers of old times to group events by their nature and over a certain period of time, separately, thus not connecting the earthquakes with the lowering of the sea.

The 957 AD earthquakes seem to have been accompanied by landslides, probably by fault movements, and perhaps by minor volcanic activity. Their accumulative effects should have been considerable, involving ground deformations. It is difficult to locate where these earthquakes occurred. One, perhaps occurred west of Kermanshah between Sari-Pul and Karind, not far from where the 872 AD earthquake occurred. The other, in all probability of much greater importance, occurred in the Alamut-rud valley along the Taliqan-rud. This is quite some distance from Rey, but it should be recognised that Rey had been used by the writers to indicate the dependency in general rather than the city of Shahr-Rey itself.

- 958 AD 347 AH; Baghdad, Jebal; An earthquake occurred, (SM).
- 958 25-959 March 13 "In the year AH 347" As-Soyuti (a) says that "earthquakes recurred at Qum and Khalwan and in the mountainous districts, and great numbers of people perished". His Paris MS indicates that "an earthquake at Qum, Khalwan, Kaman, and Jahbel killed many people; at the same time Baghdad suffered from an earthquake." Abu'l Faraj gives different places, he says "in AH 347, there was a terrible earthquake, and it destroyed many districts and many were suffocated beneath the overthrow in the mountains of Dajlomaye and Kashan". On the other hand Mis'Kahwaihi says "in AH 347 numerous earthquakes occurred in Baghdad, Khalwan and

especially in Jahbel, where buildings were ruined and hundreds killed". Wilson (1930) on the authority of Abu'l Faraj, which we were unable to check, says that in 958 AD more violent earthquakes than the previous year affected Deisan and Kashan and the country around (Mallet 1850). Dajlomaye or Deylaman is the mountainous area between Ghilan and Qazvin including the valley of Shahr-Rud (Mustawfi), and Jahbel or Jabal is the area of Iraq Adjemy, (Arak-Malayer-Kangavar), (Abu'l Fida-G).

It seems that once again a number of individual earthquakes have been reported collectively. This makes it practically impossible to separate their importance or to locate their epicentral areas. It appears that during 958 AD the shocks continued in the Shah-rud and Taliqan-rud areas, north of Qazvin. Also that the Karind area, west of Kermanshah, should have suffered from new shocks and that the seismic activity might have proceeded eastwards towards the Malayer-Kangavar area. Some activity might have been observed at Kashan and in the Qum area, (AC).

- 973 AD, 363 AH; At Waset (Khuzestan); an earthquake occurred, (SM)
- 978 AD, 368 AH; Iraq-e Adjam; A number of strong earthquakes occurred, (SM).
- 986 AD, 376 AH; A violent earthquake occurred, partly destroying Musel and causing heavy damage to the buildings in other parts of the town, (SM).
- 1003 AD; 40.15°N, 43.1°E; Kars, Ani, Diogr, (EC). In the year
- 1003 AD; Armenia, a violent earthquake occurred. Numerous people and animals were killed. The whole of Armenia was shaken by this earthquake, (AS).
- 1007 AD, 398 AH; Dinavar; there occurred a great earthquake, which killed 16,000 people, (SM). In the violent earthquake of 398 AH at Dinavar many houses were destroyed and numerous people were killed; 16,000 people were buried in Dinavar, (AA).
- 1040-1042 AD, 432-434 AH; Tabriz. In the year 1040 AD, 432 AH; a great earthquake, (SM). On second February 1040; Tabriz, III, (MJ). In the year 1041 AD, 433 AH, occurred a great earthquake, 50,000 people were killed, (SM). Hakim Naser Khosrov said that "They told me on 17 Rabi-al-avval 434 AH at Thursday night after prayer an earthquake occurred at the city, a part of the city was destroyed and another was not damaged and 40,000 people were killed; Hamdollah-e Mostofi referred to "Gazi Rokn-al Din's written (Majma-al Molk) "said that the earthquake occurred on 14 Safar 434 AH, at Thursday night and killed 40,000; he added that, Abu Taher, the Shirazian astronomer had warned the people of the city of the earthquake the day before, but the people did not believe him; he then asked the government to push out the people, but many of them who stayed in the city were killed. Abn-al Asir said that many important buildings and houses were destroyed by the earthquake of 434 AH and 50,000 people killed; he says that the Governor was safe, because he had not been in the

city. Hakim Qatran-e Tabriz described this earthquake in a poem, which said that the earthquake destroyed all buildings in the city and in many others and people of the city suffered by the earthquake all buildings in the city, a series of shocks continued for number of several months, (AA, DA, MH, NK, NM, QT, SR). Shirvani dates the event in 433 AH but seems to be in error, (SZ). The earthquake of 434 AH was a great earthquake, (SM). Sobhani thinks that the description given by Quatran is relative to a second earthquake, (SR).

- 1052 AD, 444 AH; A violent earthquake occurred in Khuzestan, Arjan, Izaj and number of other cities and was most severe at Arjan. A large fissure appeared in the mountains; in the cracks of the mountain there appeared a brick building, (AA, SM).
- 1052 AD, Ardistan and Irak? Khorassan, I, (MJ).
- 1052-1053 AD; In 444 AH, a destructive earthquake occurred in Khorassan, it was violent in the Baihaq, its castles, the mosques and wall of the city were ruined. In 464 AH the city was rebuilt by Nezam-al-Molk, (AA, SM).
A number of early writers mention an earthquake that caused extensive damage in Khorasan sometime between May 1052 and April 1053 but they do not refer to any particular locality. At that time the province of Khorasan was enormous, extending from the Caspian Sea to Samarkand and southwards to the confines of Sind, and it seems very probable that this event was connected with the destruction of Kuhistan, which is to the north of the Ferdows-Qayen area, (AD).
- 1058 AD, 450 AH; In Musel, a strong earthquake occurred, lasting one hour. Many houses were destroyed and many people were killed. The earthquake extended from Musel in Iraq to Hamadan in Iran; and afterwards a number of other earthquakes occurred in the same area (AA, SM). Musel II (MJ).
- 1058 September 23 - October 21. The two As-Soyuti MSS, with slight differences, give an earthquake in Baghdad which extended to Hamedan, Tikrit, Wasit and Anah. From Abu'l Fida we learn that this earthquake occurred most probably in 1058 February 27 and that it had its epicenter near Mosul where it caused great damage. "Anah is a small town on an island on the Euphrates (34.4°N - 42.0°E). It is however, equally probable that the Mosul earthquake of February 27 affected Baghdad, Wasit, Tikrit, and 'Anah, while Hamadan was affected by a shock from the Jabal area which was active in 958 AD, (AC).
- 1066 Mar. - April; Again between March and April 1066 Khorasan was devastated by an earthquake, but no locality is mentioned by name, (AD).
- 1066 - 1549 AD; eight catastrophic earthquakes are mentioned by early writers as having occurred in Khorasan, (AD).

- 1066 AD, In 458 AH, an earthquake occurred in Khorassan and in the mountains. The mountains were split. Many villagers sank into the ground. Many people were killed. The remainder ran away and took refuge in the desert. The earthquake occurrence lasted for some time, (AA).
- 1065 AD, 458 AH, Jebal, there occurred a number of earthquakes continuously for several days, (SM).
- 1067 AD, 460 AH; Ramleh, Jebal, Felestin, A great earthquake, (SM).
- 1067 AD; Chardin (1811) refers to an earthquake in 1067 which overturned the walls of Qazvin and ruined a third of the town. This may be the case, but we find no mention of this in the writings of the geographers that describe the events of 1066 - 1068 in Qazvin. Wilson (1930) refers to the statement made by Chardin on the authority of the "History of Qazvin for the year" AH 460 (1067 November 11 - 1068 October 30). The only earthquake mentioned in the As-Soyuti MSS for AH 460 is in Palestine where Ramla was destroyed, (AC).
- 1085 AD, 478 AH; Khozestan (SM). A number of strong earthquakes took place in Khozestan and Fars, which was destroyed; Many houses were destroyed and many people were killed at Arjan, (AA).
- 1092 AD, 485 AH; Kord-Kuh, earthquake, (SM).
- 1101 AD, 495 AH; Kord-Kuh, earthquake, (SM).
- 1101 AD; 38.47 - 43.3, VI, at Van (EC).
- 1111 AD, Van II, (MJ). 38.47°N, 43.35°E, $I_o = IX$. Van and vicinity of Van lake, (EC).
- 1117 AD 511 AH; Iraq - Adjan and Iraq - Arah, Earthquake, (SM).
- 1119 December 10. Imam abu- Kassin el-Rafia in his book on the history of Qazvin ascertains As-Sloyuti's statement that on Wednesday, the 5th of Ramadan AH 513, Qazvin was destroyed by an earthquake. He gives no details, (AC).
- *1124 AD, Khorassan, III, (MJ).
- 1120 November 29. El-Rafia states that Qazvin was shaken again on the 5th of Ramadan AH 512. He does not indicate whether this time the shock caused any damage; it is probable that he refers to the previous earthquake as he gives the same date for both events, (cf. As-Soyuti), (AC).
- 1129 AD, 524 AH; Jebal, An earthquake (SM). Referred to by Abn-al Asir "at Rabi-al-avval 524 AH, the cities of Jebal, Musel and Algeria, a great earthquake occurred, there were many destructions". Jebal is included in Rey, (KH).
- 1134 AD, 529 AH; Jebal, an earthquake, (SM).
- 1131 AD; 40.4°N, 43.6°E, VII, At Ani, Digor, (EC).
- 1134 AD, 529 AH; Jebal, earthquake occurred, (SM).
- 1139 AD, 534 AH; Ganjeh, An earthquake occurred, 230,000 people were killed, (SM).
- 1147 AD, 542 AH; Halavan, Earthquake (SM).

- 1149 May 11 - 1150 April 29. As-Soyuti (a) maintains that in AH 544 a great earthquake occurred and Baghdad was shaken violently about ten times; also, that a mountain in Khalwan was shattered by the shock. In his MSS he adds that near Khalwan the mountain fell and that the Turkomans suffered greatly. This suggests a continued activity along the Zuhab Makhsabadan line of the Zagros with new slides within the region of previous seismic activity, (AC).
- 1155 AD, 550 AH; Iraq-Adjam, Earthquake, (SM).
- 1166 October 28 - 1167 October 16. Chardin (1811) mentions an earthquake in AH 562 that caused some damage in Qazvin. Wilson (1930) dates this earthquake in 1169, (AC).
- 1175 AD, 571 AH; Mavara-al-Nahr and Iran earthquake (SM). Referred to by Abn-al Asir: "In the cities between Rey and Iraq occurred an earthquake. In Rey and Qazvin many people were killed and many buildings were destroyed." (KH).
- 1177 AD, 573 AH; Baghdad; An earthquake occurred. (SM).
- 1193 AD, 590 AG; Iraq-Adjam, Iraq-Arab, earthquake, (SM).
- 1207 AD, 604 AH; Musel, an earthquake, (SM).
- 1208 AD, 605 AH; Nishabur, was destroyed by an earthquake. The town Shad-yakh, some kilometres away was built instead of Nishabur, (Hamdollah Mostafi, SM, KM).
- 1225 AD, 622 AH; Musel, Earthquake, (SM).
- 1272 AD, 671 AH; Tabriz, an earthquake occurred, (SM).
In the year 671 AH, in a winter season there occurred an earthquake; many houses were destroyed, many minarets fell down, (Rashid-al-Din fazlollah).
- 1280 AD, 679 AH; Nishabur - Shadyakh was destroyed by earthquake. Again the town was displaced to the present location, (Hamdollah Mostafi, KM).
- 1314 AD, 714 AH; Earthquake occurred in Tabriz (SM).
- 1319 AD; 40.4N, 43.6E; Agri, Ani, (VII EC).
- 1324 AD, 725 AH; Earthquake occurred in Hamadan (SM).
End of 14th century AD, 8th century AH; A great destructive earthquake is said to have occurred in Shahr-Rey. The whole town was leveled to the ground. The news of this earthquake is in the book "Manam Teimour Jahagosha". The original source is not known (KH).
768 AH; The town Hashtborad was destroyed and the town went under the ground because of the immorality and rebelliousness of its inhabitants. Several thousand old houses collapsed. (MZ).
(It is supposed that the event referred to was an earthquake.)
- 1400 AD; According to the Koutb ed-Din Lahidji an earthquake damaged Koutoum or Housem, now the town of Rudsar (37.13°N - 50.15°E), some time in the beginning of 1400 AD. He gives no details. (AC)
- 1403 AD, 806 AH; An earthquake occurred in Hamadan and Waset, (SM).
- 1439 AD; 38.6N, 42.3E; VI, Felt in vicinity of Nemrut mountain, (EC).
- 1441 AD; 38.9 N, 42.7E; VIII, an earthquake occurred in Van, Nemrut, (EC)

- 1444 AD; An earthquake occurred in the region of Nemrut. Then the Nemrut mountains cracked and poisonous gas caused many people to be sick. About 30,000 people were killed (AS).
- *1549 Jul; In July 1549 Qayen was destroyed and 3,000 people were killed in the region. At the time the dependency of Qayen, known as the Tungayen district, extended as far north as Nimbluk and included Ferdows (Tun) to the west. However, in Qayen the old mosque (musjid), built in 1368, is still standing, suggesting that the town of Qayen did not suffer much and that the bulk of the damage occurred in other parts of the district, perhaps in the Nimbluk Valley and Ferdows. In this instance, as in others, the fact that historians refer by name to a dependency should not be interpreted that its capital was necessarily involved. (AD).

890 AH; Sunday 3 Shaban, near sunset; An earthquake took place in a number of districts, destroying many buildings and killing many people. Shakur, 70 persons buried, Karajian and Golijan 106 persons; in Rudbarat many killed; Palis, Talqan 78 persons. In Tankabon a number of castles, bathes, and mosques collapsed partly; Ranku, Lahijan, Kism, Kileh, Gukeh, Lashtnesha were severely damaged, but no one was killed. Old buildings were destroyed but no one was killed. Many animals were killed by rockfalls. The strong and important building Sardabeh-Sarakarajian was leveled to the ground. In the following days several earthquakes occurred which gradually decreased to one a day up to the month of Ramadan, (MZ). In the history of Gilan (Khadive A. , 1319) said that in 890 AH, third of Shaban, an earthquake caused destruction in the country of Mirza-Ali in name Bih Pish.

- 1485 August 14. In his book on the history of Gilan, Mir Zahir Ed-Din El-Mar'achi (1917) mentions an earthquake on the 3rd Sha'ban. AH 890 that caused considerable damage in Tamijan (Rahikuh or Gourab-i-Ranikouh 37.10°N - 50.16°E). The palace built by Seyyed Razi was destroyed together with other buildings. The shock was felt in Lahijan (37.16°N, 50.0°E) and in Biepush (37.0°N - 49.6°E) but did not cause severe damage nor casualties, (cf. Rabino, 1917). According to Hasan Beg Roumlou (1917), a year later the tomb of Sheikh Ibrahim Zahed Builani was threatened to be submerged by the Caspian Sea and was therefore removed to a new place inland near Sheikanbar (37.15°N - 50.14°E). Although Roumlou's statement may not be connected with the 1485 seismic activity, it adds to our information for the fluctuations of the level of the Caspian. (AC)
- 1505 AD, 911 AH; An earthquake occurred in Kabol (SM).
- 1519 AD, 925 AH; An earthquake occurred in Kabol (SM).
- 1527 AD; A letter referring to an Armenian writing said that an earthquake occurred in Tabriz.
- 1549 AD, 956 AH; Earthquake in Khorassan (SM). During the year
- 1549 3,000 people were killed in Khorassa and Qaiin. The degree of destruction was III (MJ).

- 1549 AD, 956 AH; In the month of Moharram, five villages in the Province Qazvin were destroyed by earthquake; 3,000 people were buried. (SM).
- 1554 AD, 962 AH; An earthquake occurred in Kashan (SM).
- 1611 Dec. 9; Khorassan, Dughabad, III, (MJ).
- 1619 Nov. 27; Khorassan, Dughabad, III, (MJ).
- 1633 AD, 1043 AH; A strong earthquake occurred in Tabriz, (DA, SR).
- 1639 AD, 1049 AH; A violent earthquake occurred in Qazvin; 12,000 people were killed (SM).
- 1640 AD; Tabriz, Damascus, II, (MJ).
- 1641 Feb. 5; Tabriz, III, was felt in Baghdad, (MJ).

A number of recent writers refer to Arakil, an Armenian writer, who said that a very destructive earthquake occurred in Tabriz. Many very important buildings, mosques and castles completely collapsed. The buildings which collapsed were: Sham-Gazan, the historical mosque of Usta-Shayerd and a number of other important mosques and the famous Karvansaray-e Tabriz. The earthquake lasted for 6 months. In the first two months several shocks per day, decreased to one a day at the end of the 6th month. Many springs dried and many new springs started, (DA, SR, KM).

A private note which belongs to Mr. Dianat (Tabriz), said to be from Arakil "In the morning of Feb. 5, 1641, a frightful earthquake occurred in Tabriz and its neighbourhood. The earthquake was so strong that the ground was shaken as a willow tree. The noise was as water in a glass and so strong that people supposed it came from hell. The buildings which were very important collapsed completely and many animals kept indoors because of cold were killed. The people with much difficulty dug out the bodies of their families.

- 1646 AD, 1056 AH; The city of Van destroyed by an earthquake, (SM).
- 1647 AD, 39.74 N, 43.04 E, Earthquake in Agri (EC).
- 1649 AD, 1066 AH; a violent Earthquake took place in Tabriz (NH). In this year another violent earthquake occurred in Tabriz, (Mir-Boghay-e Badakhshi, DA, SR).
- 1664 AD, 1075 ZI-hajah; A violent earthquake occurred in Damavand and vicinity. The buildings were all destroyed; numerous people were buried, (SM).
- 1664 AD, Tabriz, I, (MJ).
- 1668 Jan. 4; In the last Jamadial Akhar 1078 a very violent earthquake occurred in the cities of Shirvan and Shemakhieh. 12,000 people were killed and most buildings of Shemakhieh were destroyed (SM). Reference to the note of Mr. Dianat; Ararakil said that on 4 January
- 1668, in Azarbaijan and in parts of the Caucasias an earthquake took place, which was so strong that the people standing in a church fell down, and the lusters of church could be heard shaking.
- 1673 Aug.; Khorassan, Mashhad, Nishabur, II (MJ)

- 1673 AD, 1084 Rabii-al-avval; A destructive earthquake took place, in Mashhad. 4,000 people were killed. The tomb of Imam Reza, Bazar and many houses were destroyed. In Nishabur 1,600 people were killed (SM). Chardin in his diary says that on the 11th August
- 1673, two thirds of Mashhad, and a half of the city of Nishabur were destroyed by an earthquake. The tomb of Imam was destroyed.
- 1673 Aug; In August 1673 another earthquake caused severe damage to the south of Torbat. Between this date and the beginning of the twentieth century there is a big gap in the seismic history of Khorasan. (AD)
- 1667 March 6 - 1678 February 22. According to Lahidji in AH 1088, during the feast of Korban in the morning, Lahijan was shaken by a severe earthquake; all the mosques with their minarets, the ĩmamzadeh, the baths, bridges and public buildings were destroyed. The Mesdjij-i-Djame with its minarets also collapsed, (AC).
- 1679 June 4 to 12, Caucasia, The fort of Erivan and all the country round, to the Ararat chain, III, (MJ).
- 1683 Nov. 27; Caucasia, Erivan and on the frontiers of Persia and Turkey, I, (MJ).
- 1687 Apr. The town of Mashhad was ruined, II, (MJ).
- 1692 AD; In the early morning Erivan was destroyed by an earthquake (AS).
- 1701 AD; (38.47°N, 43.65°E), VII, Van, (EC).
A strong earthquake occurred in the city of Van and for some time after people lived in towns (AS).
- 1704 AD; (38.47°N, 43.65°E) VI at Van (EC).
An earthquake occurred in the city of Van (AS).
- 1707 AD; (40.61°N, 43.1°E); VII at Kars (EC).
An earthquake destroyed the city of Kars and killed several thousands (AS).
- 1709 March 13 - 1700 March 1. Rabino (1917) refers to an earthquake in AH 1121 that shook Resht. He gives no details. (AC).
- 1713 January 28 - 1714 January 16. Resht was shaken again, apparently without any damage, Rabino (1917) (AC).
- 1715 AD; (38.7°N, 43.5°E); Van and Ercis region, (EC). In the city of Van and neighbourhood, an earthquake caused some damage (AC).
- 1721 AD, 1134 AH; Tabriz; A violent earthquake occurred. The town was totally destroyed; 250 people were killed (SM, Montazam-e Naseri).
- 1721 April 26, Tabriz, 8,000 lives lost, III, (MJ).
- 1727 AD, 1140 AH; Tabriz; An earthquake occurred (MK); was very frightening and strong (SM); Milne says it occurred on 18 November and 77,000 persons were killed, III, (MJ).
- 1755 AD June 7. From press reports of the time we learn that in the region of Kashan more than 600 houses were destroyed and 40,000 people killed. The shock was very violent and it was felt in Isfahan and Tabriz, Porter (1821), Perrey (1850); it seems that the shocks felt in Tabriz were of different origin and that the epicenter of the main shock was near Kahrud, south of Kashan, (AC).
- 1766 June 9 - 1767 May 29; Lar (Fars), The town was completely destroyed by an earthquake (ER, on May 2, 1960).

- 1780 AD, 1194 AH; Tabriz; An earthquake occurred (MK); all walls were rendered unsafe by the earthquake (FM); on the 1st Moharram 1194, 1¼ hour after midnight, during winter season, there happened a frightening earthquake (SR); The number killed was 70,000 (Dianat, unpublished communication); Mr. H. Gazi (unpublished communication) quotes from Abd-al-Razzaq-Baik Donboli, and says that the number killed was 120,000 and he added that the earthquake was one of the important earthquakes of the 12th century AH; Nakhtchevani says on the 30 Zil hahhah 1193 an earthquake occurred in Tabriz, but the earthquake of 1194 was much stronger than 1192, and the number killed was 100,000 (NH). In 1780 Feb. - March 3, Tabriz, II, (MJ).
- (1783) AD, 1193 AH; Kashan; The city was completely destroyed by earthquake (NH). In the book of history of Kashan dated 1287 AH, it is quoted from Abd-al-Rahim Kalantar Zarrabi (Soheil Kashani) "about 100 years ago at midnight an earthquake occurred in Kashan and many buildings of the city were destroyed and a half of people were killed. The number of killed was 30,000; They were buried in the customs of religion Mohammad in the city of Kashan. Many others were buried as was by the earthquake and number of others were discovered after. Before the earthquake there was a heavy rain for four days and nights. The earthquakes continued for one month, two to three times a day." The city had about 45,000 people and it may be said that two thirds of the population were killed (ZA).
- 1787 AD, 1201 AH; Tabriz, The town was destroyed because of earthquake (NM), There occurred a destructive earthquake (FM).
- 1791 AD; In this year, Khoy, Tabriz, Urmiah (Rezaiah), Khaneh, Van, Erzerum were damaged by an earthquake (AS).
- (1794) AD, 1207 AH; An earthquake occurred in Kashan, (Donboli).
- 1808 Southeast Gilan. Felt in Tehran and Resht. No details. Rabino (1917) (AC).
- 1809 AD, 1224 AH, On the Friday afternoon of last days of Shavval, a great earthquake took place in Mazandaran- the ground was faulted and black clay came out from it. Many earthquakes occurred for several months after; some important buildings were destroyed (SM).
- 1810 Mazandaran. An earthquake caused much damage at Sari and destroyed the Masjid-i-Juma at Barfurush or Babul. More shocks in
- 1811 (Press Reports). (AC).
- 1815 June. Strong shocks in Damavand. No details (Press reports, AC).
- 1820 AD, 1236 AH; Shiraz; Two violent earthquakes occurred in Shiraz during one year, causing much destruction and killing many people (SM). The city wall built by Hosein-Qoli Khan Gajar was destroyed by the earthquake, (SZ).
- 1820 Mazandaran. Strong shocks in Meshha- Sar, and Babul (Press reports)(AC).
- 1823 AD; 1239 AH; Shiraz; A violent earthquake occurred and many followed during 18 months, those in the first six months being stronger and more numerous, but gradually they became slight and few (SM).

On 27th of Shavval at the sun rising; a number of strong and violent earthquakes took place and the buildings and most of the beautiful houses were demolished. Many people were killed. Many earthquakes occurred during the following one and half years "The destruction of the city was so great that when they started to rebuild it it was not possible to build it as before (SZ).

- 1823 AD, 1239 AH; In the cities of the Mazandaran and others many people were killed by an earthquake (SZ).
 - 1824 June 23; Shiraz and Kazerun, III, (MJ).
 - 1825 Oct. Shiraz, II, (MJ).
 - 1830 May 9. East Damavand. About 500 persons killed in the mountainous villages southeast of Damavand; rock falls and damage in Lavasan, Hoff (1841), (Press reports) (AC).
 - 1840 AD; Nakhichevan, Maku, Tabriz, Kars, many cities in Armenia and Azerbaijan suffered by an earthquake; in the vicinity of Ararat were started five volcano eruptions in association with this earthquake. The historical village of Agourt was completely covered with volcanic dust and materials (AS)
 - 1840 AD; (40.1°N, 43.4°E) VII, Agri, Kagizman, Igdir (EC).
 - 1840 June 20 - 28; Armenia, the whole district of Mount Ararat II (MJ)
 - 1840 Jul 2; Armenia, districts of Surmalas, Sharum 39°, 45'N 45°E, and Nakhichevan 39°, 12'N, 45°26'E, Talish and Ordubat district III (MJ).
 - 1840 Jul. 6, 8, Armenia district of Mount Ararat III (MJ).
 - 1840 Jul. 27; Armenia, Ararat and Shahriar III (MJ).
 - See Jul 2 This and the three preceding events may be components of one megaseismic event (MJ)
 - 1840 Nov. 29, Armenia, Nakhichevan and neighbouring districts more violent in Shahriar II (MJ).
 - 1841 AD; 39.53°N, 44.1°E; VI Dogu-Bayazit (EC)
 - 1841 May 18, Armenia, village of Kibrukh 39.24°N, 45°.9E Nakhichevan III, (MJ)
 - 1841 Sep. 22, Armenia, Nakhichevan and neighbourhood, I (MJ).
 - 1843 AD 1259 AH; Khoy (Azarbaijan); The city was destroyed by an earthquake, (SM).
 - 1844 AD, 1260 AH; Azarbaijan, Sarab, Garmrud and a number of villages in the civinity suffered an earthquake (SM).
 - 1844 Apr. 25; Rasht, A strong shock, no damage (Rabino 1917, AC).
 - 1844 AD, 1259 AH; At Kashan, 2 hours before sunset an earthquake occurred, about 1,500 people were killed. During the next 28 years, every year the city was shaken several times by earthquakes but they were not so destructive (ZA).
 - 1844 May 12; Ispahan (Esfahan); Julfa, Azerbaijan (Azarbai-Jan) and Irak, III, (MJ).
- (There are two Julfas, one at 38.8°N - 45.5°E in Azerbaijan about 60 Km north-east of Khoy, the other at 32.7°N - 51.4°E South of Esfahan. Arak is at 34.2°N - 49.7°E.)

- 1844 May 12, Southeast Luristan. Strong earthquake that extended from Julfa (Isfahan) to Golpayegan, Iraq Adjemy, and Daulat-abad (Malayer). Much damage in Iraq Adjemy and Malayer, Perrey (1850), Gorelikof (1960) (AC).
- 1846 Jan 11; Armenia, Nakhichevan, I, (MJ).
- 1851 Apr. 13, Armenia, Nakhichevan, I, (MJ).
- 1851 AD, 1268 AH; Khabooshan; Lightning, which burned several shops. preceded the earthquake. The earthquake caused heavy destruction (SM).
- 1851 AD, 1268 AH; A strong earthquake occurred at Shahrud (SM). See also 1852 earthquake in Khabooshan (SM).
- 1852 Feb 22; During the 19th century, the first major earthquake occurred in 1852 on the 22nd of February and almost totally destroyed Khabooshan, modern Quchan, killing 2,000 people (Ambraseys et al, 1971).
- *- 1862 October 1. Gilan; Strong shocks at Enzeli (Bandar-e-Pahlavi) and Resht. Numerous aftershocks. No damage. Musketof-Orlof (1893)(AC).
- 1853 AD; Shiraz; In the year 1269 Rajab 25, on Wednesday night, a violent earthquake occurred, causing heavy destruction. About 12,000 people were killed (SM). In the year 1269 AH, in Shiraz a violent earthquake occurred and the town was completely destroyed (NH). In the earthquake of 1269 AH, 13,000 people were killed and a large part of Shiraz was ruined (RR). On April 21-22, Shiraz, 12,000 people were killed, III (MJ). The city of Shiraz, in Persia, was totally destroyed by an earthquake on the night of May (Times, 29 Jun. 1853, 4, f See also: PA, 1854, 21, 1, 467-68).
- 1853 Jun 2; JUSD, Fort Umachan-JUSD damaged, I, (MJ).
- 1853 Jul. 11; Ispahan (Esfahan), 10,000 people were killed, III, (MJ)
- 1853 July 11. Southeast Luristan. A strong earthquake followed by numerous aftershocks killed 10,000 people in the region northwest of Isfahan; Golpayegan heavily damaged. (Press reports), Perrey (1867)(AC).
- 1854 Sept-Oct; Tabriz; On Sept 22-23 an earthquake occurred in Tabriz and another one on Oct. 30, and many slight tremors happened every day. This is quoted from Khanikov as was experienced by himself, accordingly: "Bull. Hist. Phil. de l'accd. de St. Petersburg, 1855, p. 251; 1858, p. 337-52" (MK).
- 1854 Sept. 23 or Sept. 28; Tabriz; II, (MJ).
- 1854 Oct. 1; Persia and Caucasia, Ghilan, Rasht, Enzeli and Shemakha, I, (MJ). See also: PA, 1854, 16, 6, 24.
- 1857 Oct. 27 ? Tesong, Azarbaijan, II, (MJ).
- 1861 AD, 1278 AH; Fars, Because of destruction by earthquakes in Fars, 6,000 tumans were donated for the repair of public buildings (SM).
- 1862 August 13. Iraq Adjemy. Two shocks caused damage at the northern flank of the Kuh-i-Kehriz at Khurud, 25 miles south of Kashan. (Press reports), (AC).
- 1862 October 1. Gilan. Three violent shocks felt at Resht and Enzeli (Press reports), (AC).
- 1862 Dec. 21; Shiraz, II, (MJ). See also: PA, 1864, 16, 6, 176-77.

- 1863 Jan. 1-2, Shiraz (PA, 1865, 17, 5, 108).
- 1864 Jan. 3, Caucasia, Ardabil, also felt at Lenkoran, Karabagh and Shirvan (Shemakhieh), II, (MH).
- 1864 Jan. 6; Near Ardabil 4 villages destroyed, III (MJ).
- 1863 Dec. 30 - 1864 Jan 2. Caucasia, Azerbaijan, Ardabil, Tabriz, Nowshahr (PA, 1865, 27, 5, 208- 211), (PA, 1866, 18, 44).
- 1864 Feb. 8; Ardabil, A series of earthquakes occurred from 30 Dec. 1863 (PA, 1866, 18. 51).
- 1864 January 3. Azerbaijan (Khalkhal). The villages of Gnert, Kandishlek, Nawshahr. (16 miles southeast of Ardabil) and Nir (south of Salvan-kuh) were destroyed and 500 people were killed. Ardabil was slightly damaged. The shock was felt in Karabah, Shirvan, Ur, and Lenkoran. The earthquake was accompanied by extensive ground deformations southeast of Nir, (Press reports), Mjsketof-Orlof (1893), (AC).
- 1864 Dec 2 - 5, Baghdad (PA, 1866, 18, 91).
- 1868 AD, 1285 Jamadi-al-avval 11, About midnight, a strong earthquake occurred, which was felt in Tehran, Firuz-kuh, Qom and Kashan (SM).
- 1868 Jan 20; An earthquake caused considerable damage in the region between Shahrud and Sabzaval ruining Alhak (AK, TK).
- 1868 January 20. A strong shock caused some damage at Altshaki, between Shahrud and Sabzavar (Press reports) (AC).
- 1871 AD, 38.47 - 43.35, VII, Van region, (EC)
- 1871 Dec. 11, Caucasia, Gulija, 39.57°N - 43.30°E, 56 miles west of Erivan and in the Echmiadzin district, II, (MJ, M Ø).
- 1871 Dec. 23; Khabooshan, Bojnurd; An earthquake occurred which destroyed half of Khabooshan, and buried about 2,000 of its inhabitants in the ruins. On Jan. 6, 1872, another severe shock destroyed the remainder of the town and killed about 4,000 people. 4 forts near the town were so completely buried that not a trace of them can be seen. It was estimated that 30,000 lives were lost in Khabooshan, Bojnurd and surrounding villages by the effects of these earthquakes (Nat. London 1872, 39) On 23rd December 1871 a major earthquake devastated the region of Khabooshan killing more than 2,000 people in the district of quchan and on Jan. 1872 an equally strong earthquake caused serious damage between Bojnurd and Quchan, in which about 4,000 people were killed (Ambraseys et al 1972).
- 1872 Jun. Hamadan, III, (Fuchs, MJ).
- 1872 Jun; According to Fuchs, Hamadan was destroyed by an earthquake. Rather improbable; not mentioned in press reports of the time, (AC).
- 1874 July 28, Persia, Tabriz, I, (MJ).
- 1879 March 21 Azerbaijan. Destructive earthquake in southern Khalikhala (Heroabad). The following villages were completely destroyed: Karahiran, Hadjitaran, Meshkidjik, Nir, Mehmet-Ibraimbekam, Dashanli, Saganji, Dursun-Nadjali, Hadili, Armadag, Germerud, Sar-i-gambih, Engidgeh, Diza; over 400 people were killed. Mianeh, Lashanli and Tark were damaged. A strong after-shock occurred on 22nd March. (Press reports), (AC).

- 1879 March 12 - Apr. 2 Tabriz to Mianeh and Zenjan, III, (Fuchs).
On 22 March at 3h. 42m. It lasted 12 seconds and was felt at Tabriz and east as far as Zendjan. No damage was caused in Tabriz, but in the vicinity of Mianeh, where the shocks continued with more or less vigour up to April 2, great damage and loss of life have occurred. Official damage gives 21 villages totally destroyed, 54 villages greatly damaged, 922 people killed together with 2,660 sheep, 1,125 oxen, 124 horses and 55 camels. The centre of the shock was the mountain Bousghoush. Several strongly-built houses were thrown down at Mianeh and in others large vents made in the walls. The most severe damage appears to have been occasioned in two villages off the road, 4 farsang (4x5 km) from Minahe, i.e. Tark and Manam. They were totally destroyed and over 500 and 600 people were killed respectively, (Nature). On March 22, 3h 15m., Khalkhal suffered considerable damage; Kara Shiram destroyed, Hadji-Kuli-beki destroyed, Hadji-Taran 100 killed, Meshkidyik destroyed, Dashanli destroyed, Sangandji destroyed and 100 killed, Mehmet-Ibraim-bekam many killed, Nir destroyed, Dursun-Hadiali destroyed, Armudag 150 houses destroyed, Germerud many houses destroyed, Sary-gamluch destroyed, Engidje destroyed, Dizah damaged, Lashanli damaged, Tark damaged, (Mushkelof 1896).
- 1879 Apr. 2; Bojnurd was damaged and 700 people perished in the ruins (Ambraseys et al, 1971).
- 1881 Jun. 7; 38.47° N-43.3° E, VIII, Van and Nemrut region) (EC).
- 1881 Aug. 28; Azarbaijan, Choi (Khoy = Khoi), Tabriz, II, (MJ).
Tabriz Sept. 12; over 40 shocks of earthquake have been felt at Khoi between the 28th ult. and yesterday. Some houses were destroyed, but no lives have been lost. Most of the inhabitants have left the town and are encamped outside. The direction of the earthquakes was from North to South. The shocks were accompanied by rumbling noises (Times, 13 Sept. 1881, 3 f). On 10 Jamadi-al-avval 1299, in Khoy a strong earthquake occurred, (SM).
- 1881 AD, 1298 AH Saggez; was completely destroyed (SM).
- 1882 - 1883 Mar 21, 1299 - 1300 Jamadi-al-avval 10, in Kazerum (Fars) there occurred an earthquake (SM).
- 1882- 1883 Mar. 30; 1299 Jamadi-al-avval 10; In Astarabad (Gorgan) there occurred an earthquake (SM).
- 1883 May 3; Tabriz and most of Azarbaijan III (MJ).
In the same year, there occurred an earthquake in Khoy (SM). The earthquake destroyed the walls of Khoy (SM).
- 1884 Mar. Persian Gulf, Muskat, Nedjd, III, (MJ).
- 1884 May 19, Persian Gulf, Kishm, id. III (MJ).
- 1890 Jun. 28; Between Mashhad and Tehran, Tash (Tash) II, (MJ).
- 1890 Jun. 28; A damaging earthquake ruined the district between Astarabad, Shahrud, and Bastam, causing particularly heavy damage at Tash; at Bastam 150 people were killed (Ambraseys et al, 1971).

- 1890 July 27. Asterabad. Destructive earthquake in Gorgan (Asterabad). Gorgan was heavily damaged and Shahrud suffered much. Bastam was destroyed and also Tash where the ground was displaced and many rock-slides blocked small rivers. The shock was felt in Baku and Chikishlyar, and it was followed by many aftershocks. The epicenter was near $36.9^{\circ}\text{N}-54.2^{\circ}\text{E}$. (Press reports) Popov (1940), Rezanov (1959). (AC).
- 1891 Apr. 4; $39.15^{\circ}\text{N}, 42.5^{\circ}\text{E}$; Malazgrit (EC). Under date April 4, that on the preceding day the hamlet of Adeljiwaz in the district of the Van in Armenia had been destroyed by an earthquake. 146 houses had been destroyed and hundreds of lives had been lost. The misery of the survivors ... (Times, 15 Apr. 1891, 5 f)
- 1891 April 3; Armenia, Van, Adeljiwaz, III (MJ).
- 1893 Nov. 17, 7h; $37.1^{\circ}\text{N}, 58.4^{\circ}\text{E}$, II (SSK).

The earthquake of the 17th Nov. 1893 in Quchan affected a large area, killing 5,000 people. It was followed by many strong aftershocks which added to the damage (Ambraseys et al, 1971).

Correspondent telegraphs that a severe shock of earthquake was experienced on Friday evening in the town of Kashan (?) two thirds of which was destroyed, our correspondent, by Indo-European Telegraph (Times 1893 Nov. 21, p. 5a).

Mild shocks of earthquake continue to be felt in Mashhad and the town of Kashan (?) is reported to be totally wrecked. There has been great loss of life and property, and the supply of food and water is exhausted. Most of the survivors have fled to the mountains. - Our correspondent, by Indo-European Telegraph. (Times 22 Nov. 1893 5,d).

A correspondent who has just visited Quchan telegraphs follows: "Quchan is a heap of ruins, not a house remains standing. The scene is indescribable. Bodies are still being recovered. It is established that the loss of life has been in the proportion of two deaths to every house. The sanitary condition of the place is very bad. Earthquake shocks, preceded by loud reports in the hills to west, continue to be felt only in the town and in the immediate vicinity. The neighbouring villages escaped with little damage. Communications are suspended for the time, and the prospects are not encouraging. There is some talk of building a new town to the eastward." Our correspondent, by Indo-European Telegraph. (Times, 2 Dec. 1893, 5 d).

On the 17 Nov. 1893 we had a severe shock of earthquake in Mashhad, the same that destroyed the town of Quchan, 92 miles away. I was sitting at dinner at the time and despite the $3\frac{1}{2}$ feet thickness of the walls of the houses everything shook so that I was by no means sorry to find myself out in the veranda. The shock was a long one. (Yate, 1900).

From Quchan I marched to Kharkan, ten miles down the valley. We passes three villages, all of which had suffered by the earthquake, and were being rebuilt. The shock, however, did not extend beyond them, Kharkan had been hardly damaged at all. (Yate, 1900).

Quchan I found (in Nov. 1896) to be no longer the old town that saw after its destruction by the earthquake in 1894. A new Quchan was being built eight miles to the east of the old town, near the village of Haihai, and walls and houses had been laid out and houses were being built. (Yate, 1900).

- 1894; 38.47°N, 43.3°E. Van area (EC)
- 1895 Jan. 17; 11 hr; 37.1°N, 58.5°E, II, (SSK). In the year 1312 AH, the city of Quchan was ruined by an earthquake. Many people were killed (NH). January 7, and January 17; Quchan, Mashhad, III (MJ). Quchan, which was destroyed by an earthquake 14 months ago and immediately rebuilt, was again destroyed on January 17. Many lives were lost, 100 women being crushed in one bath. The extent of the damage and the loss of life are not yet known. Extreme weather prevails causing terrible suffering. At least four slight but distinct shocks of earthquake have been felt in Mashhad during the last 3 days, but no damage has been done (Times, 21 Jan. 1895, 5e) The first shock of earthquake which occurred at Quchan on January 17 was felt at noon and in three minutes times, the place was felt in complete ruins. A great number of persons are said to have perished. In many instances the unfortunate people were burnt to death, but most of them crushed. 600 persons were entombed in the mosque while engaged in the prayer, and another 600 perished in the various baths. The telegraph instruments were destroyed and the wires broken. .. Not a single building remains, all without exception, have been levelled to the ground. Since 17th inst. shocks have occurred daily, on January 22 one of equal severity took place at 6 p.m. followed by the three others at intervals of one and four hours ... (Times, 26 January, 1895, 5d).

The disastrous earthquake in Persia: A correspondent writes under date of Mashhad, January 30: - "In accordance with your instructions I proceeded to Quchan to view the scene of the late disaster. The journey of 92 miles was as severe as I have ever experienced; the cold was simply awful, and sleeping in these caravanserais is by no means pleasant. On January 22 we had to put up at Jaffarabad, four farsacks distant from Kuchan, owing to inclemency of the weather, and here we experienced several severe shocks, so sharp was the last that the walls of the room which we were occupying were cracked in two. It was pitiful to see the terror-stricken natives huddled together in the open exposed to the full force of a cutting wind, together with babies and children screaming. We were glad to start at 4 o'clock next morning, making our way alone in the dark as best we could. Quchan was reached at 8.15 a.m. on January 23. The spectacle presented was simply one mass of bricks and mortar; without exception every building was levelled to the ground. The wailings of the poor unfortunates was terrible. Most of them have since died from exposure, the cold being intense. The first earthquake took place on Thursday January 17, at noon, and in three minutes the whole place was reduced to ruins. In the mosque 600 or 700 persons whilst engaged in prayer were entombed. To add to the calamity no food or water could be got for several days. The telegraph instruments were smashed and the wires were thrown down for several miles. At the time of the catastrophe great numbers had crowded in from the neighbouring villages to sell their wares, and many of them

have perished. It is a difficult matter to arrive at a correct estimate as to the amount of mortality, but from my interviews with those of the survivors whom I could rely on I am inclined to think that as many as 11,000 have perished, though I feel bound to add that one of the consular authorities puts it at a much lower figure. No means whatever have been taken to extricate the dead bodies. The survivors are all more or less demoralized and their fears are kept alive by the shocks which still take place occasionally." (Times, 15 Mar 1895, 15b)

- 1895 Jan.; Quchan; The aftershocks of Jan. 1895 were particularly severe and they ruined completely Quchan (Ambraseys et al, 1971).
- 1896 Jan. 2 - 5; According to a Reuter telegram from Tehran, there have been two severe earthquakes in Khalkhal, north of Mianeh. The first occurred during the night of Jan. 2. It was not felt outside the district, but completely destroyed the large village of Ganjabad and partially destroyed several other villages. 300 persons lost their lives. The second shock occurred early on the morning of the 5th inst. and was very severe, being felt more than 100 miles away. The small town of Goi (Khoy) was completely destroyed, 1,000 being laid in ruins, while great damage was done to many villages. The loss of life in Goi alone amounted to 800 persons. (Nature: 53, 252, London, 1896).
- 1896 Jan. 2 - 3; Gandjabad (37° , $17'$ N; 46° , $46'E$). At night an earthquake occurred, 300 persons killed (AM).
- 1896 Jan. 5; (38° , $34'$ N; 45° , $2'E$) in the morning at Khoi an earthquake occurred. The city and a number of villages were completely destroyed. Only 800 persons were killed at Khoi (AM).
- 1896 Jan 2; Khalkhal, north of Mianeh, Khoy, Ganjabad, III, (MJ).
- 1896 Jan. 2; Azerbaijan. Very strong earthquake on the southern slope of Sahend-kuh; 300 people killed and many villages destroyed near Ganjabad. The shock was felt at Khoi and Mianeh. Epicenter near 37.17° N - 46.6° E. (Press reports), Agamennone (1900).
- 1896 Jan. 8; a sharp earthquake disturbance was also felt at Mashhad and Kalat at 10h 50 m on the morning of Jan. 8. (Nature: 53, 252, London 1896).
- 1897 Jan 11, (night). Qishm Is.; town levelled to ground; 1,600 people were killed. Only two mosques and three or four other buildings left standing, III; Larak Is. Loss of life, III; Lingeh, no loss of life, (Persian Gulf Gazetteer, MJ).

By far the most severe earthquake of recent times in the Persian Gulf area was one which, on the night of the 11th of January 1897, laid Qishm town in ruins; only two mosques and three or four other buildings were left standing, and over 1,600 bodies were said to have been afterwards recovered from the ruins. There was some loss of life, on this occasion, on the island of Larak; and vibrations were felt as far to the west as Lingeh. (Persian Gulf Gazett.)

The island (of Kishm) in the winter of 1896 was the scene of a terrible earthquake, in which 1,200 people were killed, and almost every house destroyed. (Sykes, 1902)

- 1897 Jan. 11, an earthquake in Kishm causing enormous loss of life (Nature, 55, 276, London, 1897).
- 1898 January 15. Asterabad. A strong earthquake at Asterabad; it was felt at Chikishlyar. Heavy damage around Gorgan. Epicenter near 26.85°N - 54.4°E . (Press reports), Rezanov (1959)(AC).
- 1900 Sept.; 38.47°N , 43.3°E , VI, (EC).

APPENDIX II

Macroseismic Notes on the Earthquakes between 1901 and 1972.

The earthquakes in the period 1901 - 1972 are indexed in table (2. 1) which contains the microseismic data relative to the events in Iran. Additional information from newspapers, seismological reports and all other sources are presented here chronologically. Occasionally remarks are added on the correspondence or lack of it between micro- and macroseismic data. In many cases, macroseismic information is required to achieve an accurate location of an earthquake, especially during the earlier part of the period covered.

1. Unless otherwise stated, the information was obtained from the Iranian daily press (Keyhan and Etela'at).
2. All dates and times are given in GMT.
3. Dates and times refer to the event, not to the date of the newspaper report. In many cases, the date of the event had to be established by combining several sources such as: newspaper reports, seismological station reports, microseismic data.
4. When an intensity is given in brackets, such as (vi), the value has been deduced by the author on the basis of the macroseismic data.
5. When an intensity is given in brackets and followed by a reference to a source, such as (vii, SHI) the value is the one deduced by the source on the basis of macroseismic data.
6. Comments given in brackets are by the author.
7. The symbols referring to sources can be found in the Bibliography.

For the more recent earthquakes, some unification of vocabulary was attempted in the collection of newspaper information. the terms used to describe earthquakes of increasing strength are

Felt
Felt, people frightened
Felt, slight damage
Strongly felt, damage
Destructive.

It was found that in most cases reports fell quite naturally in the above categories.

The following remarks apply mainly to the more recent earthquakes (1941 onwards):

1901 Nov.(8 - 12)? A telegram from Tiflis states a severe earthquake is reported from ERZERUM. There were 50 shocks altogether, of which ten were especially violent, many buildings were destroyed and according to the official report 22 persons lost their lives. (Times: 16 Nov. 1901, 7 f).

Since the appeal which appeared in our issue of the 28th inst. for subscriptions in aid of the sufferers by the above, further particulars are to hand. The shocks have been very numerous, though as many were slight, accounts differ as to the number, 50 being a fair average from the 8th to 12th inst., the third shock on the morning of the 8th having been the most severe. By that about 80% of the poorer class of houses were demolished, while in the better class windows were broken, walls rent, and the plaster detached from the walls, ceilings, etc., while vases, lamps, clocks, etc., were thrown down and broken. About 20 lives were lost. Everyone felt that another severe shock would bring the majority of the houses down, consequently all the inhabitants took to sleeping in the open under tents or other rough shelter procurable, a most miserable state of things considering that the snow was falling and a few hours would bring 20 or 30 degrees of frost. (Times: 4 Dec. 1901, 9, 7 f)

See also: Times: 28 Nov. 1901, 10 f; 13 Dec. 1901, 9 c.

1902 Feb. 13, 9h.40m; Shemakha; $I_0 = (VIII - IX)$
It is announced from SHEMAKHA that the recent earthquake there was attended by very great loss of life. On the 14th inst., the dead bodies of about 200 persons who had been buried by the earth were dug up and rescue excavations are still being carried on. The work is however, one of great difficulty, as the shocks are of constant occurrence.

The earthquake in Shemakha district continued at intervals yesterday. The towns and villages for 20 versts round have suffered severely.

The district headman of Shemakha telegraphs: "The town is now almost completely destroyed. Only some dozen houses, which were less seriously damaged, remain standing. Many persons have been killed. The church, the mosque, the barracks, and the

treasury building have been destroyed, while the prison and the district government buildings have been seriously damaged. Twentyfive thousand inhabitants are without food and shelter. At half past 10 this forenoon the earthquake shocks still continued. (Times: 17 Feb. 1902, 6 b).

A battalion of guards and a number of sappers, with 200 tents have been sent to Shemakha, the whole population of which is encamped in the open air. The number of persons who have perished in the earthquake is estimated at 2,000, and the number of houses which have been destroyed at 4,000. Thirtyfour villages in the Shemakha district have suffered from the earthquake. Near the village of Mararasa, east of Shemakha, a volcano is in active eruption. (Times: 18 Feb. 1902, 5 f).

.... the town of Shemakha has been completely laid in ruins by the earthquake which occurred on 13th inst., more than 20,000 people having been rendered homeless and many hundreds having lost their lives. The first shock was felt about midday and was the most violent. In a few seconds the Orthodox Church, the mosques, the public buildings and hundreds of houses had fallen. The disaster was rendered the more terrible by an outbreak of fire immediately after the first shock. It was the Tarta portion of the town which suffered most.

.... Eight hundred bodies have been recovered at Shemakha ... (Times: 19 Feb. 1902, 5 e).

.... Altogether 4,500 houses have been destroyed in Shemakha (Times: 24 Feb. 1902, 5 b).

According to the report issued by the committee appointed to ascertain the extent of the destruction wrought by the recent earthquake in the Shemakha district, 126 villages, with a total of 9,084 houses, were visited by the disturbance. Of the houses, 3,496 were destroyed. In addition, 4,163 farm buildings, 11 churches, 41 mosques, 3 mills, 3 schools, and 6 silk-weaving factories suffered damage. 86 persons were killed and 60 injured. A number of cattle also perished. (Times: 10 March 1902, 5 e).

A severe destructive earthquake took place at SHIRVAN at 12h. 30m. The town and 100 villages suffered seriously. More than 2,200 people were killed. The shaking in Shirvan was so strong for half an hour that the people could not come to help those who were in the buildings. All buildings in Shirvan, even an 800 year old mosque, were completely destroyed. (Saleh Djalil - Ogli - Ardabili, 1319, AH.).

1902 Apr. SHEMAKHI state severe earthquakes
10 and half past 10 evening 17th inst. (Times: 21 Apr. 1902, 5 f).

1904 May 04, SHEMAKHI, A severe earthquake
shock was felt at Shemakha last evening. (Times: 5 May 1902, 8 a).

1902 Jul. 09, 03h. 38m; BANDAR-AB BAS, According
to some newspapers, shocks of earthquake have been of daily
occurrence at Bandar-Ab bas. Since 9th inst. the inhabitants are
camping owing to the abnormal heat. Other towns in the vicinity
have been damaged. The old fortress of Ormuz is destroyed and
QISHM is in ruins. The loss of life is presumed to be small.
(Times, 26 Jul. 1902, 7 e).

Bandar-Ab bas, Kishm Id., destructive (BS)

1902 Aug. (22), at 8 a.m. on 22 August only
a dozen people were killed in the town of KASHGAR, but many villages
were wrecked in the north part of the province. The total loss of
life was 1,000 (Times: 26 Sept. 1902, 3 e).

.... In earthquake 29th ult. total number of 860 persons
killed. (Times: 1 June 1903, 7 f).

1903 May 3 - 28, VAN and surroundings. (EC, KV).

1903 Sept. 25 - Dec. 17. KHORASSAN-TURKEMAN
TURSHIA, Destructive (BS)

and also see: (AD, TD).

1904 Nov. 9, KHORASSAN, Ziberg (GK)

1906 Jan. - Jun., VAN-AZARBAIDJAN (EC). A telegram
from Shemakha (Government of Baku) states that an earthquake was
felt there at 10 minutes past 12 last night. There were three shocks,
but no one was killed or injured. (Times: 22 Feb. 1906, 5 f).

1907 Mar. 31 - Apr. 12, VAN-AZARBAIDJAN. A number
destructive earthquake (KV).

1909 Jan. 23, 02h.48m. BRUJIRD; Great earthquake in Persia. Immense loss of life, (Tehran, Feb. 17, 1909)- Belated reports received by the Government record a severe earthquake on January 23 in the province of Luristan. In the districts of Brujird and SELHOR, although they are sparsely populated, 60 villages have been wholly or partially destroyed, some have been engulfed completely. The loss of life is estimated at between 5,000 and 6,000 and twice as many cattle have perished. The destitute survivors are flocking to Brujird, appealing to the Government for help. On January 23 at 03h.54m, the seismographs of the stations at Berlin, Hamburg, Lailiach and elsewhere in Europe registered severe earthquake shocks. The observatory at Cape Town registered correctly, calculated the general direction of the earthquake and its distance from the seismographs as about 2,000 miles to the east or south-east of Berlin. The area affected by disturbances covers about 100 miles. The town of Brujird has a population of between 16,000 and 18,000. (Times: 18 Feb. 1909, 7 b).

1923, May 12; 22h.57m; KAVAINKA (Caucus), A severe earthquake, with some loss of life, was reported in the vicinity of Kavainka mines (BSSA, 1923, vol. 13, 80).

1923 May 25, 22h.21m. TORBAT-e-HEIDARIEH, Destructive earthquake, a number of villages destroyed in the region of Torbat - e - Heidarieh and in many seismic stations were observed long surface-waves (STR).

.... reports a severe earthquake which occurred at Torbat - e - Heidarieh causing considerable loss of life and property. The Simla seismograph records a slight shock fifteen hundred miles away at the same hour. (Times, 28 May 1923, 11 c).

.... concerning the disastrous earthquake at Torbat - e - Heidarieh (....) says that six villages in the vicinity of the town were completely wrecked. The loss of life is estimated at 4,000, shocks are still felt in the affected area, ...

The original shock lasted from 11 p.m. on the 25th till 4 a.m. on the 26th. (Times: 30 May 1923, 13 b).

See also (AD, TD).

.... The recurrence of slight earthquake shocks in Torbat - e - Heidarieh on June 01 and June 02, there were no casualties. The surrounding villages, in addition to the city, are now evacuated owing to the custom of counting the population by the number of houses, it is difficult to estimate the total deaths but it is agreed that there are over 3,000 casualties, including only 50 injured. (Times: 1923, June 6, 13 b).

.... De Bilt observatory in Holland, which has a first class installation, tells us that slight traces of the Persian earthquake were found in the records, from which the time of the shock can be inferred as May 25th, 22h. 21m. 45sec. (GCT) or about 2h. 20m. on May 26 in local time at the epicentre ... (Times: 1923 June 5, 15 e).

See also: Times: 1923 May 31, 15 e.

May 6 (?) 1923, The entire region about Torbat was destroyed by an earthquake which occurred on this date and lasted 15 minutes. Damage was extensive. (BSSA, 1923, vol. 13, p. 80).

Torbat - e - Heidarieh, May 29 (?), 1923; Earth shocks on this date covered a period of several hours. Advices from Tehran state that 1,000 persons were killed. (BSSA, 1923, Vol. 13, p. 81).

June 17, 1923, Earthquake shocks have occurred continuously since the shock of May 6 (?) 1923. Eight villages were destroyed in the week preceeding June 17, and about 3,000 persons were killed. Many persons fled in terror from the KHORASSAN region. Torbat is in the region affected by the earthquake. (BSSA, 1923, Vol. 13, p. 81).

.... The earthquake near MESHAD reported from Allahabad in your columns on May 28 and May 30 belongs to the class which does not produce sensible effects except in the neighbourhood of the shock, where unfortunately they may be disastrous. There was no record traceable on our seismograph here in Oxford (....) at Simla (1,200 miles away) there was apparently a slight affect,

.... it may be remarked that an earthquake near Meshad on March 24, 1918 seems to have been nearer the surface than usual, according to the records at LA PAS in Bolivia ... H.H. Turner, Univ. Obs., Oxford University. (Times: 1923 May 31m 15 e).

1923 Aug. 20 (?); Torbat - e - Heidarieh; ... Five severe earthquake shocks have been felt at Torbat - e - Heidarieh during the last 24 hours. The inhabitants are panic-stricken. (Times: 1923, Aug. 21. 7 d).

See also: BSSA, 1923, 13, 114.

1923 Sept. 17, 07h.09m. Destructive earthquake at MASHHAD and BOJNURD (STR).

A severe earthquake was experienced in Bojnurd in the morning. Slight shocks were felt simultaneously in Mashhad. No damage resulted (BSSA, 1923, Vol. 13, 116).

Bojnurd, Sept. 20 (?), 1923; Nine villages were totally destroyed and 22 partially destroyed by earth shocks. The tremor caused the death of 157 persons and the injury of 156. (BSSA, 1923, Vol. 13, 116).

(Possibly the event mentioned by BSSA as Sept. 20 is the same as the Sept. 17 event.).

1923 Sept. 22, 20h.47m. KERMAN; A very strong earthquake at Kerman (STR). (1923, Sept. 27,) ? Severe earth shocks were felt at Kerman, and in a lesser degree at Bujnurd, RAFSENJAN, RAIN, and ANAR. The observatory at Tashkent recorded numerous shocks in the region south of Tashkent and up to the frontier of Turkestan. (BSSA, 1923, Vol. 13, 116).

(It is presumed that the earthquake given in BSSA on Sept. 27 is the earthquake of Sept. 22.)

1923 Sept. 23, 03h.18m., Kerman, Sept. 29 ? 1923; earthquakes which had been occurring for some time in this district were continuing at this date. They again became heavy and damaging but no details were received (BSSA, 1923, Vol. 13, 117).

(The BSSA report is a general feature on the seismic activities of the area after the main shock.)

Sept. 25, 1923, KHORASSAN, 125 persons were killed in an earthquake on this date. (BSSA, 1923, Vol. 13, 116).

(As no instrumental record is known for such a large earthquake, the BSSA report is perhaps an additional news report on the earthquake of Sept. 17 at Bojnurd. It could also be a news item referring to the Kerman region and mistakenly attributed to Bojnurd. The third possibility is that the press report belongs to both events.)

1924 Feb. 19, 06h.59m. LENKORAN (Caspian Sea), Azarbaijan in the border region of Iran - USSR: Felt (STR).

1924 Sept. 13, 14h.34m. ERZERUM: Destructive (STR).

(Sept. 16, 1924) ? Dispatches from Moscow and Constantinople state that a very severe earthquake occurred in the Erzerum district of Turkish Armenia on Sept. 16. It is reported that eight villages were seriously affected and that the earth tremors continued for a considerable time. It is also reported that over 200 lives were lost in the wrecked houses. (BSSA, 1924, Vol. 14, 215.)

(September 20, 1924) ? A dispatch from Constantinople states that new earth tremors shook the province of Erzerum on Sept. 20th, and that 60 persons were killed and 300 villages destroyed. Huge fissures are reported to have appeared in the fields. (BSSA, 1924, Vol. 14, 216.)

1925 Mar. 12, 11h.20m.; A severe earthquake was felt at BUSHIR on the Persian Gulf on Mar. 12, the extent of damage was not stated (BSSA, 1925, Vol. 15, 74).

1925 July 30, 18h.43m. LURISTAN (STR).

1925 Sept. (18); A severe earthquake shortly after midnight on the morning of Sept. 18, drove peasants of the SENGHOR district into the open. Little damage was done to the mud houses of the villages, but cracks in the fields destroyed the irrigation systems, causing heavy loss to the peasants. (BSSA, 1925, Vol. 15, 244).

1925 Dec. 10. 04h.59m. SHIRVAN; A few people were killed at Shirvan (AK, TK). The origin time of the event is given in (SSK) one hour later than in (ISS) and (KSA)

1926 Apr. 18, Eight heavy earthquake shocks which occurred within six hours in the region of MAKU, north-western Persia on April 18, 1926. (BSSA, 1926, Vol. 16, 161).

1928 Mar. 8, 18h.14m. NEHANDAN; A special dispatch states that the greater part of the town of Nehandan in SISTAN province was destroyed by heavy earthquakes on March 10th. The first shock occurred at 10.00 p.m. lasting three minutes. Four persons were reported to have been killed. (BSSA, 1928, Vol. 18, 69).

1925 Dec.18, 05h.53m. Persian Gulf (STR).

1926 April 02, 11h.56m; KURDISTAN (STR).

1926 April 23, 01h. 31m, Southern Persia (STR).

1926 May 19, 21h. 13m, TURKESTAN - Afghanistan (STR).

1926 Oct. 22, 16h. 44m, LENINAKAN and ERIVAN:
destructive (STR).

1926 Oct. 22, 16h. 44m; Leninakan, 15 persons were killed and 80 seriously injured, while in the district round about 300 persons were killed and 300 injured. Twelve villages were badly damaged, six of them being almost completely destroyed.

.... Seismographic station at Tiflis states that the earthquake was due to a collision between massive mountain layers (ISS).

The shock was followed by a larger earthquake in the same epicentral area at 19h. 59m, on the date of Oct. 22.

1926 Oct 22, 19h. 59m. The whole Armenian republic was shaken by a series of earthquakes occurring in the evening of Oct. 22. The first were felt at 7 p. m. and were followed five minutes later by violent shocks which caused the population to panic. Still more violent shocks occurred at 10.50 p. m. at Leninkan. Some 300 people were buried alive and it is reported that not a single structure in the city escaped damage. All the streets were littered with heaps of debris and telegraphic communication was stopped. Many other cities were also severely damaged. Later reports place total number of deaths at 400. Many other shocks of less severity occurred during the week following the first shocks. (BSSA, 1926, Vol. 6, 273).

Associated Press dispatches from Leninkan, under dates of Nov. 3 and 7 state that earth quakes have continued for fifteen days, averaging five shocks daily, with five major shocks of intensity 9 on the seismic scale of ten.

It is now reported that 34 villages have been devastated. The total loss of life is estimated at 1,500. (BSSA, 1926, Vol. 16, 275).

.... dispatched from Moscow under date of Dec. 3 states an earthquake in the region of Leninkan is reported to have destroyed the village of Kapli. Nothing was known as to victims and extent of damage, if any, in nearby towns. (BSSA, 1926, Vol. 16, 276).

1927 Jan (12)?, ERIVAN (Armenia): The press reports a severe earthquake which occurred at Erivan at 7.00 a. m. on Jan. 12th. (BSSA, 1927, Vol. 17, 51).

1927 Jul. 22, 03h.54m, KSARA, Seismological Observatory reported a very important earthquake in South-East Caspian Sea. The trace amplitudes were recorded on NS component 54 m.m., and on EW component 40 m.m. The magnification of both components was about 150. After the main shock, three very remarkable aftershocks were recorded on Jul. 22; 8h.37m, July 23, 20h.17m and July 23, 22h.40m. (KSA).

1928 March (10), NEHANDAN, Another severe earthquake was reported to have occurred at Nehandan on March 12th. Those two earthquakes destroyed 1,000 houses in one village and damaged many more. (BSSA, 1928, Vol. 19, 69).

1928 Aug. 21, 19h.02m. A severe earthquake was felt in the province of KHORASSAN at 11.00 p.m. on Aug. 22nd. It has been reported that 10 persons were killed at NISHAPOUR and buildings were damaged at SABZVAR, SHIRVAN, and NISHAPUR. (BSSA, 1928, Vol. 18, 239).

1928 Aug. 23, 03h.53m; Perse ? Ressenti en Perse (STR).

1929 May 1, 15h.37m; SHIRVAN: A severe earthquake occurred in the Shirvan and GIFAN region and caused numerous casualties in Khorassan. Several villages were destroyed in the earthquake. The towns of Shirvan and QUCHAN suffered more than others. The destruction and casualties of the earthquake at Shirvan was highest. The earthquake is referred to as the Shirvan earthquake (ER).

The earthquake extended between Atrek and the Caspian Sea in a South-east direction. It was associated with a fissure on the ground 25 km. long and 3 metres wide (STR).

There was a severe earthquake in Khorassan yesterday evening. Several villages are reported to have been destroyed, and it is believed that several hundred people have lost their lives. In the neighbourhood of SHIRVAN, on the ATREK and BOJNURD some 700 buildings are reported to have collapsed. (Times, 6 May 1929, 15 d).

.... It is reported that the severe earthquake which occurred in the KUCHAN and SHIRVAN districts of Northern KHORASSAN on May 2 devastated a large area 100 villages being destroyed and over 1,000 persons killed (Times, 7 May 1929, 16 b).

According to the latest news, the earthquakes on May 2 affected a large area along the perso-soviet frontier. The number of killed is now said to be nearly 2,000 of whom about 1,000 were in the province of GILAN*, ... (Times, 8 May 1929, 15 d).

Several earthquakes ravaged the Khorassan province of Northern Persia on May 1, 2 and 3, taking an estimated toll of 2,000 lives and destroying several villages and 700 buildings in the large cities. The shocks were also felt in ASHKABAD, Russian Turkestan, where some damage was done. The (USCGS) in cooperation with Science Service and the Jesuit Seismological Association determined the epicenter of a shock on May 1 to be at (41°N - 53°E) on the eastern shore of the Caspian Sea, about 450 miles north of the Persian border. It does not seem likely that this was the shock which caused the damage in Persia. (BSSA, 1929, Vol. 19, 104).

In Iran and in the Sovier Turkestan, in the earthquake more than 3,500 people were killed, of which 2,500 were in Shirvan (AK, TK).

*1929 Jul. 4; A severe earthquake was reported on Jul. 4 1929 from ASHRAF and other towns in the Mazandaran district. There was no serious damage. (BSSA, 1929, Vol. 19, p. 179).

1929 Jul. 13, 07h.36m. A severe earthquake shook the KHORASAN region of Persia on July 15. A number of villages were reported destroyed, but casualties were light as the shock came in the day time. The district between SHIRVAN and KUCHAN was particularly hard hit. (BSSA, 1929, Vol. 19, p. 180.)

Reported felt at Khorassan (STR).

*(The shock given by the BSSA on Jul. 4 could not be found in the instrumental record, but an aftershock of the earthquake on May 1 1929, has been on 13 May. Perhaps the BSSA event and the instrumental event are the same event.)

1929 Jul. 15, 07h.44m; Perse, Baghdad (STR).

1929 Jul. 25, 00h.17m, Perse (STR).

1930 May 6, 22h.34m; Salmas; ... Reported a number of earthquakes at SALMAS, KHOY, SAVOJ-BULAG, MAKU, MARAGHEH on May 6, said that 2,000 persons were killed (ER).

.... Reported a shock before noon local time, 12 persons were killed and 20 persons injured. A main shock took place at 2 minutes past midnight. The casualties of the shock are estimated to be 2,000 and 60 villages completely destroyed. The people in the towns MARAND, KHOY, TABRIZ were disturbed by the earthquakes. Schools closed down (ER).

.... The earthquake of (1309 AH Sol.) caused a slight amount of damage at Tabriz (SR).

A frightening earthquake took place at Salmas (NH).

News of severe earthquake in Persia, AZARBAYEJAN has reached Moscow, although so far only in fragmentary form, the report states that the first shock was felt in the Urmiah lake district a few days ago, causing the majority of people to leave their homes and camp in improvised tents. A second and a more severe shock occurred 11 or 12 hours later and destroyed a number of villages, houses collapsed and buried all those who had not heeded the first warning. Information has not yet been obtained from the whole area affected, but the victims are estimated to exceed one thousand (1,000) killed and a greater number injured. (Times, 12 May 1930, 16c).

From Tehran, May '10, reports received here concerning the earthquake, state that the shocks have been extremely severe in SALMAS which has been almost entirely destroyed. The new quarter of the town suffering extensively. It is reported that 2,000 persons have been killed in the district, 5,000 injured, many tremors have also been felt in Tabriz and yesterday they culminated in an earthquake which lasted a minute and a half. Most of the inhabitants took refuge on the low hills to the south of Tabriz ... (Times 12 May 1930, 16 c).

The latest reports from the districts affected by the earthquake state that the shocks are lessening at TABRIZ, but are still very severe round SALMAS. The tremors are accompanied by a hundred rumbles.

.... It is stated on good authority that the deathroll is near 3,000, more than 2,000 as at first estimated. ... (Times, 13 May, 1930 15 b).

Reported two earthquakes at Salmas on May 5 (?). Most of the buildings in the town were said to have collapsed during the second and more severe shock. Later reports said that 2,000 persons were killed and 5,000 injured in the Salmas district. Many tremors were felt in Tabriz, culminating on May 10 in a severe earthquake lasting one and a half minutes (BSSA, 1930, Vol. 20, 101).

1930 May 8, 15h.35m; Northern OURMLA Lake, Southern GAKTCHA (STR).

1930 May 10, 21h.43m; Armenia - Persia boundary (STR).

1930 May 11, 22h.35m; West KERMAN (STR).

1930 May 12 (?), Earthquake continued to be felt in the SALMAS district on May 12, although intensity had lessened. (BSSA, 1920, Vol. 20, 101).

1930 Jun. 4, 07h.28m. A severe earthquake was felt on the plains of SALMAS on Jun. 14. The shock was felt at Tabriz (BSSA, 1930, Vol. 20, 102). (The BSSA report is adapted to the date and time of an event as given instrumentally.)

1930 Oct 2, 15h.33m. A severe earthquake shock was felt in TEHRAN on Oct. 2, at 7.00 p.m. Report said that several persons were killed, but this has not been verified. Telephone lines in the region of the shock were knocked down and communication with the stricken region was cut off. (BSSA, 1930, Vol. 20, 284).

1931 Apr. 27, 16h.50m. Armenia, ZANGUEZAR: 80% of villages were destroyed and many people killed and injured (STR).

1931 May 8, 9h.6m; NAKHICHEVAN: felt (LNN)

1931 Jul. 4 21h.0m. NAKHICHEVAN: felt (LNN)

1934 Oct. 29, 16h.00m BAKU: felt (iv-v, STR).

1935 Apr.5 - 15, MAZANDARAN; ... Districts in the province of Mazandaran Persia have been devastated by earthquake shocks. The first shock was experienced as long ago as the night of Apr. 12, and others of greater severity have followed during the intervening days. Over 480 bodies have been found and the search is still proceeding among the ruins of the dwellings which collapsed and in many cases were set on fire

.... The deathroll in the earthquake in Persia is put at over 600 according to a message received here. (Times, Apr.24, 1935, 10 e).

MAZANDARAN, Apr. 29, 1935; Thirty villages, mostly in the region of SARI were destroyed and hundreds of lives were lost in an earthquake which occurred in the fortnight preceding this date according to the press reports. (BSSA, 1935, Vol. 25, 275).

1935 May 1, 10h.25m; News from KARS states that 500 persons were killed and over 2,000 injured during the recent earthquake shocks. Rivers suddenly dried up and landslides blocked the roads. It is even reported here that the ARARAT volcano which has long been extinct, is again active. The centre of the earthquake is believed to be DIGOR. (Times, 4 May, 1935, 3 f).

(This earthquake is reported in (ISS) in 1935, but in (PF) and in (KV) who refers to (PF) in 1936. The same error is repeated for the event of May 2 at 20h. 57m, 30 S.)

- 1935 May 2; 10h. 13m.; Kurdistan (STR)
- 1936 Jul. 6; (?); 12 persons were killed and more than 5 persons were injured in an earthquake in Bamroud according to press reports (BSSA, 1936, 26, 391).
- 1937 Jan 7; 20h. 47m.; Erivan, Armenia; 4 earthquake tremors were felt in this city, the houses of some villages were cracked (BSSA, 1937, 27, 139).
- 1938 Jan 26; 3h. 40m.; Baghdad; An earthquake (III (RF), STR) .
- 1941 Feb. 16; 16h. 39m.; Intensity X-XII, at Mohammad-Abatkan; VI at Birjand (ISS). 600 were killed in Mohammad-Abatkan and strongly felt at Birjand (STR).
- 1941 Sept. 10; 2h. 54m.; Van, Malazgird, Agri, Kars-Keusse, Erzingjan and Billim, were destroyed, 500 people were killed in Agri (STR).
- 1942 Jun. 7; 10h. 47m.; Bandar-Abbas: (VI ?, ISS).
- 1944 Apr. 5; 18h. 6m.; Gorgan, One third of the houses were destroyed and the remainder rendered uninhabitable (NDI). 30% of the buildings were ruined and the other 70% were uninhabitable. Nearby villages were also damaged. Movements continued until 10 am (local time) of the next day. 20 persons were killed and 2 wounded (BH). 20 people killed (AK).

See also: Asfia S. Releve des seismes observes en Iran, 1941-1945 (manuscript, ISS). In Gorgan another earthquake rather stronger than the first shock took place at 18h. 29m. in the same epicentral area and at the same date. Before these two shocks, two other shocks were reported at 10 minute intervals at Shahrud at about 11h. on March 27, 1944. And number of shocks were reported to be felt at Gorgan and Aliabad after the main shock and for a few months after. (Press).

- 1944 Jul. 17, 10h. 53m.; Tigr valley, Iraq (STR).
- 1945 Jan 15. 5h. 30m.; Van, Muratiye (38.47°N, 43.30°E), (VI EC).
- 1945 Mar 12; 1h. 38m.; Region of Iran-Iraq border (STR).
- 1945 Jul 21, 1 h. 33m.; Van, destructive, (VII, EC).
- 1945 Jul 29, 8h. 57m.; Van, destructive, (VII, EC).
- 1945 Nov. 20; 6h. 28m.; Van, (VIII, EC).
- 1945 Nov 27; 21h. 57m.; The Baluchistan part of Ormara, Arabia, a town of 10, 000 on Arabian Sea, was destroyed by an earthquake and tidal wave, killing thousands of persons. The tidal wave killed 4, 000 persons at Karachi (BSSA, 1946, 36, 45). Felt as far as Dara, Ismail Khan, Montgomery. Area of maximum intensity greater than X (RF) was 11,500 square miles and V(RF) 440,000 square miles. Destruction of the towns of Pasni and Ormara. Large tsunami, damage in the port and on

the coast of Karachi, damage and casualties in the vicinity of Bombay. Appearance of four islands on an anticline partly submarine, which extends into the mud volcanos of Hinglaj (ISS).

See also: Nat. 158, 63, London, 1946, India Mete. Dept., Scientific notes, 10, 125, Simla, 1948; Acad. Sci., 222, 301, Paris, 1946, Nat. 156, 712, London 1946, BSSA, 1946.

- 1946, Feb. 10, 13h.13m.; Birjand: Felt strongly, slight damage, 3 people killed; And number of aftershocks were felt at Birjand and vicinity (Press, BH). Heavy damage at Givar, killing a number of people (TD).
- 1946 Mar 12, 2h 22m.; Destructive; was reported felt in the region of Shiraz (BSSA, 1946, 36, 373). Destruction between Shiraz and Persian Gulf at Northern Kenar-Tacht (STR).
- 1946 Mar 17.; Felt at Pasni, Coast of Mekran (NDJ).
- 1946 Aug 17; 9h 48m.; Destruction, Penjun and Soleimaniah (STR, USCGS, ISS).
- 1946 Nov 4; 21h 47m.; Intensity IV at Baku; III at Stalinabad (STR). In Northern Iran (BSSA, 1947, 37, 76).
- 1947 Aug. 5; 14h.24m.; Intensity (VIII) at Passni with landslides (NDI). The earthquake of Aug. 5 had its epicentre about lat. 25°N ; long. 62°E in the Arabian Sea south of Baluchistan. It was registered in America and Europe, where the ground amplitude reached 250 at Stuttgart. (Nature: 161, 657, London 1948).
See also: BSSA, 1947, 37, 350.
- 1947 Sept. 23; 12h 28m.; Khorassan: Destructive. In Doulatabad near Birjand, 412 killed, and 142 injured (STR). In Dolatabad number of 170 people were killed and 58 people injured, Saraiin 2 killed and 6 injured, Tcharmeh 8 killed and 30 injured, and in Hesarian 2 killed and 7 injured (Press, BH). In the region between Ferdows and Mohammadabad destroyed. The village of Dustabad or Dowlatabad was completely destroyed and Sarayan was heavily damaged. The village of Dehsarun and Minab suffered heavy damage and over 400 people were killed (Ambraseys - Tchalenko 1969). Reported, number of aftershocks were felt in Gain, Birjand and surrounding villages for a few weeks (Press).
- 1947 Oct. 6, 15h 18.3 m.; aftershock of the earthquake 23 Sept. 1947 at 12h.23m. (STR).
- 1947 Dec. 9 16h 32m. Probably aftershock of the earthquake 27 Nov. 1945 at 21h.57m. (STR).
- 1948 Jan. 30; 8h. 44m.; Near the epicentre of the earthquake 27 Nov. 1945 and Aug. 1947 (STR).
- 1948 Feb. 1; 23h.38.5m.; The epicentral region probably was in Kerman (STR).
- 1948 Jun 18; 18h.44m.; Iran and Turkmenia border, probably a premonition of the earthquake 5 Oct. 1948 (STR).
- 1948 Jul 5, 13h.53m.; In south central Iran (BSSA, 1948, 38, 293).
- 1948 Aug 5, 22h.35.3m. An aftershock of 30 Jul 1948. at 3h. (STR).

1948 Oct. 5; 20h 12m.; Ashkhabad, $I_0 = IX$; Number of 219 persons were killed and 10,000 injured by earthquake at Province of Khorassan (Press). 200 persons were killed and thousands injured by earthquake that rocked north-west Iran, about midnight local time; Damage was reported great, Reports from Mashhad say that parts of the famous Mashhad Mosque called Goharshad collapsed. Heavy casualties and property damage are also reported from Ashkhabad (BSSAm 1949, 39, 61). In Dareh-Gaz number of 35 persons killed, 540 injured and many buildings destroyed and many aftershocks occurred (Press, BH). Causing destruction and many casualties in Ashkhabad and Khorassan (ISS). The surface motion in Moscow was 0.4mm. The main phase of the earthquake estimated 15 seconds. Before morning October 6, several serial shocks occurred including the first disastrous one; The 6 aftershocks were felt clearly but weakly. The total number of shocks perceived during Oct. 6, was 11. The earthquake caused various changes on the earth's surface, such as cracks, landslides on mountain slopes and changes in the water volume of subterraneous springs; was developed mud volcano by the earthquake. The epicentre of the earthquake considered an epicentral axis between points located at coordinates $38^{\circ}03'N$; $58^{\circ}31'E$ and $37^{\circ}75'N$; $58^{\circ}65'E$. A destruction of the earthquake reached intensity IX in the epicentral zone near Ashkhabad. The Ashkhabad earthquake according to newspaper accounts, occurred simultaneously with a large earthquake in Iran, in the Quchan valley. The extensive destruction caused in Shirvan, Keifan, Quchan and other villages in this valley cannot be tied in with the focus of the Ashkhabad earthquake which is located at a distance of 80 to 100 km transversely to the trend of the folded structures (Rezanov, 1958).

See also: Rustanovich and Shirokova, 1964, Krumbach G, 1949.

1948 Oct. (6) ($33.5^{\circ}N$, $58.8^{\circ}E$): report of an earthquake (Press, BH).

1948 Oct. (11); (18.5)h. ($25.65^{\circ}N$, $57.77^{\circ}E$): Report of an earthquake (Press, BH).

1948 Oct. (11); (19)h.; ($35.8^{\circ}N$, $52.1^{\circ}E$): Report of an earthquake (Press, BH).

1948 Nov. (25); (21h. 3m.) ($38.2N$, $44.8E$) (V) (Press, BH).

1948 Dec. (1); ($35.7^{\circ}N$, $52.7^{\circ}E$): Report of an earthquake (Press, BH).

1949 Jan, (19); ($7\frac{1}{2}$)h. (37.47°N , 57.31°E): Report of two earthquakes (Press, BH).

1949 Jan. (13); ($22\frac{3}{4}$)h.; (35.7N , 52.7E) (V) (Press)

1949 Feb. (10); (20.5)h.; (34.2°N , 48.4°E): Report of an earthquake (Press, BH).

1949 (Apr (22); ($2\frac{1}{2}$)h; (35.7°N , 53.3°E): Felt (VI)(Press, BH).

1949 Apr (23); (36.2N , 58.8E): Report of an earthquake (Press).

1949 Apr. 24; 4h.22m.; Damage and casualties at Bandar-Abbas, according to press report quoted by Triest. Epicentre as adapted by ISS; depth probably greater than normal (ISS, STR).

1949 May (8); 37.4°N , 44.1°E ; VI, Hakkari, Semdinli (EC).

1949 May (10); ($1\frac{1}{2}$)h.; (38.5°N , 45.9°E): Felt.

1949 Jun (17); (36.2N , 50.0E): Reported two shocks (Press).

1949 Jun (22); (38.2N , 44.8E) Felt (IV).

1949 Jun 22; 1h.50m.; probably depth greater than normal (STR).

1949 Jun (23); (38.2N , 44.8E): Felt (IV)

1949 Jul 4; 3h.40m.; An aftershock of the earthquake 24 Apr. 1949 at 4h. (STR). The USCGS location is in Southern Iran north of Persian Gulf, Town of Bandar-Abbas, the JSA location is about $3\frac{1}{2}$ degrees inland and north of Kerman (BSSA, 1949, 39, 315). The epicentre is as May 13, 1949 (ISS). Near Bandar-Abbas coast of Persian Gulf (NDI).

1949 Jul. 14; (40.0N 60.0E)? If the records all refer to a single shock, the epicentre given by ISS is about the best. But it seems more probable that there were two shocks, one in India and one in Western Europe (ISS).

1949 Sept. (2), (1h.30m); (36.0°N , 45.9°E): Felt (V).

1949 Sept (2); (36.24°N , 46.2°E): Felt (V).

1949 Sept. (15); 12h, 53m (38.2N , 44.8E): Felt (IV) (Press, BH).

1949 Oct. (14); (19h.45m.); (38.2°N , 44.7°E): Felt (IV)

1949 Nov. 5; 15h.6m.; Gorgan (36.85°N , 54.42°E): Felt, people frightened (BH, Press).

1949 Dec. 10; (31.4°N , 49.5°E): Report of an earthquake.

1949 Dec. 17; 1h.13m.; Bojnurd (37.5°N , 57.3°E): Felt report of two slight shocks.

1950 Jan. 19; 17h.27m.; south of Shiraz (BSSAm 40, 156). Destruction in S.E. Bushehr, many villages destroyed, one person killed (STR). S.E. Bushehr, several villages were destroyed and about 20 deaths (IND).

1950 Jan. 22; 4h.7m.; It is probably an aftershock of the earthquake Jan. 19, 1950 (BSSA, 1950, 40, 156). Near south coast of Iran (IND).

1950 Jan. (29); (36.2°N , 46.2°E): Felt.

Jan. 30 1950 (see Jan 19, 1950); a series of sharp earthquakes in the area of Kangan, a small port 80 miles south east of Bushehr on the Persian Gulf, resulted in an undetermined number of deaths. First estimates of 1,500 killed were said to be greatly exaggerated. The most recent reports list 20 dead and two injured. One report stated that 20 villages were destroyed. The shocks were followed by severe cold and snow, which are unusual for the Persian Gulf. Reports of the earthquake were delayed by disrupted communication lines (BSSA, 1950, 40, 157).

1950 Jan (30); (35.0°N , 45.9°E): Felt.

1950 Jan (30); (36.5°N , 46.2°E): Felt.

1950 Feb. (1); (29.0°N , 50.8°E): Felt.

1950 Feb. 14, 0h.6m; (36.8°N , 54.1°E): Felt.

1950 Mar. (10); (27.2°N , 54.6°E): Felt.

1950 Apr. 6 d.; 2h.43m.; The Soviet press reported in the South Asia province of Ashkhabad bordering on Iran. (BSSA, 1950, 40, 245). (27.5°N , 59.4°E): Felt (Press, BH).

1950 Apr. (6): ($6\frac{1}{2}$)h; (38.2°N , 44.8°E): Felt.

1950 (May 1); (34.0°N , 50.4°E): Felt.

1950 May 9, 11h 17m; The shock appears to be complicated (NDI

- 1950 Jun (24); (36.47°N , 54.95°E): Felt.
- 1950 Jun. (24); (38.9°N , 44.9°E): Felt.
- 1950 Jun (30) ($5\frac{3}{4}$)h.; (35.2N , 52.0°E): Felt.
- 1950 (Aug 3); (8)h., (36.5°N , 52.4°E): Felt.
- 1950 Aug (20) (18h.40m.); (35.7°N , 52.6°E): Felt. (IV).
- 1951 Feb. (18); (3h.5m.); (36.8°N , 53.9°E): Felt. (IV).
- 1951 Feb. (22); (9)h; (36.8°N , 53.9°E): Felt (V+)
- 1951 Mar. 12; 15h.45m.; (38.5N , 47.0°E): Felt (IV).
- 1951 Mar. (17); ($15\frac{3}{4}$)h. (36.5N , 51.0E): Felt (IV).
- 1951 (Apr. 1); ($7\frac{1}{2}$)h.; (37.6°N , 58.4°E): Felt (IV).
- 1951 Apr. (13); (15h.45m.); (38.5N , 47.0E): Felt.
- 1951 Apr. (15); ($18\frac{1}{4}$)h; (34.6°N , 50.8°E): Felt (IV).
- 1951 Apr. 22; 6h.33m. at (36.0N , 52.0E) (VII). at (35.5N , 51.4E) (VI) (Press, BH).
- 1951 Aug. (16); 23h.52m.; (27.2°N , 57.1°E): Felt.
- 1951 Aug (28); (14)h. (27.2°N , 57.1°E): Felt.
- 1951 Sept. (9); (29.0°N , 50.8°E): Felt.
- 1951 Sept. (20); (13)h. Shirvan (37.4°N , 57.9°E): Felt.
- 1951 Sept. (20); ($22\frac{1}{2}$)h.; (37.4N , 49.4E): Felt.
- 1951 Oct. (13); (27.2°N , 56.3°E): Felt.
- 1951 Oct. (26); (22h (30)m.); (37.4°N , 49.5°E): Felt (VI).
- 1952 (Mar. 1); (0)h.; (37.0N , 45.1E): Felt (IV) (Press, BH).
- 1952 Mar. (10); (35.2°N , 58.4°E): Felt (IV) (Press, BH).
- 1952 (Apr. 3); (37.1°N , 58.5°E): Felt (Press, BH).

1952 Apr. (10); (11)h., (35.8°N , 52.1°E): Felt (IV).

1952 May 26; 5h. 7m.; (37.2°N , 50.0°E): Felt. (Press)

1952 Jun 5; (5)h.; (37.1°N , 50.0°E): Felt (V).

1952 Jul. 18; 0h. 44m.; (37.2°N , 50.2°E): Felt (VI) (Press)

1952 Aug. 1; 10h. 30m.; As on 6 Mar. 1949 (ISS).

1952 Oct. 19; 9h. (30)m.; (37.2°N , 50.2°E): Felt (IV) (Press).

1952 Oct. (28); (27.3°N , 54.35°E): Felt (Press, BH).

1952 Dec (23); 22h. (30)m.; (31.4°N , $49^{\circ}.5\text{E}$): Felt (Press, BH).

1952 Dec (23); (31.2°N , 48.4°E): Felt (Press, BH).

1952 Dec. (23); (30.0°N , 50.2°E): Felt (Press, BH).

1953 January 15d.; 20h. 6m.; North of Kerman; destructive; 11 people were killed and numerous injured (STR, Press). Reports said the village of Rayin was destroyed on Jan. 17, by an earthquake, 11 persons were reported killed and many injured. Rayin is a village of about 2,900 population in Kerman Province, South East Iran (BSSA, 1953, 43, p.183)

1953 Jan. 27; (38.6°N , 44.9°E): Felt.

1953 Feb. 12; 8h. 15m.; This earthquake was the object of a detailed study (Abdalian, 1953): 971 dead, 1,800 houses destroyed ... which originated on the southern edge of the Elburz at the line of contact with the wide depression of Dasht-e-Kavir. ... the destroyed villages aligned in an ENE -WSW direction, are situated along a notable tectonic irregularity. The large village of Toruel was entirely destroyed, as were Mehdiabad and Sadafe, the devastated area extended over more than 300 km. The extent of damage was increased by the poor state of repair of the buildings; dwelling excavated excavated on the edge of loess cliffs were crushed by the sliding of the surface layers. The ground effects included the formation of cracks of various depths and ejection of gypso-saliferous mud through the crusts of salt-flats (RJ).

On Feb. 12, 1953 an earthquake wiped out the mountain town of Torud, about 200 miles east of Tehran and was reported to have killed at least 1,000 persons. Reports said a great fissure opened in the earth and swallowed up some of the vicinities. The entire village, which was largely constructed of the crumbly mud brick common in that area, was said to have been leveled. The earthquake apparently destroyed all the wells in Torud and the surrounding hamlets. The shock was felt in Tehran. (BSSA 1953, 43, 185).

Much damage at Toronde (35.4°N , 55.0°E) and its neighbourhood. 979 dead, 1,800 houses damaged; 7 villages destroyed and 3 others damaged, epicentre on the Safote-Toronde fault. Epicentre as adapted Strasbourg (ISS).

See also: Abdalian, 1953.

1953 Feb (13); (7h.20m.) (37.0°N , 45.1°E): Felt (IV) (Press,BH)

1953 Feb (24); (35.3°N , 59.2°E): Felt (Press, BH).

1953 Feb. (19); (37.9°N , 56.2°E): Felt (Press, BH).

1953 (Mar. 1); (29.6°N , 51.7°E): Felt (Press, BH).

1953 (Apr.2); (4h.15m.) (34.6°N , 51.4°E): Felt (Press, BH).

1953 (Apr.2); (37°N , 45.0°E): Felt (IV), (Press, BH).

* 1954 Apr. (8); (37.2°N , 49.3°E): Felt (IV)

1953 Apr. (18); Early in the morning of April 18, a sharp, 3 seconds earthquake collapsed a number of buildings in Gorgan, a town in the northeastern Iran, at the foot of the Alburz mountains. There were no casualties. A series of minor shocks followed, the fifth of which collapsed more buildings. Most of those left standing were cracked and dangerously weakened (BSSA, 1953, 43, 270).

1953 Apr. (22); (20h.30.); (36.9°N , 54.2°E): Felt.

1953 May (28); (4h.30m.); (36.9°N , 54.4°E): Felt.

1953 May (28); (36.8°N , 53.9°E): Felt.

1953 Jun. 6; 0h.2m. (35.3°N , 59.2°E): Felt.

1953 Jun. 7; 2h.35m. (36.9°N , 54.4°E): Felt.

1953 Jun. (24); (37.6°N , 46.4°E): Felt.

1953 Jun. (29); (35.4°N , 55.1°E): Felt.

1953 Sept. (22); (35.2°N , 52.3°E): Felt.

1953 Oct. (14); (35.2°N , 52.3°E)

1953 Oct. (29); (34.8°N , 45.8°E): Felt.

1953 Dec. 30; 4h. 9m.; Near Hamadan (BSSA, 1954, vol. 44, 187).

1954 Jun. (24); (37.6°N , 58.4°E): Felt.

1954 Aug. (20); (29.0°N , 50.8°E): Felt.

1954 Sept. 2; 22h. 47m.; (35.2°N , 52.3°E): Felt.

1954 (Oct. 23); (6)h.; (32.4°N , 45.7°E): Felt, people frightened (V).

1954 Oct. (27); (37.1°N , 50.2°E): Felt.

1954 Oct. (27); (18h. 15m.); (37.1°N , 50.0°E): Felt, (V).

1954 Nov. 1, 21h. 10m.; North-West of Mashhad (BSSA, 1955, 45, 80).

1955 Jan. (7); ($10\frac{1}{2}$)h.; (39.3°N , 44.5°E): Felt, (IV).

1955 April 18, Southern Iran, the survey reports an earthquake at 19h, 16m and 07 s. (GCT), with preliminary epicentre 28°N , $52\frac{1}{2}^{\circ}\text{E}$, which is in the Fars region of Southern Iran, about $1\frac{1}{2}^{\circ}$ South of Shiraz (BSSA, 1955, 45, 254).

1955 Aug. (4); (34.8°N , 48.5°E): Felt (Press, BH).

1955 Aug. (29); (35.3°N , 59.2°E): Felt (Press, BH).

1955 Sept. (17); (7)h.; (35.3°N , 59.2°E): An earthquake (Press).

1955 Sept. (23), (5)h. (34.5°N , 48.0°E): Report of an earthquake (Press).

1955 Nov. 12; 10h. 33m.; (39.3°N , 44.5°E): Felt (IV) (Press).

1955 Nov. 13; 03h. 40m.; (37.6°N , 49.1°E): Felt (IV) (Press).

1955 Nov. (23); (36.8°N , 54.1°E): Felt (Press).

1955 Nov. (24); (35.5°N , 52.0°E): Felt strongly, slight damage (VI) (Press).

1955 Nov. (29); ($18\frac{1}{4}$)h.; (32.4°N , 51.4°E): Report of an earthquake (Press).

1955 Dec. 4; 14h. 2m.; (33.5°N , 48.9°E): Destructive (VII) (Press).

1956 Feb. 3; 13h. 16m.; (34.2°N , 48.4°E): Felt (Press).

1956 Feb. (14); (13½)h.; (37.1 N, 58.5 E): Felt (Press).

1956 (Mar. 3); (36.8 N, 54.1 E): Felt (Press).

(1956 Apr. 3); Dehshak and Boznabad: Strongly felt, damage, (Press).

1956 Apr. (7); (36.4 N, 48.3 E): Felt (Press).

1956 Apr. (11); (23½)h.; (36.2 N, 49.6 E): Felt (Press).

1956 Apr. (11); (37.4 N, 49.5 E): Felt (Press).

1956 Apr. (11); (37.2 N, 49.6 E): Felt (Press).

1956 Apr. (12); (31.2 N, 48. E): Felt (Press).

1956 Apr. 12; 22h. 35m.; (37.2 N, 50.0 E): Felt (VII) (Press, BH).

1956 Apr. 12; (37.3 N, 49.5 E): Felt (V) (Press, BH).

1956 Apr. 12; (37.5 N, 49.5 E): Felt (IV) (Press, BH).

1956 Apr. 13. (2)h.; (37.3 N, 49.5 E): Felt (IV) (Press, BH).

1956 Apr. (20) (¾)h. (37.1 N, 50.0 E): Felt (V) (Press, BH).

1956 Jun. 2); (23½)h. (37.2 N, 50.0 E): Felt (IV) (Press).

1956 (Jun. 8); (2¼)h.; (36.9 N, 54.4 E): Felt (Press).

1956 (Jul. 1); (32.0 N, 49.3 E): Felt (Press).

1956 Oct. (29); (38.2 N, 48.2 E): Felt (V) (Press, EC).

1956 Oct. 31; 14h. 3m, 43s.; Destructive earthquake in Laristan, on the edge of the Persian Gulf, near Bastak, 410 dead, 170 injured, extensive material damaged; 25 of the 27 villages of the canton of Gowdeh were destroyed; 8,000 people rendered homeless in the canton of Bastak, numerous aftershocks (Press, RJ). Ninety persons were killed, and 180 injured in Laristan and Bastak according to radio report from Tehran (BSSA, 1957, vol. 47. 81).

See also: STR.

Nov. 11, 1956; Earth tremors still rocked the LAR region on the eastern shore of the Persian Gulf, the area destroyed by earthquakes that started ten days ago, twenty five villages have been destroyed and about 800 persons are homeless (BSSA, 1957, vol. 47, 82).

In the village of Bostak 347 people were killed and 267 injured, (VIII)(ER).

Another report said 14 earthquakes were felt very strongly during the last 24 hours after the main shock (ER).

1956 Nov. (21); (27.2 N, 54.2 E): Felt.

1956 Nov. (22); (32.5 N, 48.4 E): Felt.

1956 Nov. (24); (32.5 N, 48.4 E): Felt.

1956 (Dec. 2); (27.2 N, 54.3 E): Felt.

1956 Dec. (7); (27.2 N, 54.4 E): Felt.

1956 Dec.(24); (27.2 N, 54.4 E): Felt.

1957 Jan. (7); (27.2 N, 54.4 E): Felt.

1957 Mar. (7); (35.1 N, 50.4 E): Felt.

1957 Mar. (16); oh.43m. See SE.

1957 Apr. 23; Kejur Mesqal, 15 persons were killed and 28 injured by an earthquake; 210 houses were destroyed (Press). At Ardestan (32.6°N, 54.0°E), 18 persons were killed and 10 injured by an earthquake (ER). At least 8 persons were killed and 15 seriously injured in an earthquake that wrecked the village of Kejur-Mesqal in central Iran. The earthquake destroyed 210 houses (BSSA, 1957, 47,290).

1957 Jul. 2, 0h.42m.; A violent destructive earthquake occurred in the Elborz chain along the southern shore of the Caspian, in the region of Demavand volcano, on 2 July 1957. The epicentre was situated near the village of Abegarm (36.1°N, 52.3°E), where a reinforced concrete hotel building, 75 m long, in the course of construction, was completely destroyed by vertical tremors: a crack visible on the ground went right through the building. The macroseismic zone was circular, with a radius of 100 km. and the centre was approximately at the Demavand volcano (5,670 m); partial or total destruction of 500 villages or hamlets, parts of the mountain showed vertical gaps like orange segments, more than 50 m. high and 5 m. wide; landslides obstructed paths and rivers, greatly hindering relief work. Damage was also recorded at Shirga, and at Babol, where a very large branch of a centuries old tree in the imperial palace gardens was broken and thrown in the easterly direction. The village of Alach (25 km. west of Firuzkuk) suffered greatly. In Larijan, which was completely destroyed, many people were killed by falling stones. The number of fatal casualties exceeded 1,200. Several thousand were injured (RJ). The epicentre of the earthquake was at BAND-PEY (36.2°N, 52.5°E). There occurred a series of aftershocks, 6 of them reported by

Uppsala Seismological Observatory. 480 people were killed and 500 villages damaged. The intensity of the earthquake reached 9 and was radiated as follows:

$$r_9 = 19.9 \text{ km.}$$

$$r_8 = 50 \text{ km.}$$

$$r_7 = 87 \text{ km.}$$

$$r_6 = 146 \text{ km.}$$

$$r_5 = 220 \text{ km.}$$

$$r_4 = 300 \text{ km.}$$

$$r_3 = 440 \text{ km.} \quad (\text{HN}).$$

Estimates of the number killed ranged from 1,000 to 5,000. An accurate count was unavailable because communications were cut off from many remote villages (BSSA, 1957, Vol. 47, 499). 1,200 people were killed in the region of Firuzkuk and Demavand. The earthquake was felt in many cities of Khorassan, and in Qom, Kashan and Hashtpar. Many earthquakes were felt after the main shock (ER).

See also: Vrolyck 1958.

1957 (Jul. 2); Kord-kuy: report of an earthquake (ER).

1957 Aug (19); (7h. 25m.): Bandar Pahlavi, Hashtpar, Langarud and Lahijan: report of an earthquake.

1957 Aug (19); (1h. 2m.) Bostak (Larestan): Felt strongly, slight damage in the town (V - VI) (ER).

1957 Sept. 5, 11h. 36m.; In the region between Jahrom and Kerman an earthquake occurred, causing slight damage; one person killed and many injured in Jahrom (Press, STR, USCGS). Two earthquakes shook the vicinity of Jahrom and Kerman. Large parts of the city of Jahrom were destroyed, one death was reported, and many persons were injured. (BSSA, 1958, 48, 98).

1957 Oct. (14); Bostak: report of several earthquakes (ER).

1957 Oct. (14); Khalaj (Saveh): report of 27 slight earthquakes (ER).

1957 Oct. (19); Bostak (Larestan): report of a number of earthquakes during past 48 hours (ER).

1957 Oct. (27); Firuz-Kuh: Felt (IV).

1957 Nov. 18; Mazandaran: Felt.

1957 Dec. 13; 1h. 45m.; Sahneh; A violent earthquake levelled towns and villages high in the mountains of western Iran. The earthquake struck before dawn, tumbling houses and leaving thousands homeless in the snow and bitter cold. Official reports placed the centre at Sahneh, 240 miles south-west of Tehran. About 100 villages were damaged. Estimates of death ranged from 1,287 to 2,500 (BSSA, 1958, 48, 193). Large destructive earthquake in the mountainous region of Lurestan. The disaster area, very widespread, was in the triangle formed by the towns of Kermanshah, Hamadan and Sanandaj. Sahneh, Farsinaj, Murdistan, Asadabad and Kangavar suffered considerable damage; 17 villages were destroyed; the number killed was estimated at more than 2,000 in the village of Farsinaj alone, a total of more than 900 corpses were found. A severe aftershock occurred at 23.05h on 16 Dec. (RJ). In Sahneh-Farsinaj earthquake 211 villages were destroyed and 1,130 people were killed, with the total 1062 in Farsinaj (HN). 1,200 people were killed (PF). In the earthquake Sahneh-Farsinaj 1,181 people were killed, destruction in the area was so great as the intensity of the shock reached VIII+ at the epicentre (ER).

1957 Dec. (16); night (local time); Lar and some villages (Fars); Felt (IV - V) (ER).

1957 Dec. (22); Ardestan: Felt (III) (ER).

1957 Dec. (23); Kangavar: Felt (ER).

1957 Dec. (24); Qorveh, Kangavar: Felt (ER).

1957 Dec. (25); Sahneh, Sanqor, Kangavar: Felt (ER).

1957 Dec. (28); Sanqor, Najafabad, Qeitas, Khal-Jamal: Felt (ER).

1958 Jan. (2); Kangavar: Report of a number of aftershocks (ER)

1958 Jan. (4); Kangavar: A number of aftershocks (ER).

1958 Jan. (4); Hamadan, Asadabad and Nahavand: Report of an earthquake (ER).

1958 Jan. (7); Hamadan: Felt strongly, slight damage at some villages (VI)(ER).

1958 Jan. (8); Kangavar: Felt strongly, slight damage, and 12 earthquakes were felt during the last 48 hours; the intensity of the strongest one reached (VI) at the villages near the town (ER).

1958 Jan. (13); Kangavar: Felt an earthquake (V) and several slight shocks (ER).

1958 Jan. (14); Amol: Felt (V) (ER).

1958 Jan. (15); Kangavar: Report of a number of shocks (ER).

1958 Jan. 16d; 2h. 4m; Northern Iran; numerous casualties and much damage (RJ). Babol, Amol, Mahmud-abad, Shahi, and Babol-Sar: Felt (V) (ER).

1958 Jan (18 - 20); Kangavar: A series of aftershocks (ER).

1958 Jan. (22); Asad-abad and Hamadan: Felt (ER).

1958 Jan. (25) (o)h. Khoy: Felt (IV).

1958 Jan. (29); (4h. 40m.) Malayer, Sahneh and Kangavar: Felt ($I_o = VI$) (ER).

1958 Jan (30); Kashmar: Felt (IV). 3 other shocks were felt (ER).

1958 Jan (30); Arak: Felt (III) (ER).

1958 Feb. (4); (19½)h; Neirud: Felt by all, frightened many (V) (ER).

1958 Feb. (4); 21h. 10m. Bandar-Pahlavi: Felt (IV)(ER).

1958 Feb. (5); Qouy-Besha: Felt, people frightened (V)(ER).

1958 Feb. (5); Kangavar: Report of a number of earthquakes (ER)

1958 Feb. (13); Arak: Felt (IV) (ER).

1958 Feb. (13); Sahneh: Felt (ER).

1958 Feb. (13); Fandar-Pahlavi: Report of a number of earthquakes.

1958 Feb. (15); (7)h; Sahneh, Kangavar, Kermanshah, Hamadan and Saez (V).

1958 Feb. (15); (21h. 50m); Hamadan: Felt, people frightened at the villages; caused panic (V) (ER).

1958 Feb. (15); (23 $\frac{1}{2}$)h. ; Hamadan and Asad-abad: Felt strongly, frightened many (V) (ER).

1958 Feb. (17); (4h, 50m); Amol, and Larijan: Felt (V) (ER).

1958 Aug. 14; 11h. 27m. Toysarkah, Asad-abad and Nahavand: Felt by all, frightened many (IV (ER). The foreshock of the earthquake Aug. 16d. 19h. 14m (STR).

1958 Aug 14; (15 $\frac{1}{2}$)h. Asad-abad. Toysarkan and Nahavand: Felt strongly, damage in some villages, ($I_0 = VI$) (ER).

1958 Aug. 16; (4)h. Asadabad: Felt, frightened people (IV+) (ER).

1958 Aug. 16d. 17h. 9m. ; Hamadan (34.8°N, 48.5°E): Felt, frightened many, (V+) (ER). The foreshock of the earthquake of Aug. 16d., 19h. 14m (STR).

1958 Aug. 16d. 19h. 14m. ; An earthquake in the regions of Kermanshah and Nahavand resulted in 137 deaths, injured 200 persons and devastated 71 villages (BSSA, 1959, 59, 116). The maximum intensity of the earthquake reached VIII at (34.4°N, 48.2°E); 178 persons killed, 110 villages destroyed and 178 villages damaged, The intensity of the earthquake decreased by the following radiuses:

$$r_{ix} = 12 \text{ km.}$$

$$r_{viii} = 30 \text{ km.}$$

$$r_{vii} = 48 \text{ km.}$$

$$r_{vi} = 78 \text{ km.}$$

$$r_v = 108 \text{ km.}$$

$$r_{iv} = 158 \text{ km}$$

$$r_{iii} = 230 \text{ km.} \quad (\text{HN}).$$

192 people killed; 126 villages destroyed; Nahavand and Toysarkan (VII+), Asadabad (VI+), Malayer (VI), Shahabad-e Gharb (V+), a number of the villages of Kashan (33.97°N, 51.45°E) and the surrounding Khomein (34.78°N, 48.12°E) Felt rather strongly, frightened many (V); Kangavar and surrounding area (VI+). Many aftershocks occurred during Aug. 16 and Sept. 27, according to press reports (ER).

1958 Aug. 25; 4h.4m.; Nahavand, Malayer and surrounding villages: Felt.

1958 Sept. 3; 1h.34m.; Felt at Nahavand, Hamadan and Malayer; reported several slight shocks (Press).

1958 Sept. 10; 3h.49m.39s.; Nahavand: Felt (V), there occurred a strong earthquake and a number of slight shocks (Press).

1958 Sept. 21; 16h.18m.; Karksar: Large damage (USCGS). 7 villages in the vicinity of Kermanshah were damaged; probably a number of victims (STR). Heavy damage at Karksar. 7 villages near Kermanshah were wrecked and many people believed killed (BSSA, 1958, 58, 116). In north-western Iran, heavy damage in the Bostanabad region south west of Tabriz; many houses were destroyed in some 20 villages, 20 killed and 100 injured (RJ).

Note: (The macroseismic region given by (RJ) does not agree with the microseismic epicentre as it is a number of hundred km. from Kermanshah).

1959 May 1, 8h.24m. Larijan: damage (VII), Felt at Qazvin (36.2 N, 50.0 E)(VI) and Tehran (IV) (Press, SHI, STR).

1959 Jul (9) (21½)h.; Hashtpar (Astara): Felt, people frightened (KR).

1959 Aug (3); (2)h.; Nahavand: Felt, people frightened (KR).

1959 Aug (17); (20h.37m.) Gorgan: Felt strongly, slight damage (KR).

1959 Sept. (27); Nahavand: Felt (V) (KR).

1959 Oct. 22, 19h.59m. Destruction in Leninaka (Alexandrole) and the region of Ervin (STR).

1960 Apr. 2; 22h.36m.; Felt at Asadabad, Malayer, Hamadan and Kermanshah; reported some damage (Press, SHI, STR).

1960 Apr. 2; 23h.33m.; Felt at Malayer, Asadabad and Hamadan, (IV) (Press, STR).

1960 Apr. 24; 12h.14m. Lar, I₀ = VII - VIII; about 400 people killed, 600 injured and 5,000 homeless. Many aftershocks occurred; a number of them were recorded at the seismic station of Shiraz (AH). A strong aftershock occurred on 3 May at 6h.59m. (RJ). The destruction

was high in the city of Lar, in some degree in Koudeh and relatively slight in Latifi, Khur, Beraq and Gerash (SHI, STR). 500 dead, many injured and major property damage at Gerash and Lar (USCGS). The remote southern town of Lar, a farming community of 14,000, was flattened by two earthquakes. It was estimated that between 400 and 500 persons were killed and 2,500 houses were destroyed. Many deaths occurred when a schoolhouse collapsed on a holiday gathering of children and their mothers. A later earthquake added 15 more dead to the toll and toppled weakened buildings (BSSA, 1960, 50, 479).

See also: Afshar 1960.

1960 May 2, 22h.48m.; Felt at Lar, (VI)(SHI).

1960 May 3, 6h.59m.; Lar region, caused damage at Kourdeh (VII - VIII, SHI, STR). Felt at Lar (USCGS).

1960 May 28, 19h.42m.; A heavy earthquake rocked the city of Shiraz in southern Iran but no casualties or damage were reported. Slight damage was reported in the neighbouring towns of Dashtarjan and Ardakan (BSSA, 1960, 50, 610). Felt at Shiraz, (IV) (Press, SHI).

1960 Jul. 4, 3h.43m.; Felt at Shiraz (IV and at Khane-Zenian (VI), (STR). A number of houses were destroyed at Khaneh-Ramian, (VI) (Press).

1960 Jul. 14 d; 8h.8m.; Lar: Felt, (IV, SHI, STR).

1960 Aug (3); (5 $\frac{3}{4}$)h. Zirab: Felt (IV) (KR).

1960 Aug. (20); (5)h. Sabzevar: Felt (IV) (KR).

1960 Aug. (20); ? ; Varamin and Garmsar: Felt (IV)(KR).

1960 Sept. (8); ? ; Uz (Larestan): 50 shocks in the past 24 hours (KR).

1961 Feb. 27; 21h; Tehran: Felt (III) (KR).

1961 Mar (10); Borazjan (Fars): Felt (IV)(KR).

1961 Apr. 6; 18h.12m.; Bostak (27.2 N, 54.4 E) and Fariah : Felt.

1961 Apr. 27; (4)h. ; Khoy and surroundings: Felt (VI) (KR). Villages (Azarbaijan): Felt, many people frightened.

1961 May (28); Jahrom (Fars): Felt (IV)(KR).

1961 Jun. 11; 05h.10m.; Dehkouyeh (Laristan): Destructive; in Dehkouyeh 58 persons were killed and 381 houses destroyed; Khaneh: 2 persons killed, 54 houses destroyed; damage in Chageb, Nakhreiz, Bighou and Lar; Felt Shiraz (III) and the coast of the Persian Gulf; Radius of perceptibility was about 300 km. Press reported unstability of epicentral area continued for about 48 hours after the main shock. A major aftershock took place about 10 km. north west of the main shock at 12h.31m. From Apr. 6 for about 6 months there was remarkable activity in the area. (Press, SHI, USCGS, STR).

See also: Seismological activities in Iran in 1961, Inst. Geophys. Univ. Tehran;

J. Despeyrox et Leyser; 1961, UNESCO.

1961 Jun. 11; 10h.52m. Lar region: felt, many frightened, additional damage caused in the epicentral area (STR, Press).

1961 Jun. 25; 12h.40m. Masoud-abad (Fars, Lar): 5 killed, a number of houses destroyed (Press).

1961 Jun. 27; 0h.49m.; Masoud-abad (Lar): Felt.

1961 Jul. 15; (22½h); Mashhad: Felt, many people frightened.

1961 Jul. 17; 05h.13m.; Lar (Fars): (IV).

1961 Jul. 20, 20h.28m.; Lar: Felt (SHI).

1961 Sept. 5; 14h.9m.; Beh-Shahr (36.5°N, 53.1°E): slight damage (VI); Gorgan (36.8 N, 54.5 E): Felt strongly, little damage (V) (Press, STR, SHI).

1961 Sept. 13; 14h.5m. Tang-e Fani (Lorestan) : Felt. (STR, USCGS, Press).

1961 Sept. 13d. 15h.48m.; Tag-e Fani: Felt.

1961 Sept. 14; 08h.03m.; Tang-e-fani: Felt (STR, Press).

1961 Sept. 17d.; 5h.30m.; Bojnurd: Felt, slight damage (V) Kashmir (IV)(KR).

1961 Sept. 28d; 22h.36m.; Minab (27.1 N, 57.1 E): Felt (VI, STR, RJ).

1961 Oct. 2d.; 18h.8m., Ushnuieh and surrounding area: Felt, slight damage.

1961 Oct. 3 ; 9h.34m. Kangavar (near Kermanshah): People frightened and slight damage reported.

1961 Oct. 14, 7h.; I VI - VII; Lorestan: strongly felt, slight damage. Malayer, Nahavand and Hamadan: Felt, people frightened. In Burujird many houses were cracked. In the village of Aliabad- Mag two persons were killed, many mud houses were destroyed.

1961 Oct. 28 . 10h.48m.; I = VII; Lorestan: strongly felt, many houses in the Burujird area damaged. Slight damage in Khorramabad. In the village of Heidarabad, 3 houses were destroyed. 3 aftershocks reported at Khorramabad on Oct.29d, 22h.; Another aftershock felt at Lorestan.

1961 Oct. (28) (7)h. Lorestan: Felt, (V) (KR).

1961 Nov. 5d.; 8h.36m. Burujird: Felt (V) (KR).

1962 Jan. 19 ; 3h.37m. Neibit-Dagh: Felt (IV - V, STR).

1962 Jan. (24); night; Jahrum: Felt.

1962 Jan. 28 ; 22h.17m.; Tehran: Felt (III) (KR).

1962 Feb. 2 , 3h.55m.; Lar and vicinity: strongly felt, radius of perceptibility was about 120 km. (Press); near (27.6°N, 54.2°E): (VI ? SHI).

1962 Feb. (3) ; (2)h.; Ardakan-e Fars (30.2°N, 52.0°E): Felt (Press, SHI).

1962 Feb. (3) ; (2h.40m); Ardakan-e Fars: Felt.

1962 Feb. (13) ; (19)h; Tabriz: Felt (Press, SHI).

1962 Mar. 7 ; 21h.8m.; Bandar-Abibas and Minab: Felt.

1962 Mar. (9); (6)h.; Jahrum: Felt.

1962 Mar. 19 ; 23h.5m.; Gorgan: Felt.

1962 Mar. 31 ; 23h.36m.; Hamadan, Malayer and Nahavand: Felt (V), two shocks at 23h.56m. and 24h.5m. on the same date (KR).

1962 Apr.1, 0h.45m.; Birjand, (32.54°N, 59.12°E): Felt (V); Tadjkouh (33.12°N, 58.48°E): 2 killed and 3 injured, many houses destroyed in Musaviah (33.18°N, 58.54°E), and Tadjkouh. A number of aftershocks

at Birjand (ER, KR, USCGS). There was also damage in Dostabad and Kaf (SHI, STR). (The macroseismic epicentre given by Shiraz as $(34.0^{\circ}\text{N}, 58.8^{\circ}\text{E})$ may not be correct.)

1962 Apr. (4) ; (20)h. Qazvin: Felt, people frightened.

1962 Apr. 21 ; 0h.26m. ; Agd-Jari: Felt.

1962 May 1 ; 23h.29m. ; Nahavand: Felt (V), and villages: Felt (V ?, SHI).

1962 May 6 . 18h.(50)m. ; Bastak (27.7°N , 54.3°E): Felt, (V ?, SHI).

1962 May 17 , morning, Ardakan (30.3°N , 52.0°E): Felt.

1962 May 24; 9h.41m. ; Gonbad-e Kabus: Felt (IV).

1962 May 25d. ; 7h.29m. ; Lar (Fars): Felt.

1962 Jun. 10d. ; (21h.14m); Babol (36.5°N , 52.5°E): Felt, people frightened.

1962 Jun.15 ; 17h.36m. ; Bujnurd: Felt, people frightened (V).

1962 Jun. 16 . 17h.35m. ; Burujird: Felt, an aftershock at 18h.28m. (SHI).

1962 Jun. (25); $18\frac{1}{2}$ h: Felt at Tabriz.

1962 Jun. 29; 22h.35m. ; Felt at Masjed-E Soleiman, Shushtar (32.0°N , 48.5°E).

1962 Jul. (23), (3)h. Band-e Pey (36.6°N , 53.0°E): Felt.

1962 Aug (6), ($2\frac{1}{2}$)h. Jallakan (32.2°N , 49.5°E): Felt (V).

1962 Aug. 13. ; 5h.58m. Nahavand: Felt. Slight damage (V).

1962 Aug. 15, 5h.13m. Hosein-Abad (29.6°N , 52.1°E): Felt (V, SHI).

1962 Aug.27; 23h.49m. Quchan: Felt, people frightened.

1962 Sept.1; 19h.20m. Buyin-Zara: Destructive. The shock was felt with an intensity greater than III (MM) over an area about 90,000 square miles.. Several new fault scarps were formed and a narrow zone

extending east-west for over 60 miles was disrupted by fault movements. Near the fault zone, the shock was felt with an intensity IX- (MM) to VIII (near Rudak only IX), and caused damage to 324 villages with a total population of 199,500. It killed 12,225 and injured 2,776 persons. It damaged 21,309 houses beyond repair and killed approximately 35% of livestock and draught animals in the region. Furthermore, 91 villages were totally destroyed and in 181, there was at least one fatality (Ambraseys 1963). Press reported the shock was felt at Tabriz, Isfahan and in many cities of the province of Khorassan.

See also: Afshar et al, 1963; Mohajer, et al, 1963; Omote, et al, 1965, Ambraseys, 1965, Petrescu et al 1964, Wu and Ben-Menahem 1965.

1962 Sept. 2, 7h.12m; The epicentre said to be about 40 km. WNW of the epicentre of the main shock (Sept. 1, Buyin-Zara) (BCJS).

1962 Sept. 4; Igdir: Felt strongly, slight damage; In Igdir one person was killed and 22 persons injured; Digadin and Dogoubayazit: Felt, people frightened (BCIS); Maraka (V - VI), Bardachen and Nakhichevan: Felt; a total of 100 persons were injured and many aftershocks occurred (STR). The maximum intensity of the shock reached (VII) at (39°55'N, 39°55'E) (EC).

1962 Sept. 11, 0h.17m. Igdir: Felt, slight damage (BSSA, 1963, 53, 214).

1962 Oct. 1; 12h.13m. Iwaz (28°N 54°E): Felt; Jovin (28.1°N, 52.0°E): Felt.

1962 Oct. 5; 20h.2m.; Ahmadabad (35.1°N, 58.7°E), Mahmalah (35.1°N, 58.6°E) and Ritseh were destroyed; 6 persons were killed and 3 persons injured. If the main shock had not been preceded by a strong foreshock at about 19h.50m., which made the people rush out of their homes, there would have been many more casualties. The shock was felt, probably with an intensity IV, in the Torbat-e Heidarieh, Gondbad (34.33°N, 58.70°E), Ferdows (34.02°N, 58.15°E), Kashmar (35.20°N, 58.45°E), Khavaf (34.50°N, 60.50°E), Tahyf-abad (34.70°N, 60.70°E) (BSSA, 53, 737).

1962 Oct. 10; 20h.43m.; Fasa: Felt.

1962 Oct. 13; 10h.23m.; Rud-sar (37°7'N, 50°15'E): felt strongly, slight damage; Tehran: (III, STR, SHI): and also felt at Zavieh (V) (Press).

1962 Oct. 14; 14h.3m.; Rezaieh: Felt, people frightened.

1962 Oct. 16; 18h.13m.; Kashan; Felt (CI, SHI).

1962 Oct. 16, 19h.5m. Ahar: Felt.

1962 Oct. 16; 22h.; Ahar : Felt.

1962 Oct. 25; 1h; Behshahr: Felt (V, SHI).

1962 Nov. 3, 15h.37m; Kashmar: Felt (IV, SHI).

1962 Nov. 6; 0h.9m.; Bandar Abbas and Hormoz: Felt strongly, a number of houses destroyed in the villages of Kahqom and Hajiabad (RE, EK). Felt Straits of Hormoz Id. (BSSA, 1963, 53, 700)

1962 Nov.9; 1h.11m.; Pol-e Dokhtar (33.4°N , 47.2°E): Felt.

1962 Nov.10; 1h.32m.; Hajiabad: Felt and slight damage; Bandar- Abbas, Bandar-Lengeh, Minab, Hormoz, and Qishm: Felt (SHI). Slight damage at Bandar-Abbas. Felt at Bandar-Lengeh, Minab, Qeshm, and Hormoz (USCGS).

1962 Nov. 20; 11h.56m.; Borazjan (32.0°N , 51.3°E) (V, SHI).

1962 Nov. 20; 15h.52m; Rezaieh: Felt.

1962 Nov. 22; 14h.6m.; Jahrom: Felt (V, SHI).

1962 Dec.2; 22h.12m.; Tehran: Felt (II, SHI).

1962 Dec.2; 22h.21m.; Near Buyin-Zara: Felt strongly in the villages Ishtahard, Fathabad, Amirabad, Tchiskin, Danisfahan, Rustamabad, Rudak, Buyin, Ab-e Yek, Karaj and Hashtgerd; Qazvin (V), Tehran (III, SHI, STR), (III - IV, BCIS).

1962 Dec.2; 23h.36m. Ishtehard: Felt, slight damage, 3 persons injured; Qazvin: Felt strongly, slight damage (V, SHI), Tehran: Felt (III, STR, SHI).

1962 Dec.5; (4)h.; Buyin, Danisfahan and Karaj: Felt.

1962 Dec.8; 9h.2m.; Shahrud ($36^{\circ}25'\text{N}$, $54^{\circ}48'\text{E}$): Felt strongly, damage (V - VI, STR, SHI); Felt at Gorgan.

1962 Dec.12; 11h.7m.; Tehran: Felt.

1962 Dec. 12; 18h. 4m. ; Tehran: Felt.

1962 Dec. 14; Meshgin-Shahr (38.6°N , 47.9°E): Felt, people frightened.

1963 Jan. 1; 19h. 27m. ; Kashmar ($35^{\circ}12'\text{N}$, $58^{\circ}27'\text{E}$) and Torbat-e Heidarieh (35° , $16'\text{N}$, 59° , $13'\text{E}$): Felt. (Press, STR).

1963 Jan. 2; 17h. 38m. ; Buyin-Zara and Rudak: Felt strongly, slight damage (VI), Saveh and Zarand (V); Qazvin and Qom (III), Tehran (II - III).

1963 Jan. 4; 15h. 50m. ; Pol-e Dokhtar (33.5°N , 47.5°E): Felt, people frightened.

1963 Jan. 12; 16h. 36m. ; Mamunieh (Saveh): Felt, people frightened.

1963 Jan. 27; 19h. 36m. ; Lar and Bostak: Felt, people frightened.

1963 Feb. 3; 14h. 46m. ; Bostak: Felt.

1963 Feb. 4; 5h. 14m. ; Bostak ($27^{\circ}12'\text{N}$, $54^{\circ}22'\text{E}$), Lar ($27^{\circ}41'\text{N}$, $54^{\circ}20'\text{E}$): Felt, people frightened; a number of aftershocks continued (Press, BCIS).

1963 Feb. 4; 7h. 18m. ; Bostak: Felt, people frightened.

1963 Mar. 1; 3h. 20m. ; Feriman (35.7°N , 59.9°E): Felt strongly, people frightened (Press), (V, SHI); and Mashhad: Felt, people frightened (IV, SHI).

1963 Mar. 9; 23h. 10m. ; Malayer: Felt.

1963 Mar. 10; (2)h. Malayer: Felt strongly, people frightened.

1963 Mar. 24; 12h. 44m. ; Aliabad ($34^{\circ}30'\text{N}$, $47^{\circ}58'\text{E}$) and Karkhaneh ($34^{\circ}30'\text{N}$, $47^{\circ}42'\text{E}$): Strongly felt, slight damage; felt also at Hamadan, Sanandaj, Kermanshah and Avaj. Most of the buildings in 25 villages around Kangavar were seriously damaged, and 120 persons injured. At Kermanshah, Malayer, Hamadan and Nahavand (IV); Sahneh, Kangavar (VI). The radius of perceptibility was about 150 km. The intensity of the shock decreased to (IV) in a radius of about 100 km. (Press, SHI. STR).

1963 Mar. 27; 14h. 6m. ; Kangavar: Felt people frightened.

1963 Mar. 28; (7h); Kangavar: Felt, slight damage, one person killed (SHI).

1963 Mar. 30; Kangavar: Felt.

1963 Mar. 31; 2h.27m.; Dahaneh-Ojagh: Felt strongly, damage. Most of the houses in the villages around Dahaneh-e Ojagh were damaged, 4 people were killed and 2 injured. Felt at Sabzevar. A number of aftershocks were felt for a few days. (Press); 4 killed, 2 injured, extensive property damaged at Hendojan (USCGS).

1963 Apr. 5; 21h.36m. Khal-Khal ($37\frac{1}{2}^{\circ}\text{N}$, $48\frac{1}{2}^{\circ}\text{E}$): Felt, slight damage.

1963 Apr. 8 - 13, Malayer, Kangavar, Sahneh: a number of shocks felt.

1963 May 17; 21h.36m. Novbaran (35.1°N , 49.7°E): Felt, (IV).

1963 May 18; Khorramlabad: Felt.

1963 May 26; 18h.48m.; Babol (36.6°N , 52.8°E): Felt, (IV SHI).

1963 May 28; 10h.32m.; Qazvin: Felt.

1963 Jun (2-7): Ab-e Garm (35°N , $48\frac{1}{2}^{\circ}\text{E}$): Felt.

1963 Jun. 5; 21h.22m.; Hashtpar (37.6°N , 49.1°E): Felt, (IV).

1963 Jun.20 13h.29m. Borazjan (29.2°N , 51.2°E): Felt, people frightened.

1963 Jun. 30; 7h.41m.; Tapeh (Arak): Felt, slight damage. In the village of Tapeh 200 houses were partly damaged (VII).

1963 Jul. 3; Ezan: Felt strongly, slight damage.

1963 Jul. 4; 23h.49m.; Larijan, Polur: Felt, people frightened.

1963 Jul. 5; 9h.40m.; Larijan, Polur: Felt.

1963 Jul. 24; 5 $\frac{1}{2}$ h; Gaiinat: Felt, people frightened.

1963 Jul. 29; 5h.10m.; Hajiabad (Fars): Strongly felt, damage. In Kahgom and Hajiabad a total number of 350 houses were destroyed, 5 persons killed, 8 injured. People frightened in Lar and Bandar Abbas. Felt Bushehr. Intensity at Lar (VI), Banda-Abbas (V) and maximum at Hajiabad (VII).

1963 Aug. 2; 7h.35m.; Bushehr (29°N , 50.8°E): Felt, people frightened.

1963 Aug. 11; 8h.43m.; Shahrud (36.3°N , 54.9°E): Felt, people frightened.

1963 Aug. 17; 21h.58m.; Mashhad: Felt, people frightened, (V); a further shock was felt.

1963 Aug. 21; 9h.30m.; Mashhad: Felt.

1963 Aug. 22; 14h.30m.; Mashhad: Felt (IV).

1963 Sept. 12; 20h.20m.; Bojnurd: Felt.

1963 Sept. 13; 22h.31m. Bojnurd: Felt, people frightened (IV).

1963 Sept. 15; 1h.4m.; Bojnurd: Felt, people frightened.

1963 Oct. 12; 3h.45m.; Lar: Felt, people frightened.

1963 Oct. 12; 18h.30m.; Birjand: Felt, people frightened.

1963 Oct. 13; 6h.; Birjand: Felt.

1963 Oct. 27; 2h.54m.; Malayer and Hamadan: Felt, people frightened.

1963 Nov. 11; $13\frac{1}{2}$ h; Ab-e Garm (Hamadan): Felt strongly, slight damage.

1963 Nov. 18; 16h.30m.; Maku: Felt.

1963 Dec. 11; 19h.4m.; Toysarkan: Felt, people frightened.

1963 Dec. 12; Maku: Felt.

1963 Dec. 21; 4h.5m.; Kashan and in the villages around: Felt strongly, slight damage.

1963 Dec. 27; 21h.0m.; Masjed-e soleiman and surrounding villages: Felt, people frightened.

1963 Dec. 28; 12h.30m. Getmaj (Kashan): Felt, slight damage.

1963 Dec. 30; 7h. Bandar-Abbas: Felt.

1964 Jan. 1; afternoon; Shapur (Azarbaijan): Felt, people frightened.

1964 Jan. 6; Khoy: Felt.

1964 Jan. 12; 12h.45m.; Ahvaz: Felt, people frightened in Ahvaz and vicinity. Ahvaz (V) and Shushtar (IV).

1964 Jan. 19; 9h.13m.; Bandar-Lengeh (Fars): Felt, slight damage.

1964 Jan. 25; 5h.30m. Masjed-e soleiman: Felt. An aftershock at 6h.30m.

1964 Jan. 30; 22h.20m.; Bandar-Lengeh: Felt.

1964 Feb. 8; 6h.28m.; Rud-sar (Gilan): Felt, people frightened.

1964 Feb. 21; Maku: Felt, several aftershocks.

1964 Feb. 21; 1h.4m. Ferdows and Bajestan: Felt, many people frightened. Ferdows (V), Bajestan (IV).

1964 Mar. 29; 23h.3m. Astar: Felt, people frightened.

1964 Apr. 25; 23h.; Masuleh (Gilan): Felt, people frightened.

1964 May 6, 1h.56m.; Zarand, Qom, Saveh: Felt.

1964 May 15; 6h.42m.; Ardabil: Felt.

1964 May 15; 22h.31m. Mashhad: Felt, people frightened.

1964 May 28; Fin (Bandar-Abbas): Felt several slight tremors.

1964 Jun. 9; Bostanabad (near Tabriz): Felt, people frightened and a number of minor shocks occurred.

1964 Jun. 20; 22h.5m; Ushnuieh: Felt, people frightened.

1964 Jun. 24; 1h.35m.; Bandar-Abbas: Felt and an aftershock at 2h.10m.

1964 Jul. 7; 20h.30m. and 22h.; Ab-e Garmm and Gand-Ahu: Felt.

1964 Jul. 16; Ab-e Garm (Gazvin): Felt, people frightened.

1964: Jul. 17; morning (local time): Khozestan: Felt strongly, damage in some villages.

1964 Aug. 2; 9h.; Mahammadabad (Gilan): Felt.

1964 Aug. 4; 23h.18m.; Pol-e Zahab (Kermanshah): Felt, people frightened.

1964 Aug. 10; 18h.18m.; Kerman: Another shock was felt.

1964 Aug. 12; 2h.34m.; Larestan: Felt, slight damage in some villages.

1964 Aug. 12; 19h.26m.; Khorramlshahr, Abadan, Ahvaz Shadkan and Ram-e Hormoz: Felt, slight damage in some villages, including Ram-e Hormoz.

1964 Aug. 25; 0h.20m.; Qasr-e shirin: Felt by all.

1964 Aug. 26; Shiraz: Felt.

1964 Aug. 27; 12h.56m.; Bandar-Abbas: Felt, slight damage.

1964 Aug. 29; 15½h and 19½h.; Ab-e Garm: Felt.

1964 Aug. 30; 0h.39m. and 0h.44m.; Damavand: Felt.

1964 Aug. 31; Nahavand: Felt.

1964 Aug. 31; Lar: Felt by all.

1964 Sept. 1; 10h.40m. Aga-Jari: Felt (IV).

1964 Sept. 21; 22h.0m.; Kermanshah: Felt and slight damage in some villages.

1964 Sept. 28; 10h.38m.; Mashhad: Felt (IV).

1964 Oct. 8; 19h.; Rezaieh: Felt in town and surrounding villages.

1964 Oct. 12; 11h.48m.; Nagadeh, Ushnuieh: Felt by all.

1964 Nov. 3; 6h.14m.; Shahrestanak-e Ikhli (near Birjand): Felt, slight damage in some villages.

1964 Nov. 3; 17h.36m.; Eshtehard, Buin; zara and Gazvin and Saveh: Felt by all; Tehran, Toysarkan: Felt by few people.

1964 Nov. 7; 1h.16m; Gorgan: Felt by many.

1964 Nov. 9; 8h.5m.; Meshgin-shahr and vicinity: Felt by all.

1964 Nov. 15; 2h(30)m.; Zir-Ab (North-East Tehran): Felt a frequent number of slight shocks.

1964 Nov. 17; 1h.26m. Bandar Dilam: Felt by all.

1964 Nov. 18, 10h.30m.; Garmsar (South-West Tehran): Felt a slight shock.

1964 Dec. 3; 22h.32m.; Aliabad (Gorgan): Felt, people frightened.

1964 Dec. 9; Bastak (Lar): Felt.

1964 Dec. 16; 18½h.; Behehan: Felt.

1964 Dec. 22; 4h.36m.; Lar (Fars): Strongly felt, damage. The villages of Garm-e Dasht and Fadavieh were partly destroyed; 2 persons were killed and several injured.

1964 Dec. 23; 6h.38m.; Bandar-Abbas: Felt by all.

1964 Dec. 27; Lar and vicinity: Felt, people frightened.

1965 Feb. 10; 16h.9m.; Bostanabad (Azarbaijan): Destructive. In Bostanabad 20 persons were killed and 100 injured. Some houses in the surrounding villages were destroyed. Minor damage to buildings at Qara Cheman, Tokmeh-Dash. Felt at Miandaab and Mianeh (IV+).

1965 Feb. 13; 0h.56m. Tabriz, Sofian, Shahpur, and Khoy: Felt; slight tremors reported at Sofian (V).

1965 Feb. 16; Bostanabad (Azarbaijan): A number of slight tremors.

1965 Mar. 10; 5h.44m.; Arak: Felt, people frightened.

1965 Apr. 14; Bandar Jask: Felt by all, frightened many.

1965 May 4; 5h.11m.; Masjed-e soleiman: Felt, (IV).

1965 May 10; 2½h.; Arak: Felt.

1965 May 12; 11h.44m.; Sahneh: Felt, many people frightened.

1965 Jun. 21; 0h.21m.; Hajiabad (Bandar-Abbas): Felt strongly, slight damage; damage at some villages, people frightened at Bandar-Abbas.

- 1965 Jun. 28; 17½h.; Garmeh (Moghan): Felt.
- 1965 Jul. 2; 12½h.; Bandar Abbas and vicinity: Felt (IV).
- 1965 Jul. 10; Bandar Dilam: Felt (IV).
- 1965 Aug. 7; 4h.; Masjed-e soleiman: Felt by all.
- 1965 Aug. 24; 1h.20m. Gorgan: Felt (III).
- 1965 Aug. 25; ½h.; Shirvan: Felt (IV).
- 1965 Aug. 31; 3½h.; Avaj: Felt by few.
- 1965 Sept. 20; 23h.23m.; Behbahan: Felt, people frightened.
- 1965 Sept. 22; 23h.50m.; Torbat-e Heidariah: Felt,
frightened many.
- 1965 Sept. 11h.15m.; Lar, and Uz: Felt by all.
- 1965 Oct. 15; 19½h.; Tasuj (near Tabriz): Felt, frightened
a few.
- 1965 Oct. 31; 4½h.; Gorgan: Felt (III - IV).
- 1965 Dec. 23; 11h.10m.; Bazm (Lar): Felt, people frightened.
- 1966 Jan. 7; 2h.; Tabriz and Mianeh: Felt.
- 1966 Jan. 7; 7h.45m.; Felt at Tabriz (IV) and Mianeh (III).
- 1966 Jan. 7; afternoon (local time): Nik-Shahr (Zaheddn): Felt.
- 1966 Jan. 16; 20h.2m.; Anil, Masjed-e soleiman: Felt.
- 1966 Jan. 30; 0h.40m.; Tabriz: Felt (IV).
- 1966 Feb. 4; 22h.30m. Bojnurd and vicinity: Felt by all.
- 1966 Feb. 5; 20h.40m.; and 23h.; Masjed-e soleiman: Felt.
- 1966 Feb. 26; 17h.30m. and 20h.50m.; Haftgel: Felt.
- 1966 Mar. 6; 0h.10m.; Varsak: Felt and two minor shocks
afterwards.

1966 (Mar. 27 - Apr. 7); Maku: a number of shocks reported; population frightened in Maku, Bazorgan, Siah-chesmeh and surrounding villages. A number of these shocks were recorded at Tabriz seismic station. The magnitude of the largest shock did not exceed 4 Richter scale.

1966 Mar. 30; Maku: 48 earthquakes were felt in the past 12 days.

1966 Mar. 30; 9h.; Dezful: Felt by all; rather strong, people frightened, (V).

1966 Mar. 31; 0h.; Shahsavari: Felt (IV).

1966 Mar. 31; 6h.; Khorramabad: (IV); Dezful: (IV+)

1966 Apr. 1; Bandar-Abbas: two shocks were felt.

1966 Apr. 27; Sarakhs (36.6°N , 61.1°E): (IV).

1966 May 8; Maku: Press reported shocks between Mar. 25 and May 8. On May 17, $3\frac{1}{2}\text{h.}$; May 18, $13\frac{1}{2}\text{h.}$; and May 19; $1\frac{1}{2}\text{h.}$; at Maku earthquakes were felt.

1966 Jun. 5; night (local time): Saveh and Kangavar: Felt, people frightened.

1966 Jul. 27; 14h. 49m.; Khorramabad (33.8°N , 48.6°E): Felt (IV).

1966 Jul. 27; 15h. 30m.; Andimeshg (32.8°N , 48.6°E): Felt (IV) and at 21h. 10m.; at the same place (IV).

1966 Aug. 6; $1\frac{1}{2}\text{h.}$; Tasuj (Tabriz): Felt.

1966 Aug. 6; $8\frac{1}{2}\text{h.}$; Agha Jari: (IV), a number of aftershocks.

1966 Aug. 9; 0h. 19m.; Aghajari: Felt.

1966 Aug. 9; $6\frac{1}{2}\text{h.}$; Aghajari: Felt (IV), several aftershocks.

1966 Aug. 22; $20\frac{1}{2}\text{h.}$; Maku: Felt, and a number of other slight shocks.

1966 Sept. 1; 21h. 15m.; Tehran: (III), Shahr-Rey (IV), Ab-e-Ali (IV+).

1966 Sept. (1 - 3); Ardakan-e Fars: 12 shocks were felt.

1966 Sept. 2; Maku: Felt.

1966 Sept. 2; 0h.15m.; Tehran: (IV), Shahr-e Rey (IV).

1966 Sept. 5; 2h.15m.; Malayer (III - IV), Ardakan (V), a number of aftershocks.

1966 Sept. 8; Maku: Felt a number of slight shocks.

1966 Sept. 9; 19h.57m.; 20h.35m.; Garaj-abad and Saveh: Felt, and another shock was felt on Sept. 10; 5h.15m.

1966 Sept. 11; Ardakan-e Fars: in the last 48 hours 18 shocks were felt.

1966 Sept. 18; 20h.4m.; Lar, Uz, Jahrum. Two aftershocks felt at Uz.

1966 Sept. 24; 10h.; Lar, Bostak: Felt, people frightened (V).

1966 Sept. (12); ($\frac{1}{2}$)h. Lar and Bostak: Felt.

1966 Sept. 29; 17h.44m.; Lar and Bostak: Felt.

1966 Oct. 7; afternoon (local time); Bostak: (V).

1966 Oct. 11; Khoi: Felt strongly, frightened many.

1966 Oct. 24; 14h.31m.; Dahaneh-Ojag, Esfarain (Khorassan): Destructive; 300 houses destroyed, 5 persons killed and 30 injured. People frightened at Quchan. Felt at Mashhad. An aftershock was felt at Quchan at 15 $\frac{1}{2}$ h.

1966 Nov. 8; 3h.14m.; Tehran, Shemiran, Peshgel-Darreh, Larijan and Novshahr: Felt.

1966 Nov. 26; 13h.49m.; Mashhad and Quchan: Felt.

1966 Dec. 2; 3h.7m.; Jovin-e Larestan: Some damage to houses.

1966 Dec. 6 - 18; Mashhad: Reports of a number of shocks.

1966 Dec. 29; morning (local time); Torbat-e Jam and surrounding area: Felt.

1967 Jan. 9; 1h.55m.; Lar: Felt strongly, slight damage (VI-) Press reported six injured and many houses were wrecked (BSSA, 1967, 57, 824).

1967 Feb. 12; 12h.14m.; Lar: Felt.

1967 Feb. 14; Bandar-Dilam: Felt, 3 shocks.

1967 Feb. 15; 1h.47m.; Hamadan, Asadabad and surrounding area: Felt strongly, slight damage in some villages.

1967 Feb. 25; Bandar Lengeh: Felt, 2 earthquakes on the same day.

1967 Mar. 2; Maku: Felt.

1967 Apr. 9; Masjed-e-soleiman: Felt.

1967 May 20; 21h.48m.; Shiraz, Rezvande: Felt by all.

1967 Jul. (11) (2)h.; Sarain and Ardabil: Felt.

1967 Jul. 17; afternoon (local time), Shalmazar and Shahr-Kord: Felt.

1967 Jul. 27; 1h.40m.; Shalmazar: Felt.

1967 Aug. 5; night (local time) Shalmazar: Felt.

1967 Aug. 21; 12½h.; Agha-Jari: Felt.

1967 Sept. 2; 8h.2m.; Torbat-e Heidariah: Felt by all.

1967 Sept. 22; 18h.15m.; Bojnurd: Felt by all.

1967 Sept. 23; 1h.; Bojnurd: Felt.

1967 Sept. 24; Gorgan: Felt.

1967 Sept. 24; Shushtar: Felt.

1967 Oct. 3; afternoon (local time); Bavanat (Fars): Felt.

1967 Oct. 27; 8h.5m.; Natanz (Kashan): Felt.

1967 Nov. 10; 2h.50m.; Gorgan: Felt, a number of aftershocks.

1967 Nov. 15; 19h.35m.; Esfahan: Felt by all.

1967 Dec. 18; 22h.49m.; Hamadan, Kermanshah and Ilam: Felt.

1968 Jan. 2; 11h.59m.; Shiraz: Felt, and 3 other shocks.

1968 Jan.; 15; 18h Gorgan: Felt.

1968 Mar. 5; 13h.; Ramsar: Felt.

1968 Mar. 27; 17½h.; 21½h.; and 22½h.; Gorgan: Felt.

1968 Apr. 18; 12h.39m.; Bostak: Felt.

1968 Apr. 26; 2h.58m.; Arak, Qom: Felt.

1968 Apr. 29; 17.2m.; VII, Maku, Bazorgan and Siah-Cheshmeh an earthquake caused slight damage, in which a number of villages were destroyed and 41 people were killed. Felt at Khoy (see Figure II. 1) Heavy rain added to the damage after the earthquake.

Felt in north-western Iran, eastern Anatolia and south-western Armenia, USSR; 38 killed, 600 injured and 1,000 houses destroyed. In the Maku area of Iran 12 villages were reported destroyed (BSSA, 1968, 58, 1714).

See also: Bull. Inst. Geophys. Univ. Tehran, 51.

1968 Apr. 30; Bojnurd: Felt.

1968 May 26; 23h.45m.; Khoy: Felt (IV).

1968 May 27; 0h.; Khoy: Felt.

1968 May 30; 1h.10m.; Lar: Felt by all. Reports of 100 earthquakes during the past 6 months.

1968 Jun. 4; 6h.50m.; Pol-e Dokhtar, Molavi: Felt, reports of several aftershocks.

1968 Jun. 9; 0h.56m.; Ahar: Felt strongly, frightened many. No damage in the city but slight damage in northern villages of the city (VI). On the same day at 11h.39m.; a second shock was felt again at Ahar.

1968 Jun. 22; 15h.56m.; Kazerun: Felt by all. Frightened many.

1968 Aug. 12; Uz; Larestan: Press reported 12 shocks during the past 24 hours (ER).

1968 Aug. 29; 9½h.; Hasht-Gerd: Felt.

1968 Aug. 31; 10h. 47m.; Dasht-e Bayaz (Khorasan): Destructive. The shock occurred in the afternoon, at about 2h. 15m. local time; was felt over an area of about 400,000 square kilometers, was followed by numerous aftershocks. The largest of them occurred on Sept. 1, at about 11 hours local time (7h. 27m. 28s GCT). It affected the extreme west part of the area damaged by the main shock and caused heavy damage to the Ferdows region which had suffered little damage from the main shock. The Dasht-e Bayaz earthquake was associated with 80 km. of fresh faulting with numerous branches. The sense of movement along the fault-break was left lateral with the north side downthrown. Maximum relative displacement of 450 cm. lateral and 250 cm. vertical were measured. The main shock and its aftershocks affected an area of 10,000 square km. The number of people killed was between 7,000 and 12,000. About 12,000 housing units were destroyed or damaged beyond repair and 180 villages were affected, making over 70,000 people homeless (Ambraseys - Tchalenko 1969).

See also: Sobouti et al 1969; Ambraseys et al 1969; Eftekhari Negjad et al 1348 AH Sol.; Niazi 1968 and 1969; Ambraseys et al 1968; Bayer et al 1969.

1968 Sept. 1; 5½h.; Ahar: Felt strongly, people frightened (V).

1968 Sept. 1; 7h. 27m.; Ferdows: Destructive (VIII).

1968 Sept. 1; 7½h. Yazd: Felt. (Perhaps the earthquake of Ferdows felt at Yazd).

1968 Sept. 2; 21½h.; Behbahan: Felt (IV).

1968 Sept. 4; 23h. 24m.; Ferdows: Felt strongly, additional damage.

1968 Sept. 6; Gaiin: A number of villages was shaken by a number of earthquakes.

1968 Sept. 10; 2h. 15m.; Bojnurd: Felt by all.

1968 Sept. 10; 20h. 31m.; Gonabad: Felt by all.

1968 Sept. 11; 19h. 17m.; Gonabad, Birjand, Torbat-e Heidarieh: Felt, and a number of minor tremors afterwards.

1968 Sept. 11; 20½h.; Damghan: Felt.

1968 Sept. 12; 1h. 50m.; and 2h. 12m.; Damghan: Felt.

1968 Sept. 14; 13h.48m.; Jahrum: Felt strongly, slight damage in the city and in some villages. A second shock at 19h.20m. caused damage. In Mohkarakabad serious damage to houses and many injured. In Firuzabad slight damage (Press; BSSA, 1969, Vol.59, 1026).

1968 Sept. 15; 6h.14m.; Firuzabad: Felt.

1968 Sept. 15; 9h.42m.; Torbat-e Heidarieh: Felt by all.

1968 Sept. 16; 17h.55m.; Khorramabad (Larestan): Felt by all.

1968 Sept. 17; 23½h.; Shahr-e Kord: Felt.

1968 Sept. 20; During afternoon, local time, at Jahrum 3 shocks were felt.

1968 Sept. 27; 16½h. Bushehr and vicinity: Felt.

1968 Sept. 28; Jahrum: Report of a number of minor tremors.

1968 Sept. 29; 1½h. and 23½h. Larestan; Gajsaran and Khorramabad; reports added a number of shocks in the past few days.

1968 Oct. 1; 18h.16m.; Meshgin-Shahr: Felt by all.

1968 Oct. 2; Jahrom: 37 shocks felt during the last 15 days.

1968 Oct. 2; 11h.; Larijan, Langarud and Rudsar: Felt.

1968 Oct. 4; 9h.; Quchan: Felt.

1968 Oct. 4; 23½h.; Gonabad, Ferdows: Report of a shock and afterwards a number of minor shocks.

1968 Oct. 5; Gorgan: Felt.

1968 Oct. 13; Jahrom: Felt.

1968 Oct. 16; 14h. and 17h.45m.; An earthquake was felt at Kazerun and Quir.

1968 Oct. 16; 15h.27m. and 23h.50m.; Balarud, Vakhmanshir, and Andimeshg: report of two shocks.

1968 Oct. 25; 21h.; Jahrum: Felt. 49 earthquakes were felt between Sept. 14 and Oct. 25.

1968 Oct. 30; 2h.14m.; Lar: Felt.

1968 Nov. 12; 21½h. Jahrom, 50th earthquake since Sept. 14.

1968 Nov. 16; 23½h.; Ushnooieh: Felt.

1968 Nov. 17; 2h.; Ushnooieh: Felt.

1968 Dec. 7; 22h.; Gasr-e shirin: Felt strongly, slight damage.

1968 Dec. 12; 18h. 54m.; Semnan: Felt by all.

1968 Dec. 25; 4h.; Paveh: Felt by all.

1968 Dec. 28; 7½h. Ramsar: Felt.

1968 Dec. 29; Ilam: Felt, people frightened.

1969 Jan. 1; Maku; 12h. 30m.; Felt, and aftershock.

1969 Jan. 3; 3h. 16m.; Dahaneh-Ojagh, Esfarain, Sabzvar, Quchan, Bojnurd, Shirvan and Nishabur were shaken by an earthquake. 50 persons killed, 300 injured and more than 2,000 people rendered homeless. Maximum casualties occurred near Dahaneh-Ojagh and Esfarain. This earthquake and a few aftershocks were also felt in northern Khorassan and east of Gorgan (ER, KR). Damage occurred along a 75 mile line between Esfarain and Sabzevar, including the cities of Bojnurd, Shirvan, Quchan, Nishabur and Dahaneh-Ojagh, which was destroyed (BSSA, 1969, 59, 1741).

1969 Jan. 11; 6h. 45m.; Gorgan: Felt.

1969 Jan 16; 16h. 16m., 16h. 21m. and 17h. 18m.; Ushnooieh: The first shock was strong enough to break the windows (TAB, Press).

1969 Jan. 20; 10h. 58m.; Arak: Felt.

1969 Jan. 26; 2h. 25m.; Bandar-shahr: Felt, people frightened. Many people frightened.

1969 Jan. 28; 1h. 25m.; Bandar-shahr: Felt.

1969 Jan. 30; 2h. (30)m.; Gobad-e Qabus, and Minudash: Felt.

1969 Feb. 1; 8h. 15m.; Marand: Felt by all.

1969 Feb. 5; 20h. 23m.; Khoy, Marand, Sofian, Shahpur and Tasuj: Felt $I_0 = VI$. The main shock and a number of aftershocks were recorded at Tabriz seismic station.

1969 Feb. 7; 1h.5m.; Andimeshgh: Felt. The radius of perceptibility, on the strength of reports coming from the papers, was about 75 km.

1969 Mar. 2; 23h.30m. Sanandaj: Felt.

1969 Mar. 25; Karneq (Khalkhal): Strongly felt? In the village of Karneq 8 houses were reported destroyed. Very frequent earthquakes were reported to have continued several days afterwards. There were no records of the main or aftershocks on the Tabriz seismograms or at any of the other seismic stations. The earthquake was, however, reported in the papers, and from photographs in the press it seems that there were some ground effects. (During March and April 1969 this part of Azarbaijan was subject to very severe flooding).

1969 Apr. 2; Bostanabad (Azarbaijan): In this earthquake 2 persons were killed (see author's note for 1969 Mar. 25).

1969 Apr. 7; 4h.38m.; Shiraz: Felt, people frightened.

1969 Apr. 9; 1h.3m.; Gorgan: Felt.

1969 May 12; 12h.22m.; Babol, Sari, Babolsar and Amol: Felt, people frightened.

1969 May 14; 0h.44m.; In the village of Qotur (Khoy): Felt, slight damage in the region of Qotur. At the village of Mokhin a landslide killed 40 head of cattle and several houses were destroyed, ($I_0 = VI$).

1969 May 15; 7h.30m.; Masjed-e soleiman: Felt.

1969 May 18; Gormey, Dasht-e Moghan: Felt.

1969 May 20; 17h.30m.; Ferdows and Sarayan: Felt. strongly, people frightened. Slight damage in Ferdows.

1969 May 22; 11h.30m.; Bandar-Abbas: Felt strongly, people frightened.

1969 May 23; Nir ($38.0^{\circ}N$, $48.1^{\circ}E$): Felt.

1969 Jun. 16; 3h.15m.; Jahrom: Felt.

1969 Jul. 1; 6h.; Kahgom, Hajiabad, Bandar-Abbas: Felt.

1969 Jul 2; 1h.16m.; and 2h.30m.; Marand: Two shocks, felt, people frightened.

1969 Jul. 11; 21h.; Bojnurd: Felt, people frightened, also felt in surrounding area.

1969 Jul. 11, 23h.; Bojnurd: Felt.

1969 Jul. 28; 19h.30m.; Tasuj (Tabriz): Felt.

1969 Aug. 1; 23h.30m.; Gasr-e shirin: Felt.

1969 Aug. 5; Ferdows: Report of a number of earthquakes.

1969 Aug. 11; Mashhad: Felt, frightened many.

1969 Aug. 26; 11h.30m.; Kazerun: Felt.

1969 Sept. 12; 03h.18m.; Tabriz: Felt (III).

1969 Sept. 14; 5h.; Gorgan: Felt.

1969 Sept. 21; Ahar: Felt.

1969 Sept. 25; 15h.25m.; Gorgan: Felt, people frightened. Also felt in the vicinity.

1969 Sept. 28; 17h.55m.; Burijird: Felt.

1969 Sept. 30; Ashtarian (Larestan): Felt.

1969 Oct. 31; 8h.53m.; Moderate damage at Molaci, Pol-e Dokhtar, Khuh-e dasht and Haftgel (USCGS).

1969 Nov. 3; 21h.53m.; Ferdows: Felt, people frightened.

1969 Nov. 3; 8½h.; fin (Gainat): Felt.

1969 Nov. 7; 18h.33m.; Jiroft, Chah-bahar, Gasr, Gand, Bampur, Sarbaz, Khash, Iran-shahr, and Lavan: Felt, damage in some villages.

1969 Nov. 24; 22h.50m.; Ferdows and surrounding villages: felt people were awakened.

1969 Nov. 28; 1h.29m.; Piranshahr: Panic; Rezieh and Nagadeh: Felt by all, people frightened. The seismic station of Tabriz reported a number of aftershocks.

1969 Dec. 2; 22h.44m.; Ferdows and surrounding villages: Felt by all, many people frightened; Gonabad: Felt by all.

1970 Jan. 3; 13h.20m.; Andimeshg, Shahbazan and vicinity: Felt in a train running from Shahasan to Andimeshg. Minor damage at Shabazan station.

1970 Jan. 15; 3h.; Baneh (35.9°N , 45.9°E): Felt.

1970 Jan. 17; 17h.19m.; Zanzan: Felt.

1970 Jan. 23; Ferdow: Report of a number of shocks.

1970 Jan. 27; 14h.5m.; Shahrud: Felt; Bastam and Shah-Pasand: Slight damage.

1970 Jan. 30; Shahrud and Bastam: Felt.

1970 Feb. 2; Shah Pasand: Felt.

1970 Feb. 21; 20h.1m.; Ushuieh: Felt by all, frightened many. Most houses at Ushnuieh and the villages neaby cracked.

1970 Feb. 13; 11h.22m.; Lar and surrounding villages (Fars): Felt strongly. Frightened many; caused slight damage at Aliabad (western Lar).

1970 Feb. 25; 15h.7m.; Shahpasand: Felt strongly, caused slight damage and also at the villages Dash-e shah, Hoseinabad-e Kalpus, Farsian and Minudasht; Felt at Bojnurd and Gonbad.

1970 Feb. 27; 20h.56m. Sahneh: Felt by all, frightened many.

1970 Feb. 28; 19h.58m.; Aliabad (Lar, Fars): Again was rocked by an earthquake; Five houses were destroyed.

1970 Mar. 1; 20h.20m.; Ferdows, Gonabad: Felt strongly, slight damage. At the villages of Khezri, Binataj and Dasht-e Bayaz some window panes were broken and roofs of newly-built houses cracked and slight damage at Kakhk. Felt at Bajestan, Gain and Torbat-e Heidarieh (ER

1970 Mar. 14; 1h.51m.; ($I_0 = \text{VI}+$) Khoi (Azarbaijan): Strongly felt, damage. In the village of Mokhiin many houses were destroyed and 5 persons were killed. Serious damage in the villages of Geris, Dizah Bustam, Kask, Sufi, Bulag and Dash-Tapak. In Khoi slight damage. Reported that this earthquake was felt at Siahchesh-eh, Shahpur, Tashj, Julfa, Marand, Sofian Bazorgan, Maku and in Turkey. A second strong shock at 2h.1m.; felt at Khoi stronger than the first shock (Press). A number of aftershocks were reported (TAB). Five dead at Badalanlu, 2 villages destroyed, 300 homeless (USCGS). Five killed at Badalan and

and 300 homeless at Badalan, Badalabad and Safok. These villages were destroyed. Damage to buildings occurred at Khoi. Also felt at Jolfa, Alamdar, Gugard and Shahpur, Mak and Bazorgan (Press, BSSA, 1970, 60, 1760).

1970 Apr. 3; 20h.53m.; Aliabad, Gomishan, and Gali Kesh: Felt by all, frightened many. Felt at Bandar Gaz, Shahrud, Gorgan, Gonbad-e kabus, Babol-Sar, Behshahr and Sari.

1970 Apr. 4; 10h.58m.; Mashhad: Felt, people frightened. Violent shaking of pendulum clock. The shock was the second shock which was felt in Khorassan in the past 24 hours. Mashhad seismic station reported the epicentre of the earthquake took place between Mashhad, Kalat, Chenaran and Akmal. Press reported that both shocks were felt at Sabzevar. Report of 12 aftershocks during past 4 days (MSH).

1970 Apr. 26; 11h.53m.; Marand and vicinity: Report of an earthquake.

* 1970 Apr. 16 1h.27m.; Meshgin-shahr: Felt, people frightened (V+) (TAB, Press).

1970 Apr. 27; Ferdow: Report of two earthquakes.

1970 May 8; Strong shock felt at Aliabad and Shirinabad.

1970 Jun. (3) 15h.; Bazorgan: Felt.

1970 Jun. 4; 13h.22m.; Shahneh: Felt.

1970 Jun. 7; Aliabad (Gorgan): Felt by all, frightened many.

1970 Jun (24); (4h.45m.); Meshgin-shahr: Felt, people frightened.

1970 Jun. 26; 1h.56m.; Shahpur: Felt strongly, slight damage, felt at Khoi and Marand.

1970 Jun. 27; 7h.57m.; Tehran: A strong earthquake felt by everyone both indoors and outdoors. The intensity of the shock in Tehran (seismological station) was estimated as (IV) by Inst. Geoph. of Tehran. The epicentre was in the mountains near Jar, Kharaghan and Dasht-e Zarand, expected maximum intensity (VI) and the radius of perceptibility was about 90 km, and included Zavieh-Zarand (VI), Shahri-iar (VI-), Hassanabad (V), Shahr-e-Rey (IV) and Saveh (III). At Zavieh-Zarand some damage to buildings was reported. There were no casualties. (Press, TAB)

1970 Jul. 6; Taft: Report of an earthquake.

1970 Jul. 11; 22h.41m.; Korporchal (37.5°N, 49.2°E): Felt strongly, a number of houses destroyed, damage to some villages (VI - VII). Felt at Bandar Pahlavi, frightened many, slight damage (VI); was felt at Lamjan, Langrud and Kive, people frightened (V); At Astara, Ardabil, Nir, Sarain and Mianech awakened many people (IV); Ahar-Sarah and Gazvin reported the earthquake (III) as well as a number of other Caspian Sea coast cities. Felt by a few people at Tehran (Press, TAB).

1970 Jul. 25; 18½h. Lar: Felt; at the new town of Lar it caused panic.

1970 Jul 30; 0h.52m.; Moraveh-Tapeh: Destructive. The earthquake occurred in northern Khorassan, at south east of Moraveh-Tapeh; Felt in over 3.2×10^5 square kilometers. The intensity of the shock reached (VIII) at Karnaveh; a village in Moraveh-Tapeh district. A total number of 176 persons was killed, 86 injured and about 10,000 became homeless. During several months before the earthquake on July 30, the press reported a number of earthquakes at the epicentral region which were confirmed by the reports of Mashhad seismic station and also occasionally by other seismic stations near the epicentral region (Press, TEH, MSH, TAB).

See also: (SA, TK, AK).

1970 Oct. 3; 6h.57m.; Tehran: Felt in some part of the capital (Shermiran, Shahr-ara, Narmak, Mehr-abad, and Aria-shahr); the electric power supply officer said it was because of the earthquake. Some buildings cracked at Shahr-Rey and Narmak, where people were frightened. Felt at Inst. Geophys. Tehran (Amir-Abad) (III - IV) and slightly at Karaj (ER).

1970 Oct. 25; 11h.22m.; Piranshahr, Ushnuieh, Nagadeh (Azarbaijan): Felt strongly, slight damage, there was damage at the villages of Sarukani, Gard-Kashaneh, Gardashtian, Andizeh and Sarjaldian; at Ushnuieh a number of buildings cracked and at Nagadeh there was slight damage and 20 persons were injured (ER).

1971 Jan. 12; 19h.31m.; Hamadan, Avaj: Felt, people frightened.

1971 Jan. 13; 6h.5m.; Saveh: Felt.

1971 Jan (17) 20h.37m.; Tehran: Felt.

1971 Jan. 20; 21h.32m.; Kermanshah: Felt, it was felt at Kardestan, Asadabad, Paveh, Hamadan, Sanandaj, and there was slight damage at Paveh and Dana (Press, KER).

1971 Jan 21; 11h.8m.; Shah-abad: Felt.

1971 Feb. 11; 1h.41m.; Ahar: Felt strongly, damage. Meshginshahr, Kalibar: Felt, people frightened; Felt at Mianeh and also felt by a few at Tabriz. At Ahar 2,500 houses were cracked and glass panels were broken by the earthquake (Press).

1971 Feb. 14; 16h.27m.; Shahrud and Sabzevar: Felt; damage in the villages of Hosein-abad, Astarabad and Reyabad; one person killed, 50 injured. There were reports of an earthquake on Feb. 17d, 7h.30m., at Shahrud and Posht-e Bastam, and also two earthquakes on Feb. 25 at Jilan near Shahrud.

1971 Mar. 17; 3h.20m.; Nagadeh: Felt strongly, slight damage; At Piranshahr: Felt, people frightened, there was damage at some villages.

1971 Mar. 31; 21h.50m.; Tehran, Saveh, Avaj and Kharagan: Felt, people were awakened by an earthquake.

1971 Apr. 6; 6h.49m.; Shiraz: Felt strongly, Dasht-e Arjan: 3 houses were destroyed by an earthquake.

1971 Apr. 12; 19h.3m.; Bandar Abbas and surroundings were shaken by an earthquake; all ran out of doors; 45 seconds afterwards the region of Bandar Abbas was shaken more severely than by the first shock. At Hajia 150 houses were destroyed, one person was killed and 3 were injured and in addition one person was killed at Tazarj.

1971 Apr. (14); 17h.(50)m.; Maku: Felt.

1971 Apr. 30; 9h.6m.; Saveh; Felt, a few minutes later another shock.

1971 May 15; 4h.53m.; Hashtpar (between Astara and Bandar Pahlavi): Felt strongly, slight damage; Sarab: Felt, people frightened.

1971 May 18; 4h.15m.; Khoy: Felt, another shock at 10h.(30)m.

1971 May 25; 14h.2m.; Kashmar: Felt strongly, slight damage at the town and surrounding villages; Felt at Torbar-e Heidarieh, Gonabad, Feizabad and Nishbur.

1971 Jun. 2; 3h.48m.; Nahavan: report of two shocks.

1971 Jul. 25; 7h.44m.; Mashhad: Felt, people frightened (ER).

1971 Aug. 3; (6)h.; Maku, Bazorgan and Shahabad: Felt.

1971 Aug. 8; 23h. 45m. ; Sanandaj: Felt, people frightened and all awakened by the earthquake.

1971 Aug (9); 2h. (10)m. ; Warsak: report of an earthquake

1971 Aug. 9; 2h. 54m. ; The earthquake was felt over most of north central Iran and the shock was reported as being strong in Tehran, Ab-Ali, Damavand, Firuzkuh, Gorgan, Beh-shahr, and Nowshahr, as well as nearer to the epicentre: Babol, Amol, Shahi, Babolsar, Shirgah, Ziarah and Pol-sefid. Occasional damage occurred in a few places at a considerable distance from the epicentre: at Firuzkuh (65 km), at Nowshahr (120 km) and at Ab-Ali (120 km). In localities nearer to the epicentral region, slight damage was more general; in Babol a minaret collapsed, Babolsar one building was destroyed, Shrgah most houses cracked, Zivla some houses were partly destroyed; Sangchal a few houses were cracked. The most severe damage and all casualties occurred in the Babol-kemar. Here, within a radius of about 7 km, most of the houses and villages were affected to some degree. Buildings were also damaged in the Band-Pey and along Shahi-Pol sefid road (Tchalenko et al 1972). 220 houses collapsed and 570 houses were damaged at Zirah; 60% of the houses at Draz-kla and 68% at Gaval-kola were damaged; no-one was killed but 25 persons were injured at the epicentral area. People frightened at Shahr-Rey and Shemiran. People frightened by an earthquake at Babol at 19h. ; Aug. 9 again (ER).

1971 Aug. (10); (23)h. ; Kalibar: Felt (ER).

1971 Aug (11); (3½)h. ; Gain: Felt (ER).

1971 (11) (13½)h. ; Ardabil; Meshgin-shahr and surrounding villages: Felt, people frightened (ER).

1971 Aug (21); morning (local time) Kakhk and Gonabad: Felt (ER).

1971 Sept. (8); (11)h. ; Bojnurd: Felt (ER).

1971 Aug. 9; 2h. 54m. ; Tehran and other parts of north central Iran were rocked by earthquake tremors; the shocks were also felt at Sari.

1971 Aug. 22, 17h. 54m. Gach-Garan: Felt. The electric light of the city was cut off by the earthquake (ER).

1971 (Sept. 16; 17h. 26m.): Felt at Shiraz, was strong at the villages of Kamal-abad and Mohamad-abad (ER).

1971 Sept. (16); 12h.(58)m.; An earthquake caused panic at Kashmar and at some villages (ER).

1972 Jan. 18; 21h.12m.; Felt at Ardabil, Khalkhal and Rasht (SCGS).

1972 Apr. 10; 2h.7m.; in the early morning at about 5h.37m. local time Ghir and Karzin region were shaken by a destructive earthquake which caused extensive damage to more than 85 villages and killed more than 5,000 people, mostly women and children. The town of Ghir was completely destroyed by this earthquake and an overall total of about 3,000 out of 3,500 buildings of the region were either ruined or damaged beyond repair. The intensity of the earthquake in the most seriously damaged area observed about VIII, but was much greater at epicentre (Moinfar 1972). A number of earthquakes occurred in the region before this earthquake and many have occurred since until recent months.

APPENDIX III

Intensity as defined by:

Musheketov (1893):

- Grade I = Earthquakes which produced slight damage.
- Grade II = Earthquakes which destroyed a few buildings.
- Grade III = Earthquakes accompanied by widespread destruction.

Milne (1911):

- Grade I = Earthquake intensity sufficiently strong to crack walls, break chimneys, to shatter old buildings or to produce slight cracks in the ground. It corresponds to a ground acceleration of 1000 mm/sec. Damage usually confined to a town or village and the radius of the area affected will not exceed 5 miles.
- Grade II = Intensity with a corresponding acceleration of 1500 mm/sec with damaging effects within a radius of 20 miles. Buildings may be unroofed or shattered and some may fall, the ground may be badly cracked in places and small landslips may occur.
- Grade III = Destructive intensity. The ground is faulted and fissured whilst from these openings water, mud and sand may issue. In hilly country landslips are common. The acceleration may exceed 3000 mm/sec. Beyond the mesoseismic area up to a distance of 100 miles the effects produced may be similar to those of Grade II.

Modified Mercalli, Richter (1958):

- | | |
|------|---|
| I | Only recorded by seismographs |
| II | Only felt by individual people at rest. |
| III | Only felt by a few people. |
| IV | Felt by many people. Dishes and doors rattle. |
| V | Hanging objects swing, many sleeping people awake. |
| VI | Slight damages in buildings and small cracks in plaster. |
| VII | Cracks in plaster, gaps in walls and chimneys. |
| VIII | Wide gaps in masonry, parts of gables and cornices fall down. |
| IX | In some buildings walls and roofs collapse, landslips. |
| X | Collapses of many buildings, cracks in ground up to widths 1 m. |
| XI | Many cracks in ground, landslips and falls of rocks. |
| XII | Strong changes in the surface of the ground. |

APPENDIX IVT A B L E S

TABLE (2.1)

1

INDEXES OF EARTHQUAKES IN IRAN: 1902

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEPT DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
1902								
FEB								
FEB 13	BS	093406	41 N 50 E					
FEB 13	KV	0939	40.7N 48.6E		6.0*			
JUL								
JUL 09	BS	0338	27 N 56 E					
1903								
JAN								
JAN 14	BS	0246	24 N 64 E					
MAR								
MAR 22	BS	1435	35 N 60 E					
APR								
APR 28	BS	2340	39 N 43 E					
JUN								
JUN 24	BS	1656	39 N 49 E					
SEP								
SEP 25	BS	0120	34 N 58 E					
1904								
APR								
APR 28	KV	1525	40.6N 48.6E		N 5.1(1)			
1905								
JAN								
JAN 09	BS	0617	38 N 46 E					
1906								
1907								
MAR								
MAR 31	BS	1412	30 N 50 E					
MAR								
MAR 31	KV	1414	39.1N 42.5E		5.2(2)			
JUL								
JUL 04	BS	0921	27 N 55 E					
1908								
SEP								
SEP 28	KV	0628	38 N 44 E		6.0(1)			
SEP 28	BS	0628	38 N 44 E					
1909								
JAN								
JAN 23	BS	0248	33 N 50 E					
JAN 23	GR	024818	33 N 53 E		7.4			
JAN								
JAN 26	KV	2256	39.1N 45.5E		4.9*			
APR								
APR 11	BS	0402	36 N 45 E					
APR 11	KV	0402	36 N 45 E		5.6(2)			
NOV								
NOV 01	BS	0916	36 N 47 E					
1910								
JAN								
JAN 25	KV	0154	40.2N 44.5E		N 4.9*			
DEC								
DEC 04	KV	1402	38.8N 48.8E		5.1(1)			

2

INDEXES OF EARTHQUAKES IN IRAN: 1911

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
1911								
APR								
APR 18	GR	181436	32 N 56 E	50	6.7			
1912								
FEB								
FEB 24	RD	1436	37.0N 59.5E	12	4.9			
FEB 24	*SSK	1436	37 N 59.5E		5			
1913								
JAN								
JAN 27	BS	193809	42.5N 36.5E	6		36	5.5- 43.4	
JAN 27	CRA	1938	35.0N 44.0E					
JAN 27	SSK	193832	39.3N 43.0E	5				
JAN 27	PUL	1938	39.3N 43.0E					
JAN 27	AAC	1938	38.0N 44.0E					
JAN 27	KV	193832	39.3N 43.0E	N 5.6(15)				
MAR								
MAR 24	BS	103411	27.5N 53.8E	6		22	13.3- 44.7	
MAR 24	IRK	1034	28.0N 52.0E					
MAR 24	PUL	1034	26.0N 44.0E					
MAR 24	TIF	1034	27.7N 53.4E					
APR								
APR 16	KV	06	38 3/4N 48 1/2E	N 5.2*				
APR								
APR 25	*SSK	0413	39.5N 58 E	5				
1914								
NOV								
NOV 01	SSK	2152	38.4N 45.4E	4 1/2				
NOV 01	KV	2152	38.4N 45.4E	N 4.4(2)				
1915								
FEB								
FEB 28	*SSK	1247	37.7N 43.1E	5				
FEB 28	KV	124724	37.7N 43.1E	N 5.3(1)				
APR								
APR 01	KV	054142	40.5N 44.5E	N 5.2(3)				
APR 01	*SSK	0542	40.5N 44.5E	4 1/2				
OCT								
OCT 14	*SSK	0820	38.8N 42.5E	5-5 1/4				
1916								
MAY								
MAY 14	PUL	1212	40.1N 49.0E					
MAY 14	SSK	1211	40.2N 47.2E	4 1/2				
MAY 14	KV	1211	40.2N 47.2E	70 5.2(2)				
JUL								
JUL 29	BS	0521	39.0N 45.0E					
OCT								
OCT 11	*SSK	0305	39.5N 45.5E	4 1/2				
OCT 11	KV	0305	39.5N 45.5E	N 4 1/2				
NOV								
NOV 14	BS	1353	40.5N 43.6E					
NOV 14	KV	1354	40.9N 44.3E	5.1(1)				
1917								
JUN								
JUN 02	BS	002812	38.0N 48.5E	5 1/2		8	16.4- 33.1	
JUL								
JUL 15	BS	175840	33.5N 46.5E	6		22	13.4-119.3	
JUL 15	PUL	175840	34 N 46 E					
JUL 15	PAR	175840		26 5.5(1)L				

3

INDEXES OF EARTHQUAKES IN IRAN: 1917

DATE MONTH, DAY	REFER	O.TIME GMT H.M. SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
JUL								
JUL 15	BS	212210	33.5N 46.5E		5 1/2	10	13.4- 42.8	
JUL								
JUL 24	BS	161240	33.5N 46.5E		5 1/2	8	13.4- 40.6	
NOV								
NOV 23	BS	041730	33.5N 46.5E		5 3/4	13	13.4- 72.4	
NOV 23	PAR	041730			5.5(2)L			
NOV								
NOV 24	BS	195740	33.5N 46.5E		5 1/4	5	13.4- 64.7	
NOV								
NOV 28	RD	144224	36.5N 59.1E	13	5.3			
NOV 28	SSK	144224	36.5N 59.1E		5 1/4			
NOV								
NOV 28	RD	1743	36.5N 58.4E	12	4.6			
NOV 28	*SSK	1743	36.5N 60 E		4 3/4			
1918								
MAR								
MAR 24	ISS	231454	34.5N 57.1E		5 3/4-6	23	17.2-128.1	
1919								
JAN								
JAN 08	ISS	101253	40.0N 47.0E		5 1/4	6	16.3- 36.1	
JAN 08	*SSK	1012	40.0N 47.0E					
JAN 08	KV	101253	40.0N 47.0E	N	5.4(1)			
JUL								
JUL 14	ISS	142200	40.0N 60.0E		5 1/4	6	16.5- 51.0	
1920								
FEB								
FEB 20	ISS	000130	42.0N 46.0E		5 1/2	15	17.0- 80.0	
FEB								
FEB 20	ISS	114425	42.0N 46.0E		6	33	17.0 118.8	
FEB 20	STR	1145			6.1(4)L			
FEB 20	KV	1145	42.0N 44.1E	N	6.2(7)			
FEB 20	SSK	1145	42.0N 44.1E		5 3/4			
MAY								
MAY 25	ISS	113955	33.5N 46.5E		5 1/2	10	13.4- 40.5	
MAY 25	PAR	1140			5.5(1)L			
1921								
DEC								
DEC 06	ISS	132616	40.0N 45.5E		5 1/2	14	1.7- 34.9	
DEC 06	STR	1326			5.2(2)L			
DEC 06	KSA	132632						
1922								
MAR								
MAR 21	ISS	165612	33.0N 50.0E		5 1/2	12	16.3-122.3	
MAR 21	STR	1656						
1923								
MAY								
MAY 12	ISS	225723	40.5N 45.0E		5 1/4	13	1.2- 34.7	
MAY 12	KV	225723	40.5N 45.0E	N	5.2(1)			
MAY								
MAY 25	ISS	222125	32.0N 57.0E		5 3/4-6	39	13.7-128.2	
MAY 25	STR	2221	31.5N 62.6E		5.6(3)L			
MAY 25	*SSK	2221	35.3N 59.2E		5 1/2			
JUN								
JUN 18	ISS	041840	34.8N 46.0E		4 3/4	3	6.9- 27.0	
SEP								
SEP 14	ISS	081030	29.5N 59.5E		5 1/2	14	15.3-102.1	

INDEXES OF EARTHQUAKES IN IRAN; 1923

DATE MONTH. DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
SEP								
SEP 17	ISS	070904	35.5N 55.0E		6 1/4	53	10.1-126.3	
SEP 17	STR	0709			6.4(4)L			
SEP 17	SSK	070917	37.2N 57.7E		6			
SEP 17	GR	070914	35 1/2N55 E		6 1/2			
SEP								
SEP 22	ISS	204733	29.5N 56.0E		6 3/4	74	15.2-133.5	
SEP 22	STR	2047			6.6(6)L			
SEP 22	GR	204738	29 N 56 1/2E		6.9			
SEP								
SEP 23	ISS	031858	29.5N 56.0E		5 1/2	13	15.2-102.1	
NOV								
NOV 29	ISS	033636	31.2N 61.6E		5 1/2	16	13.4- 60.4	
1924								
JAN								
JAN 01	*SSK	1517	38.2N 60.6E		4 3/4			
JAN								
JAN 18	ISS	145620	29.5N 56.0E		5 1/2	15	16.0- 48.9	
JAN 18	STR	1456						
FEB								
FEB 01	*SSK	1720	40.5N 43.5E		4			
FEB								
FEB 19	ISS	065945	39.0N 47.5E		5 3/4-6	45	16.1-120.2	
FEB 19	STR	0659	39 N 49 E		5.9(4)L			
FEB 19	SSK	065955	39.0N 47.8E		5 1/2			
FEB 19	KV	065955	39.0N 47.8E	50	5.8(24)			
MAY								
MAY 13	ISS	015230	40.0N 42.0E		5 1/4	24	6.0- 81.1	
MAY 13	SSK	015233	39.7N 42.8E		5			
JUN								
JUN 30	ISS	034112	27.5N 53.8E		5 1/2	17	24.8-102.1	
JUN 30	STR	0341			5.9(1)L			
JUL								
JUL 03	ISS	080830	35.5N 55.0E		5	8	19.0- 43.8	
JUL 03	STR	0808						
JUL								
JUL 25	ISS	213924	38.0N 43.0E		4 3/4	5	5.8- 35.2	
JUL 25	KV	213924	38.0N 43.0E	N 4.9				
SEP								
SEP 06	ISS	045056	40.0N 42.0E		5 1/2	25	7.9- 86.3	
SEP 06	*SSK	0451	39.1N 42.6E		4 1/2			
SEP								
SEP 13	ISS	143400	40.0N 42.0E			85	6.0-144.4	
SEP 13	STR	1434			7.0(7)L			
SEP 13	GR	143405	40 N 42 E		6 3/4			
SEP 13	SSK	143405	40.0N 42.0E		6 3/4			
SEP 13	KV	143405	40 N 42 E	N 6.9(32)				
SEP								
SEP 27	ISS	042723	40.0N 42.0E		5 1/2	25	6.0- 78.1	
SEP 27	STR	0427			5.4(3)L			
SEP 27	*SSK	042736	39.5N 43.9E		5			
SEP 27	KV	042736	39.5N 43.9E	N 5.2(14)				
OCT								
OCT 09	KV	05	40.5N 48.5E	N 4.6				
NOV								
NOV 08	ISS	090500	35.5N 48.0E		5 1/2	26	5.1- 74.7	
NOV 08	STR	0905			5.5(2)L			
NOV								
NOV 08	ISS	174520	35.5N 48.0E		4 1/2	3	23.0- 42.6	
NOV								
NOV 10	ISS	210856	35.5N 48.0E		4 1/2	4	5.1- 42.6	

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NOV								
NOV 10	ISS	215456	35.5N 48.0E		4 3/4	8	5.1- 42.6	
NOV								
NOV 11	ISS	155340	35.5N 48.0E		4 1/2	3	5.1- 42.8	
NOV								
NOV 12	ISS	092820	35.5N 48.0E		4 1/2	3	5.1- 26.8	
DEC								
DEC 11	ISS	230100	25.2N 56.8E		5-5 1/4	11	16.2- 52.6	
DEC 11	STR	2301						
1925								
MAR								
MAR 12	ISS	012200	40.0N 42.0E		4 3/4	8	4.1- 27.9	
MAR 12	KV	012200	40.0N 42.0E		N 5.2(2)			
MAR								
MAR 12	ISS	112012	39.0N 55.0E		4 1/2-4 3/4	6	4.2- 36.1	
MAR 12	*SSK	1120	39.0N 55.0E					
MAR								
MAR 29	*SSK	1806	40 N 58 E					
MAY								
MAY 02	ISS	025700	34.0N 61.0E		4 1/2-4 3/4	5	11.2- 32.9	
JUL								
JUL 11	ISS	215222	29.5N 59.5E		4 1/2-4 3/4	5	13.4- 45.6	
JUL								
JUL 30	ISS	184310	30.0N 51.0E		5-5 1/4	16	10.4- 45.6	
JUL 30	KSA	1843	35 N 44 E		5.2(1)L			
JUL 30	IRK	18	35 N 44 E					
JUL 30	STR	18	35 N 44 E					
SEP								
SEP 24	ISS	043836	27.5N 55.0E		5 1/2-5 3/4	38	17.6-104.0	
SEP 24	STR	0438			5.6(5)L			
DEC								
DEC 10	ISS	045940	40.0N 60.0E		4 3/4-5	10	7.8- 39.0	
DEC 10	SSK	055930*	37.1N 57.8E		5			
DEC								
DEC 18	ISS	055320	30.0N 51.0E		5 1/4	19	10.4- 44.6	
DEC 18	STR	0553			5.6(1)L			
DEC								
DEC 18	ISS	181016	36.8N 71.0E	200	5 1/4-5 1/2	20	8.5- 43.4	
DEC 18	SSK	181025	36.7N 71.0E	220	6			
DEC 18	*SSK	1818	36.8N 62.5E		5			
1926								
APR								
APR 02	ISS	115600	35.0N 44.0E		4 3/4-5	12	7.1- 45.4	
APR 02	KV	115600	35.0N 44.0E		N 4.6(2)			
APR								
APR 23	ISS	013130	27.5N 55.0E		5 1/4-5 1/2	24	13.5- 49.9	
APR 23	STR	0113						
MAY								
MAY 19	ISS	211344	27.2N 59.5E		5-5 1/4	14	15.4- 53.3	
MAY 19	GR	211355	26 1/2N59 E		D			
JUL								
JUL 08	ISS	145912	39.7N 44.0E		4 1/2-4 3/4	10	4.4- 42.4	
JUL 08	KV	145912	39.7N 44.0E		N 4.5			
OCT								
OCT 22	ISS	164405	40.5N 45.0E		5 1/4	23	3.7- 70.0	
OCT 22	SSK	164405	40.7N 43.4E		4 1/2			
OCT 22	KV	164405	40.7N 43.7E		5.2(4)			
OCT								
OCT 22	ISS	195920	40.5N 45.0E		5 3/4	50	3.7- 82.1	
OCT 22	STR	1959			5.6(4)L			
OCT 22	KV	195920	40.7N 43.8E	10	5.7(16)			
OCT 22	GR	195926	40 1/2N44 E		D			
OCT 22	SSK	195920	40.7N 43.8E		5 1/2			

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OCT								
OCT 25	*SSK	1402	40.9N 44.1E		4 1/2			
NOV								
NOV 05	*SSK	0041	40.7N 43.9E		4			
1927								
MAR								
MAR 29	ISS	180524	40.0N 78.0E		4 1/2	7	6.7- 35.5	
MAR 29	SVE	18	38.4N 58.7E					
MAY								
MAY 09	ISS	103140	28.5N 56.0E		6 1/4	66	12.9-127.5	
MAY 09	STR	1031	32 N 57.5E		6.1(6)L			
MAY 09	GR	103147	27 1/2N56 E		6 1/4			
JUN								
JUN 15	ISS	064610	35.5N 48.0E		4 1/2	5	5.1- 23.0	
JUL								
JUL 07	ISS	200621	28.0N 62.0E		6 1/4	56	13.5-132.8	
JUL 07	STR	2006		100	6.2(2)L			
JUL 07	GR	200630	27 N 62 E	100	6 1/2			
JUL								
JUL 11	*SSK	1612	36.7N 63.0E					
JUL								
JUL 22	ISS	035454	34.7N 54.0E		6 1/2	94	6.5-125.5	
JUL 22	STR	0355	33.5N 55 E		6.2(6)L			
JUL 22	GR	035510	34 1/2N53 1/2E		6 1/4			
JUL								
JUL 22	ISS	083730	34.7N 54.0E		5 1/4	30	6.5- 87.9	
JUL 22	SVE	0837	33.78N 56.96E					
JUL 22	STR	0837						
JUL								
JUL 22	ISS	203308	33.5N 54.0E		4 3/4	12	7.6- 40.3	
JUL 22	ISS	203330	34.7N 54.0E		4 3/4	12	6.5- 39.5	
JUL								
JUL 23	ISS	201746	34.7N 54.0E		5 3/4-6	67	6.5- 96.9	
JUL 23	SVE	2017	33.95N 54.96E					
JUL 23	MKY	2017	35.3N 54.8E					
JUL 23	STR	2017			5.6(7)L			
JUL								
JUL 23	ISS	224018	34.7N 54.0E		5 3/4-6	62	6.5-133.8	
JUL 23	STR	2240			5.5(6)L			
JUL								
JUL 24	ISS	132312	28.5N 56.0E		4 3/4	10	12.9- 42.7	
JUL								
JUL 27	ISS	204142	34.7N 54.0E		4 3/4	7	10.1- 38.4	
JUL								
JUL 29	ISS	113312	33.5N 55.0E		4 3/4	8	10.1- 38.4	
JUL 29	*SSK	1133	35.5N 55.0E					
JUL								
JUL 30	ISS	040440	28.7N 51.9E		4 1/2	4	14.2- 34.3	
OCT								
OCT 31	ISS	062300	36.5N 49.0E		4 1/2	7	3.9- 26.2	
NOV								
NOV 12	ISS	144540	33.5N 46.5E		5 1/2	47	7.4-119.3	
NOV 12	STR	1445			5.5(6)L			
NOV 12	GR	144550	32 1/2N46 1/2E		D			
NOV 12	PF	144550	32.3N 46.5E					
NOV								
NOV 15	ISS	173912	33.5N 48.0E		4 3/4	9	7.1- 44.0	
NOV								
NOV 16	ISS	012700	27.5N 53.8E		4 1/2	6	13.3- 36.0	
DEC								
DEC 14	ISS	075018	24.7N 63.0E		4 1/2	5	17.4- 32.1	

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1928								
MAR								
MAR 08	ISS	181354	32.0N 59.0E		5 1/4	26	12.4- 98.2	
MAR 08	STR	1814						
MAR								
MAR 24	ISS	105316	37.8N 47.3E		5	17	3.3- 41.6	
MAR 24	KV	105316	37.8N 47.3E		N 4.9			
MAR								
MAR 28	ISS	115742	40.0N 47.0E		4 1/2-4 3/4	9	2.3- 40.4	
MAR 28	KV	115742	40.5N 46.7E		N 4.6(2)			
APR								
APR 14	ISS	131633	35.5N 55.0E		5	16	6.3- 38.7	
APR 14	MOS	131644			5 3/4			
APR 14	SSK	131644	35.3N 54.4E		5 5/4			
APR								
APR 15	ISS	100928	28.7N 51.9E		4 3/4	9	11.8- 45.0	
APR								
APR 26	ISS	153950	37.5N 55.0E		4 1/2	8	4.9- 37.1	
APR 26	SSK	154001	37.4N 55.4E		4 1/2			
APR								
APR 30	ISS	111948	27.6N 57.8E		4 1/2	6	14.4- 43.7	
MAY								
MAY 01	ISS	155818	38.5N 60.0E		4 1/2	7	7.6- 33.3	
MAY 01	RD	155818	38.5N 60.0E		11 4.2			
AUG								
AUG 14	ISS	000909	27.6N 57.8E		4 1/2	7	14.4- 42.9	
AUG								
AUG 21	ISS	190152	35.5N 59.0E		5 1/4	25	8.7-100.5	
AUG 21	STR	1902						
AUG 21	*SSK	1902	35.5N 59.0E		5			
AUG								
AUG 23	ISS	035325	42.0N 74.0E		5 1/2-5 3/4	48	3.6- 98.0	
AUG 23	STR	0353			5.5(2)L			
AUG 23	SSK	035338	42.0N 73.0E		5 1/2			
AUG								
AUG 26	ISS	231621	28.7N 51.9E		4 1/2	6	11.8- 38.9	
AUG								
AUG 27	ISS	033754	28.7N 51.9E		4 1/2	8	11.8- 38.9	
AUG								
AUG 27	ISS	041957	28.7N 51.9E		4 1/2-4 3/4	9	11.8- 45.0	
SEP								
SEP 18	ISS	080750	32.5N 53.0E		4 1/2	5	8.5- 41.5	
SEP								
SEP 20	ISS	1459	25.2N 56.8E		4 1/4-4 1/2	4	16.2- 31.7	
NOV								
NOV 06	ISS	134225	39.7N 53.3E		4 3/4	12	2.7- 31.2	
NOV 06	GR	134235	40 N 53 1/2E		D			
NOV 06	SSK	134236	39.8N 53.3E		4 3/4			
1929								
JAN								
JAN 21	ISS	154805	30.5N 54.5E		4 3/4	12	10.5- 42.1	
FEB								
FEB 05	ISS	015713	31.5N 47.5E		4 1/2	8	9.1- 34.5	
FEB								
FEB 22	ISS	193836	42.0N 46.0E		4 1/2	7	3.3- 21.0	
FEB 22	*SSK	1938	40.6N 45.7E		4 1/2			
MAR								
MAR 26	ISS	140010	28.0N 62.0E		5	16	12.4- 46.5	
MAY								
MAY 01	ISS	153722	38.0N 56.8E			125	5.8-133.2	
MAY 01	STR	1537			7.0(7)L			
MAY 01	SSK	153727	37.4N 58.0E		6 1/2			
MAY 01	GR	153730	38 N 58 E		7.1			

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MAY								
MAY 01	ISS	224245	38.0N 56.8E		4 3/4	11	5.8- 35.3	
MAY 01	SSK	224244	37.0N 57.6E		4 3/4			
MAY								
MAY 03	ISS	161956	38.4N 57.7E		5 1/4	33	6.3- 62.5	
MAY 03	STR	1619			5.0(1)L			
MAY 03	SSK	162001	37.8N 57.8E		5			
MAY								
MAY 04	ISS	063112	38.4N 57.7E		5	21	6.3- 50.8	
MAY 04	SSK	063113	37.5N 58.2E		4 1/2			
MAY								
MAY 13	ISS	063222	38.4N 57.7E		4 3/4	11	7.3- 50.8	
MAY 13	*SSK	0632	38.4N 57.7E		4 1/2			
MAY								
MAY 13	ISS	132703	38.0N 56.8E		5 3/4	79	5.8- 97.6	
MAY 13	STR	1327			5.7(4)L			
MAY 13	SSK	132709	37.7N 57.4E		5 1/2			
MAY								
MAY 17	ISS	193333	32.0N 57.0E		4 1/2	7	10.1- 39.5	
JUL								
JUL 13	ISS	073625	37.0N 58.5E		5 3/4	64	7.5- 88.9	
JUL 13	STR	0736			5.6(2)L			
JUL 13	SSK	073630	37.0N 58.5E		5 1/2			
JUL								
JUL 15	ISS	074407	33.7N 49.4E		6 1/4-6 1/2	99	6.6-121.8	
JUL 15	STR	0744	33 N 46.5E	65	6.3(2)L			
JUL 15	GR	074414	32 N 49 1/2E		6 1/4			
JUL								
JUL 16	ISS	194315	28.7N 51.9E		4 3/4	11	11.8- 57.7	
JUL								
JUL 25	ISS	001717	37.7N 57.8E		5 1/2-5 3/4	45	6.7- 98.0	
JUL 25	STR	0017			5.2(2)L			
JUL 25	SSK	001721	37.2N 57.8E		5 1/2			
AUG								
AUG 07	ISS	202225	35.0N 44.0E		4 1/2	5	6.8- 26.3	
AUG 07	KV	202225	35.0N 44.0E		4.8(2)			
AUG								
AUG 11	ISS	100816	30.5N 54.5E		4 1/2-4 3/4	10	10.5- 41.8	
SEP								
SEP 03	ISS	120732	26.4N 62.3E	110		66	12.3-133.1	
SEP 03	STR	1207		110	6.4(2)L			
SEP 03	GR	120739	26 1/2N62 1/4E	110	6 1/2			
OCT								
OCT 02	ISS	115154	28.7N 51.9E		4 1/2	7	11.8- 28.8	
OCT								
OCT 27	ISS	164257	33.5N 48.0E		5	17	7.1- 44.0	
OCT								
OCT 29	ISS	055330	27.5N 54.5E		5 1/2	44	13.5- 97.5	
OCT 29	GR	055339	27 1/2N54 1/2E		D			
OCT								
OCT 29	ISS	085735	25.0N 51.5E		4 3/4	10	15.4- 47.9	
OCT								
OCT 29	ISS	103236	25.0N 51.5E		4 3/4	12	13.5- 44.0	
OCT								
OCT 29	ISS	114820	25.0N 51.5E		4 3/4	15	13.5- 44.0	
NOV								
NOV 05	ISS	100604	37.5N 45.5E		4 1/2-4 3/4	13	4.5- 42.8	
NOV 05	KV	100604	37.5N 45.5E	N	4.4(2)			
NOV								
NOV 20	ISS	195658	27.5N 55.5E		4 3/4	13	13.5- 44.0	
DEC								
DEC 24	ISS	195435	37.5N 60.0E		4 1/2	10	5.9- 34.0	

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DEC								
DEC 24	*SSK	2212	40.8N 49.3E		4 1/4-4 1/2			
DEC								
DEC 25	*SSK	2225	38.4N 49.2E		4			
1930								
FEB								
FEB 15	ISS	190706	28.7N 51.9E		5	21	11.8- 46.8	
APR								
APR 03	ISS	063258	32.5N 47.0E		4 3/4	9	8.2- 45.3	
APR								
APR 03	ISS	120840	32.5N 43.7E		4 3/4	10	6.7- 47.3	
APR 03	KV	120840	32.5N 43.7E		N 5.3(4)			
APR								
APR 15	ISS	095627	28.0N 54.0E		5 1/4	17	12.8- 59.1	
APR 15	STR	0956	27.5N 52.5E					
APR 15	GR	095627	29 N 54 E		D			
APR								
APR 16	ISS	212542	38.0N 43.8E		4 1/4-4 1/2	5	7.6- 21.9	
MAY								
MAY 06	ISS	070322	37.0N 44.0E		5 1/4-5 1/2	30	5.7- 65.7	
MAY 06	STR	0703	38 N 44 E					
MAY 06	KV	070322	37.0N 44.0E		N 5.4(7)			
MAY								
MAY 06	ISS	223427	37.0N 44.0E			138	5.7-142.1	
MAY 06	STR	2234	38 N 45 E					
MAY 06	STR	2234			7.4(7)L			
MAY 06	GR	223423	38 N 44 1/2E		7.2			
MAY 06	SSK	223223	38.0N 44.5E		6 1/2			
MAY 06	KV	223423	38 N 44 1/2E		N 7.3(35)			
MAY								
MAY 07	ISS	044746	37.0N 44.0E		4	2	5.7- 7.3	
MAY								
MAY 07	ISS	045840	37.0N 44.0E		4 1/4	4	5.7- 24.4	
MAY 07	KV	045840	37.0N 44.0E		N 4.3(2)			
MAY								
MAY 07	ISS	052424	37.0N 44.0E		4	2	5.7- 7.3	
MAY								
MAY 07	ISS	054230	37.0N 44.0E		4 1/4	5	5.7- 24.4	
MAY 07	KV	054230	37.0N 44.0E		N 4.2			
MAY								
MAY 07	ISS	092930	37.0N 44.0E		4 1/2	8	5.7- 24.4	
MAY 07	STR	0929	37.5N 45 E					
MAY 07	KV	092930	37.0N 44.0E		N 4.5(4)			
MAY								
MAY 07	ISS	105825	37.0N 44.0E		4 1/4	3	5.7- 22.7	
MAY								
MAY 07	ISS	113142	37.0N 44.0E		4 1/4	4	5.7- 24.7	
MAY								
MAY 07	ISS	134748	37.5N 45.5E		4 3/4	11	4.5- 29.4	
MAY 07	STR	1347	37.5N 45 E					
MAY 07	*SSK	1347	37.3N 45.1E		4.3/4			
MAY 07	KV	134748	37.5N 45.5E		N 4.9(5)			
MAY								
MAY 08	ISS	052930	37.5N 45.5E		5	18	4.5- 42.8	
MAY 08	STR	0529			4.8(2)L			
MAY 08	KV	052930	37.5N 45.5E		N 4.8(5)			
MAY								
MAY 08	ISS	142332	37.5N 45.5E		4 1/2	6	4.5- 24.3	
MAY 08	*SSK	1423	37.7N 45.2E		5			
MAY 08	STR	1423	37.5N 45 E					
MAY 08	KV	142330	37.7N 45.2E		N 5.1(4)			

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MAY								
MAY 08	ISS	150521	37.5N 45.5E		4 3/4-5	13	4.5- 29.7	
MAY 08	KV	150521	37.5N 45.5E		N 5.4(4)			
MAY								
MAY 08	ISS	153524	37.3N 44.8E		6 1/4	96	8.1-118.0	
MAY 08	STR	1535			6.2(7)L			
MAY 08	KV	153524	37.3N 44.8E		N 6.0(34)			
MAY								
MAY 08	ISS	233622	37.3N 44.8E		4 3/4-5	12	5.0- 38.1	
MAY 08	STR	2336	37 N 45.5E					
MAY 08	KV	233622	37.3N 44.8E		N 4.5(5)			
MAY								
MAY 09	ISS	014300	37.0N 44.0E		4 1/2	6	5.7- 24.4	
MAY 09	KV	014300	37.0N 44.0E		N 4.6(2)			
MAY								
MAY 09	KV	08	37.5N 45.0E		N 4.4			
MAY								
MAY 10	ISS	214322	37.5N 44.0E		5-5 1/4	21	5.7- 44.1	
MAY 10	KV	214322	37.5N 44.0E		N 4.7(5)			
MAY 10	STR	2143	37.5N 44 E					
MAY								
MAY 10	ISS	235920	37.0N 44.0E		4 1/4-4 1/2	5	5.7- 24.4	
MAY 10	KV	235920	37.0N 44.0E		N 4.2			
MAY								
MAY 11	ISS	223550	27.5N 55.0E		6	80	13.5-126.6	
MAY 11	KSA	2235	30 N 54 E					
MAY 11	STR	223550			33 5.9(4)L			
MAY 11	MOS	2235	29.7N 55.5E					
MAY 11	GR	223546	27 1/2N55 E		6			
MAY								
MAY 12	ISS	002115	27.5N 55.0E		5 3/4	59	13.5-126.6	
MAY 12	STR	0021	30.0N 56.6E		43 5.6(3)L			
MAY								
MAY 13	ISS	201414	27.5N 55.0E		4 3/4	13	13.5- 44.0	
MAY								
MAY 14	KV	0259	37.5N 43.5E		N 4.3			
MAY								
MAY 21	ISS	135051	37.0N 44.0E		4 1/2	7	5.7- 24.4	
MAY 21	KV	135051	37.0N 44.0E		N 4.6(2)			
MAY								
MAY 23	ISS	094820	37.5N 45.5E		5 1/4	33	4.5- 42.8	
MAY 23	STR	094820	37 N 42.5E		5.1(2)L			
MAY 23	KV	094820	37.5N 45.5E		N 5.2(8)			
MAY								
MAY 29	ISS	171455	37.5N 45.5E		5 1/4-5 1/2	37	4.5- 47.5	
MAY 29	STR	171455	37.5N 44.0E		5.5(2)L			
MAY 29	KV	171455	37.5N 45.5E		N 5.5(10)			
JUN								
JUN 04	ISS	072810	37.9N 45.1E		5 1/2-5 3/4	52	4.5- 47.0	
JUN 04	STR	0728	38 N 45 E		5.4(2)L			
JUN 04	SSK	072807	38.3N 45.0E		5 1/2			
JUN 04	KV	072810	37.9N 45.1E		N 5.3(7)			
JUL								
JUL 08	ISS	171542	28.7N 51.9E		4 3/4	8	11.8- 45.0	
JUL								
JUL 09	ISS	043549	37.0N 44.0E		4 1/2	8	5.7- 24.4	
AUG								
AUG 03	ISS	220551	37.3N 44.8E		5-5 1/4	25	5.0- 28.9	
AUG 03	KV	220551	37.3N 44.8E		N 5.0(5)			
AUG								
AUG 17	ISS	122932	27.5N 55.0E		5 1/2-5 3/4	52	15.7-106.2	
AUG 17	STR	122932			5.8(4)L			

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AUG								
AUG 21	ISS	065520	37.0N 44.0E		4 1/4-4 1/2	5	7.3- 28.3	
AUG 21	KV	065520	37.0N 44.0E		N 4.7(2)			
AUG								
AUG 23	ISS	105318	27.5N 55.0E		6-6 1/4	87	17.6-126.6	
AUG 23	STR	1053			24 6.3(6)L			
SEP								
SEP 02	ISS	185852	29.4N 51.4E		5 1/2	49	11.0- 65.3	
SEP 02	MOS	1859	31 N 51 E					
SEP 02	STR	185852			20 5.4(2)L			
SEP 02	GR	185848	30 N 51 1/2E		D			
SEP								
SEP 05	ISS	162038	27.5N 55.0E		5 1/4	24	13.5- 45.3	
SEP								
SEP 06	ISS	213605	31.2N 61.6E		4 1/2	5	11.8- 25.6	
OCT								
OCT 02	ISS	153312	35.8N 52.1E		5 1/4-5 1/2	32	4.9- 51.3	
OCT 02	*SSK	1533	35.8N 52.1E		5			
OCT								
OCT 06	ISS	180818	37.0N 58.5E		4 1/4-4 1/2	5	7.2- 22.0	
OCT								
OCT 07	ISS	205306	35.8N 52.1E		5	17	4.9- 39.9	
OCT								
OCT 18	ISS	010220	29.4N 51.4E		4 1/2	6	11.0- 44.8	
OCT								
OCT 25	ISS	233425	37.9N 45.1E		5	17	4.5- 42.9	
OCT 25	STR	233425	37.5N 45 E		5.3(1)L			
OCT 25	KV	233425	37.9N 45.1E		N 5.0(6)			
DEC								
DEC 05	ISS	055648	33.5N 46.5E		4 1/2	6	7.4- 28.3	
1931								
JAN								
JAN 04	ISS	201048	32.5N 53.0E		4 1/2-4 3/4	7	8.3- 41.5	
JAN 04	LNN	2010	35 N 46 E					
FEB								
FEB 06	*SSK	0520	39.5N 46.3E		4 1/4-4 1/2			
FEB								
FEB 06	*SSK	2028	39.5N 46.3E		4 1/4			
APR								
APR 27	ISS	165045	38.7N 46.1E			127	3.4-119.0	
APR 27	STR	165045	39.5N 46.3E		15 6.3(6)L			
APR 27	SSK	1651	39.3N 46.0E		6 1/2			
APR 27	GR	165038	38 3/4N 46 E		6 1/2			
APR 27	KV	165038	39.3N 46.0E		15 6.3(31)			
APR 27	KV	165045	38.7N 46.1E		N			
APR								
APR 27	ISS	180520	40.0N 47.0E		4 1/2	6	2.3- 22.3	
APR 27	SSK	1805	39.5N 46.0E					
APR 27	KV	1805	39.5N 46.0E		N 4.9*			
MAY								
MAY 03	ISS	192230	30.5N 54.5E		4 3/4	8	10.5- 62.5	
MAY 03	LNN	1922	30 N 47 1/2E					
MAY								
MAY 05	ISS	064219	26.0N 54.8E		5 1/4	24	14.9- 45.4	
MAY 05	LNN	0642	27 N 50 E					
MAY 05	GR	064215	26 1/2N 54 1/2E		D			
MAY								
MAY 05	ISS	114007	26.0N 54.8E		4 1/2	7	14.9- 42.9	
MAY								
MAY 05	ISS	141045	26.0N 54.8E		4 3/4-5	16	14.9- 42.9	
MAY 05	LNN	1410	28 N 52 1/2E					

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MAY								
MAY 07	ISS	004540	26.0N 54.8E		5 1/4	24	14.9- 61.2	
MAY 07	LNN	0045	27 N 55 E					
MAY								
MAY 08	ISS	090603	40.5N 46.0E		4 1/2	7	3.0- 21.6	
MAY 08	SSK	0906	39.0N 46.0E		4 1/4			
MAY 08	KV	090603	39.0N 46.0E		N 4.3(4)			
MAY								
MAY 12	ISS	102510	37.5N 45.5E		5 1/4	28	4.5- 47.5	
MAY 12	STR	1025			5.2(2)L			
MAY 12	SSK	102513	38.8N 46.3E		5 1/4			
MAY 12	KV	102513	38.8N 46.3E		N 5.2*			
MAY								
MAY 17	ISS	152319	41.5N 47.9E		4 3/4	15	1.9- 31.0	
MAY 17	SSK	1523	40.5N 48.5E		4 1/2			
MAY 17	KV	152319	40.5N 48.5E		N 5.0(3)			
MAY								
MAY 21	*SSK	1200	39 N 44 1/2E		4 1/4			
JUN								
JUN 25	*SSK	2141	39.3N 46.4E		4			
JUL								
JUL 04	ISS	210054	37.5N 45.5E		4 3/4	12	4.5- 28.7	
JUL 04	LNN	2101	37 1/2N46 E					
JUL 04	SSK	210050	38.0N 45.6E		4 3/4			
JUL 04	KV	210050	38.0N 45.6E		N 4.8(5)			
JUL								
JUL 05	ISS	175722	39.0N 47.5E		4 3/4-5	19	2.3- 46.8	
JUL 05	SSK	1757	39.0N 48.5E		4 1/4			
JUL 05	KV	175700	39.9N 48.5E		N 4.6(1)			
JUL								
JUL 08	ISS	131313	33.7N 49.4E		4 1/4	4	6.6- 24.4	
JUL								
JUL 28	ISS	173632	29.4N 51.4E		5	15	13.9- 46.0	
JUL 28	LNN	1736	30 1/2N49 E					
JUL 28	GR	173625	29 1/2N52 E		D			
AUG								
AUG 07	ISS	104945	40.0N 60.0E		5	13	7.1-104.1	
AUG 07	*SSK	1049	40 N 64 E					
AUG								
AUG 08	ISS	085424	37.0N 58.5E		5 1/4	22	9.4- 52.3	
AUG 08	LNN	0854	37 N 56 E					
AUG 08	SSK	085416	37 N 59 E		5			
AUG 08	GR	085416	37 N 58 1/2E		D			
AUG								
AUG 27	LNN	11	36 N 47 1/2E					
AUG								
AUG 28	ISS	194008	29.8N 67.3E		5 1/4	22	9.3- 61.9	
AUG 28	STR	1940	25 N 60 E					
AUG								
AUG 28	ISS	21	29.8N 67.3E		4 3/4	12	9.3 50.2	
AUG 28	STR	21	25 N 60 E					
AUG 28	LNN	21	25 N 60 E					
AUG								
AUG 29	STR	11	25 N 60 E					
AUG								
AUG 29	ISS	123051	32.0N 49.0E		4 1/2	8	8.4- 34.8	
AUG 29	LNN	1230	33 N 48 E					

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AUG								
AUG 29	STR 13		25 N 60 E					
SEP								
SEP 02	ISS 032823		30.5N 54.5E		4 1/2	8	10.5- 36.4	
OCT								
OCT 13	ISS 073642		35.6N 43.2E		4 3/4	12	6.2- 27.2	
OCT 13	KV 073642		35.6N 43.2E		N 5.0(2)			
NOV								
NOV 16	ISS 082505		27.5N 55.0E		4 3/4	12	15.7- 38.5	
DEC								
DEC 24	ISS 230005		37.3N 44.8E		4 3/4-5	15	8.1- 43.4	
DEC 24	KV 230005		37.3N 44.8E		N 4.8*			
1932								
JAN								
JAN 22	ISS 004856		33.5N 48.0E		5	14	7.1- 30.2	
JAN 22	ISS 004918		33.5N 48.0E			1	- 8.6	
JAN 22	MOS 0049		30.0N 47.5E					
JAN 22	GR 004856		33 N 47 E		D			
FEB								
FEB 04	ISS 211816		26.4N 62.3E		5 1/4	25	12.3- 49.8	
FEB 04	MOS 2118		27.5N 60 E					
FEB 04	ISS 211816		26.4N 62.3E			1	21.0	
FEB 04	GR 211809		26 1/2N 62 1/4E		D			
MAR								
MAR 15	ISS 074434		39.7N 44.0E		5-5 1/4	19	4.5- 42.4	
MAR 15	ISS 074434		39.7N 44.0E			3	2.1- 22.6	
MAR 15	STR 0744		39 N 43 E					
MAR 15	SSK 074434		40.2N 44.9E		5			
MAR 15	GR 074434		41 N 45 E		D			
MAR 15	KV 074434		40.2N 44.9E		N 5.2(2)			
MAR								
MAR 15	ISS 101810		34.2N 48.0E		5	15	6.3- 43.5	
MAR 15	ISS 101810		34.2N 48.0E			1	7.9	
MAR 15	STR 1018		39 N 43 E					
MAR 15	GR 101806		34 N 48 E		D			
APR								
APR 18	ISS 112327		24.5N 63.4E		5 1/2	38	10.3- 65.5	
APR 18	ISS 112307		24.5N 63.4E			1	46.9	
APR 18	STR 112327		26.0N 61.5E		5.7(2)L			
APR 18	GR 112321		25 N 64 E		6			
MAY								
MAY 07	ISS 145415		36.3N 44.9E		4 1/2	8	5.4- 25.3	
MAY 07	STR 1454		35.5N 45 E					
MAY 07	KV 145409		36 1/4N 45 E		5.1(1)			
MAY 07	GR 145409		36 1/4N 45 E		D			
MAY								
MAY 20	ISS 191618		36.3N 53.5E		5 1/4-5 1/2	30	5.0- 51.3	
MAY 20	ISS 191618		36.3N 53.5E			1	33.9	
MAY 20	STR 1916		36 N 54 E					
MAY 20	GR 191611		36 1/2N 53 1/2E		D			
MAY 20	SSK 191608		36.0N 54.0E		5			
MAY								
MAY 24	ISS 232926		37.8N 48.2E		4 3/4	11	2.9- 26.8	
MAY 24	STR 2329		37.5N 47 E					
MAY 24	KV 232926		37.8N 48.2E		N 4.5*			
MAY								
MAY 24	ISS 233151		37.8N 48.2E		4 3/4	10	4.7- 48.2	
MAY 24	KV 233151		37.8N 48.2E		N 4.5*			
JUN								
JUN 16	ISS 120931		38.7N 46.1E		4 3/4	12	3.2- 46.6	
JUN 16	SSK 1209		38.7N 46.1E		4 1/2			
JUN 16	KV 120900		38.7N 45.1E		N 4.5(3)			

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AUG							
AUG 10	ISS	170027	38.7N 46.1E	4 1/2	12	3.2- 31.2	
AUG 10	STR	1700	38 N 46 E				
AUG 10	SSK	1700	38.3N 46.3E	4 1/4			
AUG 10	KV	1700	38.3N 46.3E	N 4.4(2)			
SEP							
SEP 08	ISS	072539	30.7N 58.4E	5 1/2	39	12.1- 59.2	
SEP 08	STR	072539		5.5(2)L			
SEP 08	GR	072532	31 N 58 1/2E	D			
SEP							
SEP 12	ISS	233735	39.0N 50.0E	4 1/2-4 3/4	10	1.4- 24.2	
SEP 12	SSK	233737	39.5N 50.5E				
SEP 12	KV	233737	39.5N 50.5E	N 4.9*			
1933							
FEB							
FEB 21	ISS	190305	27.5N 57.5E	5 1/4	20	14.3- 43.7	
FEB 21	STR	1903	28 N 55 E				
FEB 21	GR	190259	27 1/2N57 1/2E	D			
FEB							
FEB 26	ISS	050942	27.5N 57.5E	4 1/2	7	14.3- 37.2	
APR							
APR 16	ISS	065446	39.0N 48.5E	4 1/2	6	1.8- 38.6	
APR 16	SSK	0654	39.0N 48.5E				
APR 16	KV	065446	39.0N 48.5E	N 4.8			
JUL							
JUL 09	SSK	1750	40.3N 46.8E	3 1/2			
AUG							
AUG 24	SSK	001201	40.3N 48.5E				
AUG 24	KV	001201	40.3N 48.5E	N 4.0			
OCT							
OCT 05	ISS	132953	35.1N 57.8E	6	87	10.9-128.6	
OCT 05	ISS	132953	35.1N 57.8E		1	- 32.8	
OCT 05	STR	1330	34 N 61.5E	5.9(2)L			
OCT 05	GR	132945	35 N 57 1/2E	6			
NOV							
NOV 06	ISS	070716	39.0N 43.5E	4 3/4	10	2.9- 29.4	
NOV 06	STR	0707	35 N 52.5E	5.1(2)L			
NOV 06	SSK	0707	39.3N 46.6E	4 3/4			
NOV 06	KV	070716	39.3N 46.6E	N 5.5(5)			
NOV							
NOV 28	ISS	110926	32.0N 56.1E	6 1/4	89	9.7-131.3	
NOV 28	ISS	110926	32.0N 56.1E		1	- 34.8	
NOV 28	STR	110926	31 N 54 E	27 6.2(4)L			
NOV 28	GR	110918	32 N 56 E	6 1/4			
DEC							
DEC 12	ISS	052146	32.2N 55.8E	4 3/4	12	9.4- 32.3	
DEC							
DEC 14	ISS	185149	32.2N 55.8E	5 1/2	38	9.4- 59.2	
DEC 14	STR	1852	32 N 54 E				
1934							
JAN							
JAN 01	ISS	215555	32.0N 56.1E		11	9.7- 25.0	
JAN							
JAN 02	ISS	205538	30.0N 57.5E	5 1/2-5 3/4	44	12.1- 93.5	
JAN 02	STR	205545	16 N 57 E	5.7(2)L			
JAN 02	GR	205538	30 N 57 1/2E	D			
FEB							
FEB 04	ISS	132720	30.5N 51.7E	6-6 1/4	82	10.0-123.7	
FEB 04	STR	1327	31.5N 51 E	6.1(5)L			
FEB 04	LNN	1327	31 1/2N51 E				
FEB 04	GR	132714	30 1/2N51 3/4E	6 1/4			

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FEB								
FEB 16	ISS	075953	26.0N 54.0E		4 1/2	8	14.9- 23.4	
FEB 16	LNN	0800	27 1/2N53 1/2E					
FEB								
FEB 22	ISS	080720	37.9N 45.1E		5 3/4	60	2.4-140.6	
FEB 22	ISS	080720	37.9N 45.1E			4	22.4- 35.9	
FEB 22	LNN	0807	39 N 44 1/2E					
FEB 22	STR	080720	39 N 44.5E		5.7(2)L			
FEB 22	GR	080713	38 1/2N45 E		D			
FEB 22	SSK	080716	38.7N 45.1E		5 1/2			
FEB 22	KV	080716	38.7N 45.1E		N 5.6(13)			
FEB								
FEB 26	ISS	144719	27.5N 57.5E		4 3/4	12	14.3- 25.5	
MAR								
MAR 10	ISS	020318	26.5N 52.5E		4 3/4-5	17	14.0- 30.9	
MAR								
MAR 13	ISS	232338	30.5N 51.7E		4 3/4	15	10.0- 36.2	
MAR 13	LNN	2333	31 N 52 E					
MAR								
MAR 18	ISS	221933	26.5N 52.5E		4 1/2-4 3/4	12	14.0- 30.9	
MAR								
MAR 18	ISS	224437	26.5N 52.5E		4 3/4	14	14.0- 36.6	
MAR								
MAR 19	ISS	032828	27.0N 52.5E		5	19	13.5- 53.5	
MAR 19	LNN	0328	28 N 51 1/2E					
APR								
APR 06	LNN	15	29 N 52 E					
MAY								
MAY 01	ISS	034045	26.2N 66.7E		5-5 1/4	27	9.2- 51.8	
MAY 01	LNN	0340	27 1/2N57 1/2E					
MAY 01	STR	034045	27.5N 57.5					
JUN								
JUN 08	ISS	020203	39.0N 48.5E		4 1/2-4 3/4	12	1.8- 23.7	
JUN 08	KV	020203	40.5N 48.7E		N 4.6(2)			
JUN								
JUN 13	ISS	221024	27.5N 62.5E			157	12.6-137.7	
JUN 13	LNN	2210	30.0N 60.4E					
JUN 13	STR	221024	29.5N 61.5E		65 6.9(5)L			
JUN 13	GR	221028	27 1/2N62 1/2E		80 7.0			
AUG								
AUG 31	ISS	004002	27.5N 53.3E		4 3/4	13	15.8- 36.1	
SEP								
SEP 26	ISS	010702	36.5N 70.5E		5	22	4.2- 45.5	
SEP 26	STR	0107	27 N 57 E					
SEP 26	BAK	0107	27 N 57 E					
OCT								
OCT 29	ISS	161548	39.8N 47.5E		5 1/2-5 3/4	62	0.9- 79.4	
OCT 29	LNN	1615	40 N 47 1/2E					
OCT 29	STR	161551			5.7(2)L			
OCT 29	GR	161543	40 3/4N49 E		D			
OCT 29	*SSK	1615	39.8N 47.5E		5 1/2			
OCT 29	*SSK	1615	40.5N 48.7E					
OCT 29	KV	161545	39.8N 47.5E		N 5.7(13)			
NOV								
NOV 02	ISS	220600	39.0N 49.3E		4 1/2-4 3/4	12	0.7- 23.2	
NOV 02	SSK	2206	40.0N 49.0E		4 1/2			
NOV 02	KV	220600	40.0N 49.0E		N 4.4*			
NOV								
NOV 06	MOS	202712	29 N 56 E					

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1935							
JAN							
JAN 06	ISS	212505	39.6N 46.3E	4 1/2	8	1.5- 19.6	
JAN 06	SSK	212458	39.5N 46.2E	4 1/4			
JAN 06	KV	212458	39.5N 46.2E	95 4.8(2)			
MAR							
MAR 05	ISS	102637	36.2N 53.0E	5 1/2-5 3/4	60	8.1- 63.4	
MAR 05	ISS	102642	36.3N 53.5E		1	- 30.0	
MAR 05	KSA	1026					
MAR 05	STR	1026	37 N 53 E	5.8(2)L			
MAR 05	SSK	102637	36.2N 53.0E	5 1/2			
MAR 05	GR	102635	36 1/2N53 1/4E	.6			
APR							
APR 11	ISS	231449	36.3N 53.5E		126	5.0-128.2	
APR 11	ISS	231449	36.3N 53.5E		2	30.0- 63.9	
APR 11	KSA	2315					
APR 11	JSA	2315	37.2N 53.5E				
APR 11	STR	231449	37 N 53 E	6.3(2)L			
APR 11	SSK	231443	36.1N 53.5E	6 1/2			
APR 11	GR	231443	36 1/2N53 1/2E	6 3/4			
APR							
APR 11	ISS	235917	36.3N 53.5E	4 3/4	15	5.0- 23.8	
APR 11	SSK	235908	36.2N 53.8E				
APR							
APR 12	ISS	001123	36.3N 53.5E	5 1/4-5 1/2	30	8.1- 45.1	
APR 12	ISS	001123	36.3N 53.5E		1	- 30.0	
APR 12	KSA	0011					
APR 12	SSK	001114	36.0N 53.1E	5 1/2			
APR							
APR 12	ISS	003344	35.8N 52.8E	5 1/4	21	7.9- 44.7	
APR 12	SSK	003339	36.0N 52.8E	5 1/4			
APR							
APR 12	ISS	010644	36.3N 53.5E	5 1/2	40	5.0- 48.3	
APR 12	ISS	010644	36.3N 53.5E		1	- 30.0	
APR 12	SSK	010635	36.0N 53.5E	5 1/2			
APR							
APR 12	ISS	124438	36.3N 53.5E	5 3/4	59	5.0-109.2	
APR 12	ISS	124438	36.3N 53.5E		1	- 30.0	
APR 12	STR	124438		5.4(1)L			
APR 12	SSK	124430	36.0N 57.5E	5 1/2			
APR							
APR 12	ISS	2024	36.3N 53.5E	4 1/2	8	8.7- 21.2	
APR							
APR 12	ISS	223148	35.9N 53.5E	5 1/4-5 1/2	39	5.0-109.2	
APR 12	KSA	2232					
APR 12	SSK	223148	35.9N 53.5E	5			
APR							
APR 13	ISS	022907	34.8N 52.2E	5	23	5.8- 49.4	
APR 13	KSA	0229					
APR							
APR 15	ISS	230447	36.3N 53.5E	4 1/2-4 3/4	16	5.0- 27.8	
APR 15	KSA	2305					
APR 15	SSK	230435	35.9N 54.0E	4 1/4			
APR							
APR 17	ISS	133635	36.3N 53.5E	4 1/2	7	5.0- 27.8	
MAY							
MAY 01	ISS	102444	39.6N 43.1E	6	100	1.2-104.2	
MAY 01	ISS	102444	39.6N 43.1E		2	23.5- 56.6	
MAY 01	STR	102444		5.9(4)L			
MAY 01	GR	102435	39 1/2N43 E	6			
MAY 01	SSK	102437	40.4N 43.4E	5 1/2			
MAY 01	KV	102437	40.4N 43.4E	N 6.2(22)			
MAY 01	*KV	102444	39.6N 43.1E	N 5.6*			

DATE MONTH. DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH MAGNITUDE KM	NO. OF OBS	DELTA RANGE DEGREES	SD
MAY							
MAY 02	*ISS	1013	37 N 44.5E	4 3/4	19		
MAY 02	SVE	1013	37 N 44.5E				
MAY							
MAY 02	ISS	205730	39.8N 43.5E	4 1/4	5	0.8- 4.7	
MAY 02	*KV	205730	39.8N 43.5E	N 5.0*			
MAY							
MAY 02	ISS	215626	39.8N 43.5E	4 1/2	10	0.8- 21.6	
MAY							
MAY 31	ISS	131643	32.1N 47.8E	5 1/4	33	8.3- 54.5	
MAY 31	MOS	1316	32.5N 47.5E				
MAY 31	KSA	1317					
JUN							
JUN 30	ISS	080822	24.7N 66.0E	5	20	8.6- 66.1	
JUN 30	MOS	0808	26 N 59 E				
JUL							
JUL 02	ISS	152453	25.5N 55.2E	4 3/4	13	15.5- 38.3	
JUL 02	KSA	1525					
JUL 02	MOS	1525	22 N 70 E				
AUG							
AUG 18	ISS	090010	39.6N 43.1E	4 1/4	5	1.2- 20.0	
AUG 18	KV	090010	39.6N 43.1E	N 4.3			
SEP							
SEP 08	ISS	011612	37.3N 54.4E	4 1/2-4 3/4	13	4.7- 33.5	
SEP 08	KSA	0116					
SEP 08	SSK	011602	36.4N 54.1E	4 1/4			
SEP							
SEP 22	ISS	014023	29.0N 61.0E	4 1/2	7	14.0- 27.8	
SEP 22	STR	0140					
OCT							
OCT 15	ISS	170242	28.7N 51.9E	4 1/2	11	14.2- 23.1	
OCT 15	KSA	1703					
OCT							
OCT 27	ISS	064309	27.6N 54.6E	4 3/4-5	21	15.2- 41.1	
OCT 27	KSA	0643					
NOV							
NOV 02	SSK	0038	40.1N 47.2E				
1936							
JAN							
JAN 08	ISS	123443	27.0N 52.5E	4 3/4-5	20	13.5- 36.1	
FEB							
FEB 24	ISS	162931	33.5N 48.0E	5	23	7.1- 37.0	
FEB 24	STR	1629	32 N 48 E				
FEB 24	KSA	1624					
MAR							
MAR 07	KSA	1911					
MAR 07	KV	191216	40.2N 45.7E	4.5			
APR							
APR 17	ISS	221521	28.0N 55.7E	5	24	13.3- 41.4	
APR 17	KSA	2215					
APR							
APR 21	ISS	021450	28.0N 55.7E	5 1/4	31	13.3- 59.6	
APR 21	STR	0215		5.5(2)L			
APR 21	KSA	0215					
APR 21	MOS	0215	28 N 55 E				
JUN							
JUN 10	ISS	032912	26.5N 64.0E	5 1/2-5 3/4	54	11.1-134.6	
JUN 10	STR	0329		5.6(2)L			
JUN 10	MOS	0329	27.5N 63.5E				
JUN							
JUN 17	ISS	084052	25.5N 55.2E	4 1/2	6	18.3- 25.8	

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DATE MONTH. DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
JUN								
JUN 30	ISS	192607	33.5N 60.5E		6	78	8.1-131.0	
JUN 30	STR	1926	34.0N 60.6E		5.6(2)L			
JUN 30	GR	192606	33 N 60 E		6 1/4			
AUG								
AUG 16	ISS	213708	26.6N 55.6E		5-5 1/4	27	14.6- 60.9	
AUG 16	KSA	2137						
AUG 16	MOS	2137	26.5N 54.0E					
AUG								
AUG 20	ISS	020849	30.5N 51.7E		5	22	10.0- 63.0	
AUG 20	STR	0208	31.0N 50.5E					
AUG								
AUG 28	ISS	001950	33.5N 46.5E		4 1/2	11	6.8- 32.3	
AUG 28	STR	0020	34.0N 45.5E					
SEP								
SEP 07	ISS	085230	29.0N 61.0E		4 3/4	13	11.7- 37.1	
NOV								
NOV 06	ISS	202712	28.5N 56.8E		4 3/4-5	21	13.1- 28.5	
1937								
JAN								
JAN 07	SSK	204742	40.1N 44.3E		4 1/4			
FEB								
FEB 13	ISS	021755	31.5N 56.0E		4 3/4	11	12.1- 48.8	
MAR								
MAR 07	ISS	191050	38.5N 45.0E		4 3/4	17	1.7- 27.7	
MAR 07	SSK	191045	38.4N 43.7E		4 1/2			
MAR 07	KV	191045	38.4N 43.7E		N 4.6(6)			
APR								
APR 07	ISS	183059	34.8N 52.1E		5 1/2	41	5.8-106.9	
APR 07	MOS	1831	34.5N 51.0E					
MAR 07	STR	1831	34.5N 51.0E					
MAY								
MAY 11	ISS	160217	29.5N 57.5E		4 1/2	11	12.8- 27.4	
MAY 11	KSA	1602						
MAY								
MAY 12	ISS	091033	29.5N 57.5E		4 1/2-4 3/4	13	12.5- 27.4	
MAY								
MAY 21	ISS	215624	29.0N 54.0E		4 1/2-4 3/4	13	11.8- 28.2	
NOV								
NOV 19	ISS	023611	32.5N 49.0E		4 1/2	8	7.9- 25.6	
1938								
JAN								
JAN 26	ISS	034002	33.2N 46.4E		5 1/2	47	7.1-118.7	
JAN 26	STR	034005	33.2N 46.4E					
JAN 26	NDI	0340			5.7(4)L			
JAN 26	MOS	0340	33.5N 42.0E					
APR								
APR 23	ISS	060403	27.3N 53.2E		5 1/2	47	13.4-126.4	
APR 23	MOS	0604	28.0N 53.5E					
APR 23	STR	060409	28 N 53 E					
APR								
APR 23	ISS	092601	27.3N 53.2E		5 1/4-5 1/2	44	13.4- 50.5	
APR 23	STR	092607	28 N 53 E					
JUL								
JUL 19	ISS	194522	35.2N 59.3E		4 3/4	17	7.5- 38.8	
JUL 19	MOS	1945	34.5N 59.0E					
JUL 19	STR	194530	33 N 59 E					
JUL 19	*SSK	1945	34.5N 58.5E					
NOV								
NOV 14	ISS	115447	40.5N 43.0E		5	19	1.2- 77.5	
NOV 14	SSK	115441	40.2N 43.6E		4 1/2			
NOV 14	KV	115441	40.2N 43.6E		N 4.8(5)			

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DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
NOV								
NOV 14	ISS	120634	40.5N 43.0E		4 1/2-4 3/4	14	1.2- 20.9	
NOV 14	SSK	120639	40.4N 43.5E		4 1/4			
NOV 14	KV	120639	40.4N 43.5E		N 4.6(4)			
DEC								
DEC 12	KV	122350	40.6N 46.6E	30	4.9(1)			
DEC 12	KV	1224	40.5N 46.3E	50	4.5			
DEC								
DEC 19	ISS	185648	36.2N 58.0E		5-5 1/4	21	7.5-104.3	
1939								
JAN								
JAN 23	SSK	023423	40.6N 43.9E					
JAN 23	KV	0234	40.6N 44.1E		N 4.7(1)			
JAN								
JAN 25	ISS	110219	30.3N 50.8E		5-5 1/4	27	10.1- 44.6	
JAN 25	BOM	110222						
JAN 25	MOS	1102	31.5N 49.0E					
JAN 25	STR	110224	29.9N 51.0E					
JAN 25	GR	110222	31 N 50 E		D			
APR								
APR 06	ISS	040802	35.0N 54.5E		5 1/4	28	6.4- 58.7	
APR 06	BOM	0408	38 N 55 E					
APR 06	MOS	0408	34.5N 52.0E					
APR 06	STR	040810	35.8N 55.0E					
APR 06	GR	040800	35 1/2N54 1/2E		D			
JUN								
JUN 10	ISS	083639	33.0N 58.0E		5-5 1/4	26	9.8- 49.8	
JUN 10	STR	083636	31 1/2N58 1/2E					
JUN 10	MOS	0836	33.0N 58.0E					
JUN 10	GR	083641	33 1/2N56 1/2E		D			
JUN								
JUN 30	ISS	000143	34.2N 56.6E		4 3/4-5	17	8.2- 35.7	
JUN 30	MOS	0001	35 N 59 E					
JUN 30	STR	000125	33 N 59 E					
JUL								
JUL 15	MOS	2146	27.5N 53.0E					
JUL 15	STR	214554						
JUL								
JUL 24	ISS	172945	27.3N 53.2E		4 1/2-4 3/4	12	16.0- 36.1	
JUL 24	MOS	1729	30.5N 50.0E					
JUL 24	STR	1729	27 N 54 E					
AUG								
AUG 18	ISS	225231	27.0N 54.5E		4 3/4-5	15	15.6- 41.8	
AUG								
AUG 28	ISS	213519	35.2N 59.3E		4 3/4-5	15	7.5- 36.8	
AUG 28	MOS	2135	36.5N 57.2E					
AUG 28	STR	213517	35 N 59 E		5.0(1)L			
AUG 28	SSK	213536	36.4N 58.0E		5			
SEP								
SEP 19	ISS	032403	38.6N 57.2E		5 1/2	52	5.9-127.6	
SEP 19	STR	0324	40 N 56 E					
SEP 19	MOS	0324	39.0N 56.5E					
SEP 19	SSK	032400	38.0N 57.8E		5 1/4			
NOV								
NOV 04	ISS	101519	32.5N 49.0E		5 3/4	61	7.9-125.2	
NOV 04	USCGS	1015	31 N 51 1/2E					
NOV 04	BOM	1015	33 1/2N48 1/2E					
NOV 04	GR	101524	32 N 49 1/2E		6			
NOV								
NOV 08	ISS	172110	36.2N 58.0E		5 1/4	26	7.6- 97.9	
NOV 08	MOS	1721	35 1/2N58 E					
NOV 08	BOM	1721	38 N 57 E					
NOV								
NOV 28	ISS	142210	32.2N 49.3E		5-5 1/4	26	8.2- 44.2	

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1940								
MAR								
MAR 17	ISS	090851	38.0N 43.0E		4 3/4	21	2.5- 31.3	
MAR 17	KV	090851	38.0N 43.0E		N 4.8			
MAY								
MAY 04	ISS	170433	35.8N 58.1E		4 3/4	15	7.9- 37.7	
MAY								
MAY 04	ISS	182822	37.5N 55.0E		4 1/4-4 1/2	6	11.7- 19.8	
MAY								
MAY 04	ISS	210155	35.8N 58.1E			90	7.9-131.9	
MAY 04	USCGS	210155	35.5N 58.9E					
MAY 04	BCIS	210154	35 1/4N58 1/4E					
MAY 04	STR	210154						
MAY 04	NDI	2101	36 N 56 E		6.4(7)L			
MAY 04	GR	210154	35 1/4N58 1/4E		6 1/2			
MAY								
MAY 05	ISS	060130	34.7N 57.5E		4 3/4-5	20	8.3- 36.1	
MAY 05	STR	0601						
MAY								
MAY 11	SSK	204547	40.3N 43.8E					
JUN								
JUN 01	ISS	151000	27.0N 54.5E		4 1/2	9	13.9- 30.1	
JUL								
JUL 06	ISS	072014	33.2N 46.4E		4 3/4	15	7.7- 85.6	
JUL								
JUL 06	ISS	174511	33.2N 46.4E		5 1/4	32	8.8-112.0	
JUL 06	GR	174512	33 1/2N46 1/2E		D			
JUL								
JUL 11	ISS	012329	39.3N 47.5E		4 1/2-4 3/4	12	2.2- 27.0	
JUL 11	SSK	012333	39.2N 47.8E					
JUL 11	KV	012333	39.2N 47.8E		N 4.4*			
JUL								
JUL 19	SSK	045326	37.7N 57.5E		4 3/4			
SEP								
SEP 25	ISS	193120	36.4N 52.1E		5 1/4	47	12.2- 64.6	
SEP 25	BCIS	193122	37.3N 52.0E					
SEP 25	BOM	193130	37 N 53 E					
SEP 25	ZUR	1931	37 N 50 E					
SEP 25	SSK	193123	36.2N 52.2E		5			
OCT								
OCT 18	ISS	122544	38.5N 45.0E		5-5 1/4	32	1.7- 63.0	
OCT 18	BCIS	122554	38 N 44 E					
OCT 18	SSK	1226	39.6N 42.2E		5 1/2			
OCT 18	KV	122544	39.6N 42.2E		N 5.6(5)			
OCT 18	KV	122554	38 N 44 E		N 4.5			
DEC								
DEC 16	ISS	095115	28.0N 57.0E		4 1/2-4 3/4	12	17.1- 30.2	
1941								
FEB								
FEB 04	ISS	190907	27.3N 53.2E		4 1/2-4 3/4	9	16.3- 40.7	
FEB								
FEB 16	ISS	163859	33.3N 58.7E			73	9.2-133.1	
FEB 16	USCGS	163900	33.5N 58.5E					
FEB 16	GR	163903	33 3/4N59 E		6 1/4			
FEB 16	NDI	163903	33.5N 58.0E		6.2(5)L			
MAR								
MAR 28	ISS	211319	28.3N 54.2E		5 1/4	38	12.6- 44.0	
MAR								
MAR 29	ISS	003736	28.3N 54.2E		4 1/2	8	15.5- 40.8	
JUN								
JUN 10	ISS	203844	33.2N 46.4E		5 1/2	41	8.8-111.5	
JUN 10	USCGS	203836	32 N 47 E					
JUN 10	STR	203845	33.5N 47 E					
JUN 10	GR	203843	32 N 47 1/2E		D			

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JUN								
JUN 15	ISS	123856	27.3N 53.2E		4 3/4-5	14	13.4-118.9	
AUG								
AUG 28	ISS	001835	33.4N 47.3E		4 3/4-5	18	9.5- 41.3	
AUG 28	STR	001850	34 1/2N45 1/2E					
SEP								
SEP 10	ISS	215352	39.5N 43.0E		5 3/4	59	5.4-116.8	
SEP 10	STR	215348	39.5N 43 E					
SEP 10	BOM	215406	38 N 41.5E					
SEP 10	GR	215355	39 1/2N43 E		6			
SEP 10	SSK	215355	39.5N 43.0E		6 1/4			
SEP 10	KV	215352	39.5N 43.0E		N 5.8(11)			
1942								
MAR								
MAR 27	ISS	183804	40.8N 53.5E		4 3/4	14	11.9- 32.0	
MAR 27	SSK	183803	39.8N 54.0E		5			
JUN								
JUN 07	ISS	104743	27.0N 54.5E		4 3/4	12	17.4- 41.6	
JUL								
JUL 29	ISS	202204	29.5N 57.5E		5	21	15.2- 44.7	
JUL 29	BOM	202154	34.5N 58.5E					
SEP								
SEP 19	SSK	072634	40.5N 46.4E		4 1/2			
SEP 19	KV	072634	40.5N 46.4E		N 5.2*			
1943								
FEB								
FEB 06	ISS	023558	25.0N 63.0E		5 1/2-5 3/4	49	10.9-138.6	
FEB 06	NDI	023548	24.2N 62.6E		29 6.2(6)L			
FEB 06	GR	023558	24 1/2N63 E		6 1/4			
FEB								
FEB 06	MOS	2105	26.5N 63.5E					
FEB 06	STR	210536	25.5N 63.5E					
DEC								
DEC 31	ISS	093535	28.0N 61.0E		4 1/2	8	12.4- 27.6	
DEC 31	NDI	093537	28.0N 61.0E					
1944								
APR								
APR 05	ISS	180559	36.7N 54.5E		4 1/2	9	15.5- 46.6	
APR 05	NDI	180554			5.2(1)L			
APR 05	SSK	180553	36.0N 54.8E		5 1/4			
APR								
APR 05	SSK	182930	36.0*N 54.8*E		4 3/4			
APR								
APR 11	SSK	1622	36.0*N 53.0*E					
JUN								
JUN 28	KV	025721	36 N 45 E		N 5.5(1)			
JUL								
JUL 17	ISS	105346	35.8N 43.0E		5 1/2-5 3/4	54	6.2-108.7	
JUL 17	STR	105339	36 N 44 E					
JUL 17	KV	105339	37.3N 42.2E		N 5.9(9)			
JUL 17	KV	105346	35.8N 43.0E		N 5.9			
NOV								
NOV 09	ISS	193940	38.0N 48.4E		4 1/2	9	3.7- 25.7	
NOV 09	KV	193940	38.0N 48.4E		N 4.2			

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1945								
JAN								
JAN 11	ISS	020302	26.3N 55.4E		5	25	14.8- 51.3	
JAN								
JAN 15	ISS	053001	38.0N 43.5E		4 3/4	14	5.5- 41.3	
JAN 15	MOS	0530	40.0N 42.5E					
JAN 15	STR	053030	38.0N 42.5E					
JAN 15	SSK	0530	38.4N 44.2E		5			
JAN 15	KV	053001	38.0N 43.5E		N 5.1			
JAN 15	KV	0531	39.0N 43.3E		N			
JAN								
JAN 15	ISS	172121	26.3N 55.4E		5	24	14.8- 51.3	
FEB								
FEB 01	ISS	195333	36.5N 57.7E		4 3/4	13	7.2- 37.6	
FEB 01	SSK	195323	36.0N 59.3E		5			
MAR								
MAR 12	ISS	013856	33.4N 47.3E		4 3/4-5	23	7.1- 41.3	
MAR 12	MOS	0139	33.3N 46.7E					
MAR 12	STR	013848	32 N 47 E					
MAY								
MAY 11	ISS	201728	34.8N 52.1E		4 3/4	15	5.8- 38.8	
MAY 11	STR	201738	36 N 52 1/2E					
JUL								
JUL 21	ISS	013321	37.5N 45.0E		4 3/4	12	2.7- 28.4	
JUL 21	KV	013318	38.8N 43.3E		N 4.8(1)			
JUL								
JUL 29	ISS	085649	38.0N 43.0E		4 1/2	7	2.9- 24.9	
JUL 29	KV	085648	38.0N 43.0E		N 4.9*			
AUG								
AUG 11	SSK	093255	40.5N 45.0E					
SEP								
SEP 05	ISS	013340	38.6N 57.2E		4 1/2	6	7.7- 23.0	
SEP 05	STR	0133	38.3N 55.3E					
SEP 05	SSK	013341	38.2N 57.5E		4 3/4			
NOV								
NOV 20	ISS	062753	38.0N 43.0E		5 1/4	37	2.5-106.0	
NOV 20	USCGS	062755	39 N 43 E					
NOV 20	BCIS	062748	38 N 43 E					
NOV 20	MOS	0627	37.5N 45.5E					
NOV 20	STR	062748	38 N 43 E					
NOV 20	SSK	0628	39.9N 41.4E		5 1/2			
NOV 20	KV	062753	38.0N 43.0E		N 5.2(7)			
NOV								
NOV 27	ISS	215649	24.9N 63.5E			143	10.5-139.1	
NOV 27	USCGS	215700	25 N 60 1/2E					
NOV 27	JSA	215652	25.3N 63.0E					
NOV 27	MOS	2157	25 N 65 E					
NOV 27	PAS	215650	24 1/2N63 E		8 1/4			
NOV 27	STR	215700	25.0N 62.2E					
NOV 27	GR	215650	24 1/2N63 E		8 1/4			
DEC								
DEC 11	MOS	1021	24.5N 65.0E					
DEC 11	STR	102142						
1946								
FEB								
FEB 10	ISS	131325	31.5N 58.5E		4 1/2	9	14.3- 28.3	
FEB 10	STR	1313						
MAR								
MAR 02	ISS	204658	35.3N 44.6E		4 1/2	10	4.9- 28.1	
MAR 02	KV	204658	35.3N 44.6E		N 4.5			

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MAR							
MAR 05	ISS	044511	40.6N 50.0E	5 1/4	39	4.4- 91.3	
MAR 05	MOS	0445	40.3N 49.1E				
MAR 05	SSK	044507	39.6N 49.3E	5			
MAR 05	KV	044507	39.6N 49.3E	N 4.6*			
MAR							
MAR 12	ISS	022154	29.8N 51.8E	5 3/4	68	10.7-123.8	
MAR 12	JSA	022150	32 N 53 E				
MAR 12	STR	0221	29 3/4N51 1/2E				
MAR							
MAR 17	ISS	210556	25.0N 63.5E	5	24	10.6- 49.2	
MAR 17	BCIS	210556	25 N 63 1/2E				
MAR 17	STR	210542	25 N 63 1/2E				
MAR 17	BOM	210556	25 N 63 E				
MAR							
MAR 27	STR	233047	25.0N 62.2E				
MAY							
MAY 29	ISS	231431	30.5N 54.5E	4 1/2	8	10.5- 27.9	
JUL							
JUL 27	ISS	162542	35.6N 45.8E	5 1/4-5 1/2	44	5.4- 64.2	
JUL 27	MOS	1625	35.8N 45.7E				
JUL 27	STR	162539	35.5N 46.5E				
JUL 27	GR	162543	36 N 46 E	5 1/2			
JUL 27	KV	162542	35.6N 45.8E	N 5.4(8)			
AUG							
AUG 07	ISS	224654	25.0N 63.0E	5 1/4	31	10.9- 57.3	
AUG 07	MOS	2247	27 1/2N60 E				
AUG 07	STR	2247	25 N 63 1/2E				
AUG							
AUG 15	ISS	192521	27.5N 65.3E	5 1/2	48	10.6-120.5	
AUG 15	MOS	1925	28 N 65 E				
AUG 15	BOM	192518	26 1/2N63 E				
AUG 15	STR	192518	26 1/2N66 E				
AUG							
AUG 17	ISS	094803	35.6N 45.8E	5 1/4	44	5.4-108.9	
AUG 17	BCIS	0948	35.8N 45.7E				
AUG 17	MOS	0948	35.8N 45.0E				
AUG 17	STR	094809	35.8 45.7E				
AUG 17	GR	094806	35 N 46 E	D			
AUG 17	MOS	0948	35.8N 45.0E				
AUG 17	KV	094803	35.6N 45.8E	N 5.5(9)			
AUG							
AUG 17	ISS	233737	35.6N 45.8E	5 1/2	55	3.3-109.5	
AUG 17	STR	233742	35.8N 45.7E				
AUG 17	MOS	2337	35.6N 45.5E				
AUG 17	GR	233740	35 N 46 E	D			
AUG 17	KV	233737	35.6N 45.8E	N 5.5(7)			
SEP							
SEP 19	ISS	001120	29.5N 57.5E	4 3/4	16	12.8- 50.9	
OCT							
OCT 03	ISS	153739	39.5N 44.0E	5-5 1/4	34	0.8- 63.1	
OCT 03	MOS	1537	39 N 44 1/2E				
OCT 03	STR	153742	38.8N 44.2E				
OCT 03	KV	153739	39.5N 44.0E	N 5.0(4)			
NOV							
NOV 04	ISS	214744	40.0N 54.6E		138	3.6-136.3	
NOV 04	USCGS	214736	40 N 53 E				
NOV 04	BMO	214757	40.8N 55.7E				
NOV 04	JSA	214730	36.2N 57.1E				
NOV 04	MOS	2147	40.5N 55.0E				
NOV 04	PAS	214736		7 1/2			
NOV 04	STR	214748	40.0N 54.0E				
NOV 04	GR	214747	39 3/4N54 1/2E	7.5			
NOV 04	SSK	214747	39.7N 54.6E	6 1/2			

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1947								
JAN								
JAN 02	ISS	141103	28.5N 51.5E		4 1/2	10	13.7- 22.2	
FEB								
FEB 20	SSK	2136	40.3N 45.4E		4			
APR								
APR 19	ISS	173906	37.7N 43.5E		5	41	2.6- 37.8	
APR 19	STR	173907	37.7N 43.5E					
APR 19	MOS	1739	37.7N 41.7E					
APR 19	NDI	1739			5.3(1)L			
APR 19	KV	173912	37.9N 43.1E		N 5.1			
MAY								
MAY 04	ISS	004955	26.3N 55.4E		4 3/4	15	14.8- 42.7	
MAY 04	STR	004948	26 N 55 E					
MAY 04	MOS	0049	27 1/2N56 1/2E					
MAY								
MAY 04	ISS	223402	26.3N 55.4E		4 3/4-5	26	14.8- 44.8	
MAY 04	NDI	2234			5.0(1)L			
MAY 04	MOS	2234	27 N 55 1/2E					
JUN								
JUN 23	ISS	115044	40.0N 54.6E		4 1/2	14	3.6- 33.2	
JUN 23	MOS	1150	40 N 54 E					
JUN 23	SSK	115041	39.5N 54.5E		4 1/4			
JUN								
JUN 30	MOS	0337	36 N 58 E					
JUN 30	SSK	033640	35.5N 59.0E		4 1/4			
JUL								
JUL 13	ISS	145121	36.2N 58.0E		4 1/2	14	7.6- 37.5	
JUL 13	MOS	1451	36 1/2N57 1/2E					
JUL 13	STR	1451						
JUL 13	SSK	145118	36.3N 57.5E		4 1/4			
JUL								
JUL 31	STR	100136	24 N 64 1/2E					
AUG								
AUG 05	ISS	142407	24.9N 63.5E			135	10.5-139.4	
AUG 05	USCGS	142412	25 N 62 E					
AUG 05	MOS	1424	25 1/2N62 E					
AUG 05	JSA	142414	24.2N 61.2E					
AUG 05	NDI	142414	25.3N 63.0E		7.3(5)L			
AUG 05	STR	142413	25.1N 63.0E					
AUG 05	GR	142410	25 1/2N63 E		7.3			
AUG								
AUG 11	MOS	11	38.3N 44.5E					
SEP								
SEP 23	ISS	122810	33.3N 58.7E			122	4.7-133.6	
SEP 23	CLE	1228	34.1N 57.6E					
SEP 23	JSA	122822	34.1N 57.6E					
SEP 23	MOS	1228	34.0N 59.5E					
SEP 23	NDI	122815	34.0N 58.6E		7.0(5)L			
SEP 23	PAS	1228			6 3/4			
SEP 23	STR	122813	33.7N 59.1E		6 1/2			
SEP 23	GR	122809	33 N 59 E		6 3/4			
SEP								
SEP 23	MOS	22	33.7N 59.2E					
SEP								
SEP 24	MOS	03	33.5N 59.0E					
SEP								
SEP 24	MOS	04	34.2N 58.5E					
SEP								
SEP 25	ISS	182510	33.3N 58.7E		4 1/2	8	4.7- 23.6	
SEP 25	MOS	1825	33.6N 59.5E					
SEP								
SEP 26	ISS	030431	33.3N 58.7E		5 1/2	55	4.7-114.1	
SEP 26	MOS	0304	32.5N 56.5E					

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SEP								
SEP 26	MOS	05	33.3N 60.0E					
SEP								
SEP 26	MOS	12	35.7N 57.7E					
SEP								
SEP 27	ISS	081610	33.3N 58.7E		4 1/2	10	4.7- 23.6	
OCT								
OCT 03	ISS	061346	26.0N 57.2E			74	12.0-128.5	
OCT 03	CLE	0614	26 N 55 E					
OCT 03	NDI	061348	25.8N 57.4E	65	6.3(2)L			
OCT 03	MOS	0613	27.0N 58.5E					
OCT 03	STR	061347	25.5N 57 1/2E					
OCT 03	JSA	061400	26 N 55 E					
OCT 03	MOS	0614	27.5N 58 E					
OCT 03	PAS	061350	27.5N 59 E		6 3/4			
OCT 03	GR	061351	27 1/2N58 E		6 1/4			
OCT								
OCT 06	ISS	151814	33.3N 58.7E		5 1/4	32	4.7- 51.0	
OCT 06	MOS	1518	33.4N 59.5E					
OCT								
OCT 29	ISS	220538	28.0N 61.0E		4 1/2	7	10.2- 44.6	
OCT 29	MOS	2205	29.5N 62.5E					
NOV								
NOV 13	ISS	024442	33.3N 58.7E		4 1/2	9	4.7- 19.0	
NOV 13	MOS	0244	32.0N 58.3E					
NOV								
NOV 13	ISS	032623	33.3N 58.7E		5	31	4.7- 51.0	
NOV 13	STR	032630	34 1/2N59 1/2E					
NOV 13	MOS	0326	33.5N 60 E					
DEC								
DEC 07	ISS	192301	39.5N 43.0E		5	20	1.3- 90.2	
DEC 07	SSK	192300	40.0N 42.2E		4 1/4			
DEC 07	KV	192301	39.9N 42.7E		N 4.5(2)			
DEC								
DEC 09	ISS	163221	24.9N 63.5E		5	23	10.5- 52.8	
DEC 09	MOS	1632	25 N 57 E					
DEC 09	STR	163218	24.5N 63 1/4E					
DEC								
DEC 18	MOS	14	37 3/4N61 E					
1948								
JAN								
JAN 30	ISS	084348	24.9N 63.5E			103	10.5-139.1	
JAN 30	USCGS	084336	24 N 64 E					
JAN 30	NDI	084336	26 N 64 E		6.4(4)L			
JAN 30	JSA	084406	25.0N 59.1E					
JAN 30	STR	084352	25 N 63.8E		6 1/4			
FEB								
FEB 01	ISS	233824	27.0N 58.0E		5-5 1/4	21	10.9-120.1	
FEB 01	MOS	2338	24.5N 62.0E					
FEB								
FEB 11	ISS	153109	35.6N 45.8E		4 3/4	16	4.7- 29.8	
MAR								
MAR 14	ISS	211812	33.2N 59.0E		5 1/4	32	4.8- 44.4	
MAR 14	STR	2118						
APR								
APR 26	ISS	072413	35.3N 44.6E		4 3/4	17	4.9- 24.1	
JUN								
JUN 17	ISS	140822	36.5N 49.0E		5 1/4-5 1/2	40	3.9- 84.5	
JUN 17	MOS	1408	36 N 47 E					
JUN 17	STR	140812	36 1/4N49 E					
JUN								
JUN 18	ISS	184432	37.5N 57.8E		5 1/2	58	0.6- 87.5	
JUN 18	MOS	1844	36.2N 56.7E					
JUN 18	SSK	184428	37.5N 57.8E		5 3/4			

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JUN								
JUN 30	ISS	193139	36.5N 49.0E		5	23	3.9- 84.7	
JUN 30	MOS	1931	35.5N 47.5E					
JUN 30	STR	193142	36 3/4N49 E					
JUL								
JUL 05	ISS	135314	29.5N 57.5E		5 3/4	95	8.4-133.0	
JUL 05	USCGS	135324	28.8N 57.5E					
JUL 05	JSA	135324	30 N 56 E					
JUL 05	NDI	1353		100	6.7(4)L			
JUL 05	MOS	1353	28.8N 57.5E					
JUL 05	STR	135310	28 3/4N57 3/4E		5 3/4			
JUL 05	TRI	1353	31.5N 58.0E					
JUL								
JUL 30	ISS	033007	31.0N 49.0E		5 1/2	52	9.4- 88.9	
JUL 30	STR	033012	31 1/4N49 E					
JUL 30	MOS	0330	30 N 47.5E					
AUG								
AUG 05	ISS	223514	31.0N 49.0E		4 3/4	15	11.4- 38.3	
AUG 05	MOS	2235	30 N 49 E					
SEP								
SEP 08	ISS	111811	33.2N 59.0E		4 1/2	11	9.1- 27.0	
OCT								
OCT 05	ISS	201204	37.9N 58.6E			175	6.8-131.7	
OCT 05	USCGS	201206	38 N 58 E					
OCT 05	JSA	201200	36.1N 58.5E					
OCT 05	MOS	2012	37.6N 58.4E					
OCT 05	PAS	2012			7 1/2			
OCT 05	STR	201207	37.6N 57.8E		7			
OCT 05	GR	201205	37 1/2N58 E		7.3			
OCT 05	SSK	201205	37.8N 58.6E		7			
OCT								
OCT 05	STR	21	38 N 58 E					
OCT								
OCT 05	STR	22	38 N 58 E					
OCT								
OCT 05	MOS	223854	39.6N 70.6E					
OCT 05	STR	224059	38 N 58 E					
OCT								
OCT 06	ISS	012443	37.9N 58.6E		5 1/2	58	6.8- 48.5	
OCT 06	MOS	0124	37.1N 58.3E					
OCT 06	STR	012447	38 N 58 E					
OCT 06	SSK	012444	37.4N 58.8E		5 3/4			
OCT								
OCT 06	STR	02	38 N 58 E					
OCT								
OCT 08	*SSK	1453	38 N 53.5E		4 1/4			
OCT								
OCT 17	ISS	061631	37.9N 58.6E		4 3/4	12	6.8- 36.9	
OCT 17	SSK	061625	37.3N 59.0E		4 3/4			
NOV								
NOV 02	ISS	152424	38.3N 59.2E		4 3/4	16	1.2- 48.1	
NOV 02	STR	152418	37.6N 57.8E					
NOV 02	SSK	152431	38.4N 59.2E		4 3/4			
DEC								
DEC 19	SSK	045810	37.6N 58.6E		4 1/2			
1949								
JAN								
JAN 02	ISS	125022	24.9N 63.5E		5 1/2	54	11.5-139.1	
JAN 02	USCGS	125022	26 N 64.5E					
JAN 02	NDI	125030	25.5N 64.0E		5.8(2)L			
JAN 02	MOS	1250	23.5N 65.5E					
JAN 02	STR	125023	24 3/4N63 3/4E					

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JAN								
JAN 02	MOS	1411	29 N 50 E					
JAN								
JAN 11	MOS	2007	37.0N 56.5E					
JAN 11	SSK	200703	37.0N 57.0E		4 1/2			
FEB								
FEB 06	MOS	2241	40.2N 44.5E					
MAR								
MAR 03	MOS	0719	38.5N 57.2E					
MAR								
MAR 06	ISS	163640	29.8N 51.8E		5 1/4	32	9.8-113.1	
MAR 06	MOS	1636	30.0N 50.5E					
MAR 06	STR	163645	30 1/2N51 1/4E					
APR								
APR 09	STR	235522	25 N 54 E					
APR								
APR 24	ISS	042208	27.2N 56.2E			122	15.2-132.2	
APR 24	USCGS	042214	27 N 56 E	100				
APR 24	MOS	0422	27.0N 55.5E	50				
APR 24	JSA	042218	26 N 55 1/2E	100				
APR 24	P00	0422	27 N 55 E					
APR 24	PRA	0422			6 1/2			
APR 24	STR	042209	27.2N 56.2E		6			
MAY								
MAY 08	KV	09	37.3N 44.6E		N 4.9(2)			
MAY								
MAY 13	ISS	050312	27.2N 56.2E		4 1/2	10	14.2- 26.3	
MAY 13	MOS	0503	28.0N 55.5E					
JUN								
JUN 03	SSK	065345	40.5N 44.4E					
JUN 03	KV	065345	40.5N 44.4E		N 4.9*			
JUN								
JUN 14	MOS	0910	37.9N 58.3E					
JUN								
JUN 22	ISS	015045	34.0N 45.5E		4 3/4	20	6.2- 37.2	
JUN 22	MOS	0150	34 N 44 E					
JUN 22	STR	015048	34.1N 45.3E					
JUL								
JUL 04	ISS	034038	27.2N 56.2E		5 3/4-6	95	10.9-127.6	
JUL 04	USCGS	034040	27 1/2N56 E					
JUL 04	JSA	034052	30.4N 56.9E					
JUL 04	NDI	034050	27.5N 55.5E	110	6.1(2)L			
JUL 04	MOS	0340	26.5N 55.5E					
JUL 04	STR	034039	27.2N 56.2E					
JUL								
JUL 04	ISS	042237	27.2N 56.2E		4 3/4	15	15.2- 86.4	
JUL 04	USCGS	042240	27 N 56 E					
JUL 04	STR	042212	27 N 56 E					
JUL								
JUL 05	ISS	023000	27.2N 56.2E		5 1/2	54	10.9-127.6	
JUL 05	USCGS	023001						
JUL 05	MOS	0230	26.0N 55.5E					
JUL 05	STR	023000						
JUL								
JUL 21	ISS	212600	26.3N 58.7E		5	22	14.9- 59.5	
JUL 21	MOS	2126	29.5N 52.5E					
JUL 21	STR	212616	29 N 57 E					
JUL								
AUG 05	ISS	071439	27.2N 56.2E		5	23	15.2- 59.2	
AUG 05	MOS	0714	26 1/2N55 E					
AUG 05	STR	071443	27 1/2N56 3/4E					

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SEP								
SEP 02	ISS	014733	35.3N 44.6E		5	22	4.9- 79.7	
SEP 02	MOS	0147	35 N 44 1/2E					
SEP 02	STR	014735	35 1/2N45 3/4E					
SEP 02	KV	014733	35.3N 44.6E	N 4.5				
OCT								
OCT 13	ISS	102630	36.6N 44.5E		5 1/4	43	3.6-104.9	
OCT 13	MOS	1026	36.0N 42.5E					
OCT 13	STR	102631	37 N 44 1/2E					
OCT 13	KV	102630	36.6N 44.5E	N 5.0(4)				
NOV								
NOV 05	ISS	150540	37.5N 55.0E		5	25	2.7- 94.0	
NOV 05	MOS	1505	37.8N 55.4E					
NOV 05	SSK	150545	36.6N 55.2E		5			
NOV								
NOV 22	ISS	152116	28.0N 57.0E		5 1/2	45	10.0-119.0	
NOV 22	USCGS	152112	28 N 56 E					
NOV 22	MOS	1521	27 N 56 E					
NOV 22	STR	152118	28 1/2N57 1/2E					
DEC								
DEC 14	ISS	034350	36.0N 59.0E		4 3/4	13	2.0- 77.3	
DEC 14	MOS	034353	36.0N 59.0E					
DEC 14	SSK	034353	35.9N 58.9E		4 3/4			
DEC								
DEC 16	ISS	232400	27.0N 54.5E		4 3/4	12	11.4- 65.6	
DEC 16	MOS	2324	27.5N 53.0E					
DEC								
DEC 17	ISS	011315	38.0N 57.0E		5	21	1.1- 93.7	
DEC 17	MOS	011315	38.0N 57.0E					
DEC 17	SSK	011315	38.0N 57.0E		4 3/4			
1950								
JAN								
JAN 19	ISS	172715	27.3N 53.2E		5 3/4	78	12.6-129.6	
JAN 19	USCGS	172718	27 1/2N53 E					
JAN 19	MOS	1727	27.5N 52.0E					
JAN 19	POO	172705	27.5N 52.0E					
JAN 19	NDI	172720	27.5N 52.0E		5.5(1)L			
JAN 19	STR	172718	27 3/4N53 E					
JAN 19	NA	172716.8	27.29N 53.04E	06		64		1.84
JAN								
JAN 19	ISS	231053	27.3N 53.2E		5	21	15.5- 86.7	
JAN 19	USCGS	231055	27 1/2N53 E					
JAN 19	STR	231056						
JAN 19	NA	231101.3	27.27N 53.06E	67		20		1.68
JAN								
JAN 22	ISS	040713	27.3N 53.2E		5 1/2-5 3/4	74	11.5-124.9	
JAN 22	USCGS	040715	28 N 53 E					
JAN 22	MOS	0407	26 N 52 E					
JAN 22	NDI	040715			5.3(1)L			
JAN 22	STR	040714						
JAN 22	NA	040713.9	27.22N 53.04E	14		63		2.62
JAN								
JAN 30	ISS	100323	34.0N 45.5E		5	18	6.2- 96.0	
JAN 30	MOS	1003	34.0N 54.3E					
JAN 30	NA	100321.6	33.59N 45.50E	00		12		1.83
FEB								
FEB 02	MOS	1546	29 N 49 E					
FEB								
FEB 02	ISS	224513	25.5N 54.0E		4 3/4	12	15.3- 56.4	
FEB 02	MOS	2245	25.5N 54.0E					
FEB								
FEB 04	MOS	11	31.5N 63.5E					

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FEB								
FEB 14	ISS	000559	36.7N 55.3E		4 3/4	15	2.4- 77.2	
FEB 14	MOS	0006	36.7N 55.3E					
FEB 14	STR	000600	37 N 55 E					
FEB 14	SSK	000558	36.6N 54.7E		4 1/2			
FEB 14	NA	000606.9	36.87N 55.26E	94		13		2.05
FEB								
FEB 27	MOS	0355	26 N 52 E					
FEB 27	STR	035512						
MAR								
MAR 03	MOS	2253	37.6N 58.2E					
MAR 03	SSK	225356	37.6N 58.1E					
MAR								
MAR 03	MOS	2333	37.6N 58.2E					
MAR 03	SSK	233314	37.6N 58.0E					
MAR								
MAR 08	MOS	081752	40 N 54 E					
APR								
APR 06	ISS	024327	37.9N 58.6E		5 1/2	56	0.2- 93.9	
APR 06	USCGS	024328	38 N 58 1/2E					
APR 06	MOS	0243	37.6N 57.9E					
APR 06	STR	024326	38 N 58 1/2E					
APR 06	SSK	024328	38.1N 58.2E		5 1/4			
APR 06	NA	024327.4	37.97N 58.52E	00		45		2.40
APR								
APR 10	MOS	14	38.6N 45.8E					
APR 10	SSK	1418	38.6N 46.0E					
APR								
APR 13	ISS	002325	40.5N 52.0E		5-5 1/4	30	1.9- 89.7	
APR 13	USCGS	002317	40 N 53 E					
APR 13	MOS	0023	41.4N 51.7E					
APR 13	STR	002320	41 N 52 E					
APR 13	NA	002330.2	40.94N 52.03E	67		27		1.46
MAY								
MAY 01	ISS	081454	38.5N 45.0E		5-5 1/4	27	1.7- 76.5	
MAY 01	MOS	0814	39.0N 45.0E					
MAY 01	STR	081457						
MAY 01	SSK	081502	39.0N 44.3E					
MAY 01	KV	081502	39.0N 44.3E	N 4.6				
MAY 01	NA	081502.9	38.88N 45.21E	52		20		2.15
MAY								
MAY 02	ISS	164302	38.0N 58.5E		5	35	2.7- 75.4	
MAY 02	MOS	1643	36 N 58 1/2E					
MAY 02	STR	164300	38.0N 58.7E					
MAY 02	SSK	164259	36.5N 58.5E		4 1/2			
MAY 02	NA	164303.2	38.03N 58.75E	00		27		2.70
MAY								
MAY 09	ISS	111656	38.4N 58.4E			121	0.4-131.3	
MAY 09	USCGS	111657	38 N 58 E					
MAY 09	JSA	111706	39.4N 57.2E					
MAY 09	MOS	1117	38.4N 58.4E					
MAY 09	NDI	111710	41 N 58 E		6.0(4)L			
MAY 09	PRA	1117			6 3/4			
MAY 09	ROM	1117			5.6			
MAY 09	STR	111656	38 N 58 1/4E		5 3/4			
MAY 09	SSK	111657	38.4N 58.6E		6			
MAY 09	NA	111655.3	38.34N 58.41E	00		105		2.04
MAY								
MAY 17	MOS	22	38 N 58 E					
MAY								
MAY 20	MOS	13(36)	38 N 58 E					
MAY								
MAY 27	STR	070342						
MAY 27	MOS	0703	39.7N 48.6E					
MAY 27	SSK	070451	39.7N 48.6E					

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MAY								
MAY 31	MOS	043216	38.3N 58.0E					
MAY 31	SSK	043216	38.1N 57.9E					
JUN								
JUN 04	MOS	09	37.5N 56.5E					
JUN								
JUN 07	MOS	1257	36 N 57 E					
JUL								
JUL 06	MOS	0351	40.5N 46.6E					
JUL 06	SSK	035108	40.4N 46.6E					
JUL								
JUL 09	ISS	002821	24.9N 63.5E		5 3/4	87	10.5-122.9	
JUL 09	USCGS	002824	25 1/2N63 E					
JUL 09	MOS	0028	24 N 63 E					
JUL 09	PRA	0028			5 1/2			
JUL 09	POO	002820	27 1/2N63 E					
JUL 09	STR	002820	24 3/4N63 1/2E					
JUL 09	NA	002829.3	25.14N 63.31E	50		79		2.05
JUL								
JUL 16	MOS	1216	38 N 57 E					
JUL								
JUL 20	MOS	0833	37 N 56 E					
JUL								
JUL 20	MOS	0902	37 N 56 E					
JUL 20	SSK	090218	37.1N 55.9E					
JUL								
JUL 31	MOS	1614	38 N 58 E					
AUG								
AUG 08	ISS	052914	38.4N 58.4E		4 3/4-5	29	0.4- 47.5	
AUG 08	MOS	0529	38.5N 58.2E					
AUG 08	STR	052915	38 N 58 1/2E					
AUG 08	SSK	052916	38.1N 58.2E		4 1/2			
AUG 08	NA	052914.5	38.31N 58.49E	00		28		2.16
SEP								
SEP 01	MOS	0827	37.5N 53.5E					
SEP 01	SSK	082646	37.7N 53.6E					
SEP								
SEP 24	ISS	225638	34.5N 60.7E		5 3/4	91	3.2-131.0	
SEP 24	USCGS	225639	34 1/2N60 E					
SEP 24	MOS	2256	34.0N 60.5E					
SEP 24	POO	225618	36.5N 58.5E					
SEP 24	PRA	2256			5 1/4			
SEP 24	STR	225637	34 1/2N60 1/4E					
SEP 24	ROM	2256			5.3			
SEP								
SEP 25	MOS	0418	35.7N 60.0E					
SEP								
SEP 29	ISS	014405	40.0N 54.6E		4 3/4-5	24	1.6- 91.5	
SEP 29	MOS	0144	40.0N 56.0E					
SEP 29	SSK	014413	40.0N 55.8E		4 3/4			
SEP 29	NA	014408.2	39.65N 54.91E	31		21		2.20
OCT								
OCT 04	MOS	0404	39.8N 44.5E					
OCT								
OCT 09	MOS	0100	35 N 62 E					
NOV								
NOV 12	ISS	163736	33.3N 58.0E		4 1/2-4 3/4	18	4.7- 37.2	
NOV 12	MOS	1637	33.4N 58.2E					
NOV 12	NA	163730.1	32.31N 57.92E	31		17		1.35
NOV								
NOV 14	ISS	220442	24.9N 63.5E		5 1/4-5 1/2	53	10.5- 87.3	
NOV 14	MOS	220435	24 N 63 1/2E					
NOV 14	POO	220452	26 N 63 E					
NOV 14	STR	220442	25.0N 63.4E					
NOV 14	NA	220448.7	24.91N 63.67E	63		48		1.87

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NOV								
NOV 25	ISS	171848	37.0N 42.3E		5 1/4	46	3.6-105.2	
NOV 25	USCGS	171848						
NOV 25	MOS	171835	35 N 44 1/2E					
NOV 25	ROM	171826	38 N 46 E					
NOV 25	STR	171847	37 1/2N42 1/2E					
NOV 25	KV	171839	37 N 44 E		N 4.7(3)			
NOV 25	KV	171855	37.5N 41.6E		N			
NOV 25	NA	171854.4	36.97N 42.42E	72		39		2.18
1951								
JAN								
JAN 16	ISS	175350	39.2N 49.5E		5	33	0.7- 75.4	
JAN 16	MOS	175353	38.6N 49.9E					
JAN 16	STR	175351	39 1/4N49 1/2E					
JAN 16	SSK	175355	39.1N 49.6E					
JAN 16	KV	175355	39.1N 49.6E		N 4 1/4-5			
JAN 16	NA	175351.5	39.31N 49.60E	05		29		2.25
JAN								
JAN 16	SSK	233756	37.5N 58.2E					
FEB								
FEB 02	SSK	0352	38.9N 49.0E					
FEB								
FEB 04	SSK	174630	38.3N 58.6E					
FEB								
FEB 25	MOS	1547	34.0N 47.0E					
FEB 25	STR	154754	37 N 50 1/2E					
MAR								
MAR 05	SSK	220004	38.4N 58.6E					
MAR								
MAR 12	ISS	154536	39.3N 48.5E		4 3/4	21	0.6- 75.4	
MAR 12	SSK	154544	39.3N 48.5E					
MAR 12	KV	154536	39.3N 48.5E		N 4.8*			
MAR 12	NA	154541.2	38.50N 49.04E	55		12		1.73
MAR								
MAR 15	SSK	100102	38.4N 44.0E					
MAR 15	KV	100102	38.4N 44.0E		N 4.8			
MAR								
MAR 26	SSK	085010	40.4N 46.2E					
APR								
APR 22	ISS	063241	34.8N 52.1E		5	31	4.8- 52.3	
APR 22	MOS	0632	35.0N 51.8E					
APR 22	STR	063248	36 N 52 1/2E					
MAY								
MAY 01	SSK	200727	39.1N 46.0E					
MAY								
MAY 11	SSK	011958	37.6N 57.6E					
JUN								
JUN 05	ISS	033449	36.0N 48.5E		5 1/4	51	2.8- 84.6	
JUN 05	USCGS	033455						
JUN 05	MOS	0334	35 N 47 E					
JUN 05	STR	033451	36 1/2N48 E					
JUN 05	NA	033459.6	36.18N 48.33E	81		48		1.74
JUN								
JUN 09	ISS	112203	32.2N 49.3E		5 1/2-5 3/4	100	6.6-121.6	
JUN 09	USCGS	112205						
JUN 09	MOS	112156	31 N 48 1/2E					
JUN 09	STR	112202	32 1/2N49 1/2E		5.0			
JUN 09	NA	112207.6	32.26N 49.80E	53		90		2.20
JUN								
JUN 17	ISS	184623	35.7N 57.0E		4 1/2-4 3/4	15	2.5- 34.9	
JUN 17	SSK	184624	35.6N 56.8E					

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JUL								
JUL 08	SSK	190145	36.7N 57.7E					
JUL								
JUL 19	ISS	222721	27.1N 51.7E		4 1/2-4 3/4	16	12.2- 41.9	
JUL 19	MOS	2227	27 N 52 E					
JUL 19	STR	222731	28 1/2N51 3/4E					
JUL 19	NA	222737.7	28.10N 51.89E	72		15		1.89
JUL								
JUL 25	SSK	230936	37.4N 57.1E					
AUG								
AUG 16	ISS	235210	28.0N 57.0E		5 3/4	111	10.0-128.3	
AUG 16	USCGS	235210						
AUG 16	MOS	235206	27 N 57 1/2E					
AUG 16	PRA	2352			5 1/4-5 1/2			
AUG 16	ROM	2352			5 3/4			
AUG 16	STR	235209	28.2N 57.3E		5 3/4			
AUG 16	POO	235159	28 N 56 E		5			
AUG 16	NA	235212.0	27.53N 57.26E	48		105		1.75
AUG								
AUG 22	SSK	071422	38.6N 45.4E					
OCT								
OCT 08	ISS	113203	31.2N 56.8E		5	29	6.8- 62.9	
OCT 08	STR	113204	31 1/4N56 3/4E					
OCT 08	MOS	113159	30.8N 56.5E					
OCT 08	NA	113207.8	32.00N 56.31E	00		23		2.30
OCT								
OCT 20	SSK	232250	38.4N 45.4E					
OCT								
OCT 21	SSK	001400	38.3N 45.6E					
OCT								
OCT 21	SSK	031027	39.3N 46.0E					
OCT								
OCT 28	ISS	015334	27.3N 53.2E		5	30	11.5- 45.1	
OCT 28	MOS	0153	26.5N 53.5E					
OCT 28	POO	015336	28 1/2N54 E					
OCT 28	STR	015340	28 1/4N53 1/2E					
OCT 28	NA	015342.4	27.93N 53.40E	42		26		1.84
NOV								
NOV 04	SSK	1957	39.0N 55.4E					
NOV								
NOV 13	SSK	0514	38.4N 45.3E					
NOV								
NOV 13	ISS	140147	36.1N 52.5E		4 1/2-4 3/4	20	3.9- 42.6	
NOV 13	STR	140150	36 1/2N52 1/2E					
NOV 13	MOS	140150	36.1N 52.5E					
NOV 13	SSK	140154	35.7N 53.2E		4 1/2			
NOV 13	NA	140155.8	35.89N 53.17E	69		18		2.60
NOV								
NOV 15	SSK	004121	38.9N 57.5E					
NOV								
NOV 17	SSK	1039	38.8N 55.4E					
NOV								
NOV 22	SSK	205034	37.2N 55.1E					
NOV								
NOV 29	STR	073318	33 N 58 E					
DEC								
DEC 30	ISS	182107	28.0N 57.0E		5 1/2-5 3/4	80	10.0-128.3	
DEC 30	STR	182109	28 1/4N57.0E					
DEC 30	NA	182118.3	28.34N 57.21E	87		75		1.28

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1952								
JAN								
JAN 04	SSK	150153	40.2N 47.1E					
JAN								
JAN 20	ISS	144304	19.3N 60.5E		5 1/2	60	11.6-120.1	
JAN 20	MOS	144304	18.0N 61.0E					
JAN 20	STR	144259	19 N 61 E					
MAR								
MAR 01	SSK	175835	39.9N 49.9E					
APR								
APR 18	ISS	052603	38.5N 45.0E		4	10	0.8- 3.5	
APR 18	SSK	052609	39.1N 45.0E		3 1/2			
MAY								
MAY 01	SSK	161350	38.5N 45.5E		3 1/2			
MAY								
MAY 13	ISS	222954	40.7N 48.3E		4 1/2	15	0.3- 31.1	
MAY								
MAY 26	SSK	050748	37.9N 58.8E					
JUN								
JUN 20	SSK	064835	38.9N 43.4E					
JUL								
JUL 18	ISS	004351	37.5N 50.1E		4 3/4-5	27	1.6- 40.9	
JUL 18	MOS	004354	37.5N 50.1E					
JUL 18	STR	004351	37 1/2N50.0E					
JUL 18	NA	004354.4	37.16N 50.14E	40		24		1.82
JUL								
JUL 18	STR	005528						
JUL 18	MOS	005528	37.5N 49.8E					
AUG								
AUG 01	ISS	103035	29.8N 51.8E		4 3/4-5	22	13.2- 63.7	
AUG 01	MOS	103033	28.0N 52.0E					
AUG 01	STR	103040	30 N 51 E					
AUG 01	NA	103114.7	29.87N 50.27E	321		18		1.49
AUG								
AUG 04	ISS	014933	31.1N 49.8E		5 1/4-5 1/2	56	8.8- 67.7	
AUG 04	MOS	014933	30.5N 49.5E					
AUG 04	STR	014938	31 1/2N49 1/2E					
AUG 04	TRI	014938	30.8N 49.5E					
AUG 04	NA	014944.2	31.66N 49.93E	69		52		1.38
AUG								
AUG 13	ISS	143045	33.7N 46.8E		5 1/2	70	5.3- 79.7	
AUG 13	STR	143046	34 N 47 E					
AUG 13	MOS	143045	33.3N 46.5E					
AUG 13	NDI	143039						
AUG 13	NA	143056.0	34.19N 46.81E	81		69		2.12
AUG								
AUG 30	ISS	061455	32.1N 55.8E		5 1/4	49	6.2- 67.3	
AUG 30	STR	061457	32 N 55 E					
AUG 30	MOS	061502	32.5N 55.5E					
AUG 30	NA	061459.7	32.26N 55.83E	30		42		2.34
SEP								
SEP 03	BCIS	1348	39 N 43 E					
SEP 03	KV	134806	39.0N 43.0E		N 5.5*			
SEP 03	STR	134806	39 N 43 E					
SEP 03	EC	134806	39 N 43 E					
SEP 03	TRI	134802	39.5N 42.4E					
SEP 03	MOS	134742	39.2N 39.8E					
SEP								
SEP 05	SSK	014154	39.5N 48.2E					
SEP								
SEP 14	SSK	235855	39.4N 44.3E					

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SEP								
SEP 15	ISS	043128	38.0N 58.5E		5 1/4-5 1/2	57	0.1- 69.5	
SEP 15	BCIS	043124	38 N 59 E					
SEP 15	MOS	043132	38.0N 58.2E					
SEP 15	STR	043130	38.0N 58.1E					
SEP 15	SSK	043132	37.9N 58.0E		5			
SEP 15	NA	043127.9	38.10N 58.19E	00		46		2.47
SEP								
SEP 20	ISS	184121	27.0N 61.8E		4 1/2-4 3/4	12	5.6- 61.6	
SEP 20	MOS	184106	25.5N 64.0E					
SEP 20	STR	184112	27 N 62 E					
SEP 20	NA	184133.3	26.97N 62.09E	90		12		1.32
SEP								
SEP 30	ISS	025040	38.9N 44.0E		5-5 1/4	49	1.3- 36.4	
SEP 30	MOS	025044	39.0N 44.2E					
SEP 30	STR	025044	39 1/2N 42 E					
SEP 30	SSK	025043	39.0N 44.2E		4 1/2			
SEP 30	KV	025043	39.0N 44.2E		N 4.6(6)			
SEP 30	NA	025043.4	38.84N 44.16E	18		48		2.23
OCT								
OCT 01	SSK	022637	38.7N 43.6E					
OCT								
OCT 09	ISS	191220	36.7N 54.5E		4 3/4-5	27	3.3- 44.3	
OCT 09	MOS	191221	36.6N 54.5E					
OCT 09	STR	191221						
OCT 09	SSK	191221	36.6N 54.4E		4 3/4			
OCT 09	NA	191219.1	36.65N 54.33E	00		26		2.23
OCT								
OCT 19	SSK	113535	38.8N 44.1E					
OCT								
OCT 27	SSK	235158	40.3N 46.3E					
NOV								
NOV 12	SSK	133039	39.9N 45.7E					
DEC								
DEC 04	ISS	150057	27.3N 53.2E		4 3/4	16	12.5- 65.4	
DEC 04	MOS	150051	26.0N 53.5E					
DEC 04	STR	150056	27 1/2N 53 1/4E					
DEC 04	NA	150058.8	27.62N 53.54E	14		14		1.15
DEC								
DEC 28	ISS	184020	24.9N 63.5E		5 3/4	77	6.1-119.7	
DEC 28	USCGS	184020						
DEC 28	MOS	184009	22.5N 64.0E					
DEC 28	STR	184020	25.0N 63 1/4E					
DEC 28	POO	184008	26.0N 63.0E					
DEC 28	NA	184019.8	24.94N 63.23E	00		74		1.65
DEC								
DEC 29	STR	173651	37 3/4N 57 1/2E					
DEC 29	MOS	173652	38 N 58 E					
DEC 29	SSK	173650	37.9N 58.2E		5			
1953								
JAN								
JAN 10	SSK	142031	38.8N 44.2E					
JAN								
JAN 15	ISS	131512	27.9N 54.8E		5 1/4	47	10.4- 66.5	
JAN 15	BCIS	131510	25.8N 54.5E					
JAN 15	MOS	131507	26.5N 55.0E					
JAN 15	STR	131510	25 3/4N 54 3/4E					
JAN 15	RJ	131512	27.9N 54.8E		N D			
JAN 15	NA	131519.2	27.95N 54.88E	66		45		1.96

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JAN							
JAN 15	BCIS	2006	31.5N 58.0E				
JAN 15	MOS	200558	29.0N 57.0E				
JAN 15	SHL	200600	30.5N 55 E				
JAN 15	STR	200608	31.3N 56.9E				
JAN							
JAN 16	SSK	174937	38.0N 57.9E				
JAN							
JAN 18	SSK	130142	39.9N 46.3E				
JAN							
JAN 25	SSK	123351	37.9N 57.4E				
JAN							
JAN 30	SSK	233539	38.0N 57.7E				
FEB							
FEB 01	MOS	183635	38.4N 45.4E				
FEB 01	STR	183635	38 N 45 1/2E				
FEB 01	SSK	183636	38.4N 45.1E				
FEB 01	KV	183636	38.4N 45.1E	N 4.6			
FEB							
FEB 08	SSK	035947	40.3N 45.8E				
FEB							
FEB 10	SSK	181826	38.0N 45.1E				
FEB							
FEB 12	ISS	081531	35.8N 55.0E		228	3.3-135.7	
FEB 12	USCGS	081529	35 N 54 1/2E				
FEB 12	BCIS	081532	35.8N 55.0E				
FEB 12	MOS	081531	35.2N 55.0E				
FEB 12	HRB	0815		6 1/4			
FEB 12	KIR	0815		6 1/4-6 1/2			
FEB 12	PAS	0815		7			
FEB 12	PLE	0815		6 1/4			
FEB 12	PRA	0815		6 1/2			
FEB 12	ROM	0815		6 1/2-6 3/4			
FEB 12	SPC	0815		6 1/4			
FEB 12	STR	081532	35.8N 55.0E	6 1/4			
FEB 12	SSK	081531	35.3N 55.2E	6 1/4			
FEB 12	RJ	081531	35.0N 54.5E	N 6.5			
FEB 12	NA	081529.9	35.40N 55.08E	00	204		2.34
FEB							
FEB 12	STR	082727	36 N 55 E				
FEB							
FEB 13	MOS	043627	35.8N 54.8E				
FEB 13	STR	043627					
FEB 13	SSK	043623	35.6N 54.7E				
FEB							
FEB 14	MOS	205230	38.5N 43.7E				
FEB 14	STR	205230					
FEB 14	SSK	205230	38.5N 43.6E				
FEB							
FEB 25	SSK	152826	37.2N 57.8E				
MAR							
MAR 12	MOS	203251	37.3N 45.0E				
MAR							
MAR 12	MOS	212957	27.0N 58.5E				
MAR							
MAR 14	SSK	190955	38.4N 45.4E	3 1/4			
MAR							
MAR 21	SSK	015216	38.1N 57.9E				
MAR							
MAR 21	SSK	020131	37.9N 57.8E				

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DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
MAR								
MAR 23	STR	011356						
MAR 23	MOS	011356	37.4N 45.6E					
APR								
APR 01	SSK	022435	35.5N 55.2E					
APR								
APR 18	MOS	063234	37.9N 54.3E					
APR 18	STR	063234						
APR 18	SSK	062234	37.0N 54.4E					
MAY								
MAY 11	STR	154536	33 N 48 1/4E					
JUN								
JUN 06	SSK	000224	35.6N 59.0E		4 1/2			
JUN								
JUN 11	SSK	172730	39.8N 47.8E					
JUN 11	KV	172730	39.7N 47.8E		N 3.8			
JUN								
JUN 21	SSK	202509	37.9N 47.1E		4			
JUN								
JUN 25	SSK	212218	37.0N 58.0E					
JUN								
JUN 26	SSK	220523	39.1N 48.1E					
JUL								
JUL 04	MOS	035238	37.6N 45.1E					
JUL 04	STR	035231	37 N 45 E					
JUL								
JUL 05	SSK	065154	39.9N 50.0E					
JUL 05	KV	065154	39.9N 50.0E		N 4 1/4-5			
JUL								
JUL 11	SSK	152508	35.9N 55.1E		4 1/2			
JUL								
JUL 23	ISS	010544	26.5N 65.1E		5 1/2	47	4.1-140.2	
JUL 23	USCGS	0105	26 1/2N65 E					
JUL 23	MOS	010544	26.0N 65.5E					
JUL 23	KIR	0105			5 1/2			
JUL 23	STR	010545	26 1/4N65.0E					
JUL								
JUL 24	SSK	053056	35.8N 55.4E		4 1/2			
AUG								
AUG 04	SSK	043010	38.6N 43.7E					
AUG								
AUG 16	SSK	143405	40.2N 45.5E					
AUG								
AUG 24	STR	162931	36 N 54 1/2E					
AUG 24	MOS	162930	35.4N 54.8E					
AUG 24	SSK	162930	35.5N 55.0E		4 3/4			
SEP								
SEP 02	SSK	014533	35.7N 53.5E					
OCT								
OCT 06	SSK	165440	39.4N 46.0E					
OCT								
OCT 08	KV	181833	40.4N 48.0E		N 4.5			
DEC								
DEC 09	SSK	222024	38.2N 44.8E					
DEC								
DEC 14	SSK	151210	37.3N 56.8E		4 1/4			
DEC								
DEC 30	USCGS	040950	34 1/2N48 E					
DEC 30	BCIS	040951	34 N 48 E					
DEC 30	NA	040933.4	31.78N 46.47E	00		11		1.83

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DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH MAGNITUDE KM	NO. OF OBS	DELTA RANGE DEGREES	SD
1954							
JAN							
JAN 03	SSK	075108	40.0N 49.6E				
JAN 03	KV	075108	40.0N 49.6E	N 4.6			
JAN							
JAN 15	STR	215526	28 1/2N52 1/4E				
JAN							
JAN 30	BCIS	214321	32 1/2N55 3/4E				
FEB							
FEB 28	STR	212343	27.0N 56.0E				
FEB 28	JER	2123		5			
MAR							
MAR 18	MOS	071714	39.7N 54.0E				
MAR 18	SSK	071714	39.7N 54.0E	4 1/4			
APR							
APR 01	SSK	064930	38.4N 45.1E				
APR							
APR 06	ISS	143508	28.3N 54.2E	5 1/4	44	11.4-122.8	
APR 06	USCGS	143510					
APR 06	MOS	143506	28 N 53.5E				
APR 06	STR	143509	28 3/4N55 E				
APR 06	NA	143518.3	28.73N 54.36E	81	42		1.70
APR							
APR 08	SSK	184620	40.0N 45.0E				
APR							
APR 15	SSK	073521	39.1N 44.4E				
APR							
APR 20	SSK	153340	38.6N 45.0E				
APR							
APR 21	SSK	142506	39.3N 43.7E				
APR							
APR 24	SSK	021632	39.4N 43.6E				
MAY							
MAY 05	SSK	181823	39.3N 44.1E				
MAY							
MAY 11	SSK	202842	38.2N 44.7E				
MAY							
MAY 13	SSK	130559	38.5N 45.0E				
MAY							
MAY 14	SSK	172007	38.7N 44.0E				
MAY							
MAY 18	BCIS	0744	30 1/2N53 1/2E				
MAY 18	STR	074454	28 N 53 E				
MAY 18	MOS	074452	26.5N 52.5E				
MAY							
MAY 20	BCIS	0406	30 1/2N53 1/4E				
MAY 20	MOS	040641	25.5N 53.0E				
MAY 20	QUE	040700					
MAY 20	STR	040658					
MAY							
MAY 23	MOS	0102	40.4N 44.8E				
MAY							
MAY 23	SSK	002537	40.4N 44.8E				
MAY							
MAY 23	SSK	010228	40.4N 44.8E				
JUN							
JUN 14	SSK	144539	38.4N 45.1E				
JUN							
JUN 25	BCIS	2135	30 N 52 E				
JUN 25	STR	213509	30 N 52 E				
JUN 25	MOS	213504	28.0N 52.0E				
JUN							
JUN 26	SSK	014425	40.1N 46.2E				

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
JUN								
JUN 27	SSK	131757	39.2N 44.1E					
JUL								
JUL 26	SSK	141537	38.7N 44.7E					
JUL								
JUL 27	SSK	002723	39.6N 44.5E					
AUG								
AUG 16	MOS	145900	39.0N 48.7E					
AUG 16	SSK	145900	39.0N 48.7E					
AUG 16	KV	145900	39.0N 48.7E	N 4.5				
AUG								
AUG 20	USCGS	152930						
AUG 20	MOS	153020	27.5N 53.0E					
AUG 20	STR	153015	27 N 52 E					
AUG								
AUG 30	SSK	114327	39.7N 44.6E					
SEP								
SEP 02	SSK	224700	35.3N* 52.0E*	4 1/2				
SEP								
SEP 11	MOS	071940	27.5N 60.0E					
SEP 11	STR	071940						
SEP								
SEP 19	STR	041637						
SEP 19	MOS	041637	25.0N 53.0E					
SEP								
SEP 19	STR	041936	25 N 53 E					
SEP								
SEP 29	SSK	190236	40.1N 45.0E					
SEP 29	MOS	1902	40.1N 45.0E					
SEP								
SEP 29	SSK	190447	40.1N 45.0E					
OCT								
OCT 08	STR	0043	36 N 58 E					
OCT 08	SSK	004306	36.0N* 57.5E*					
OCT								
OCT 12	BCIS	203839	26 3/4N56 1/2E					
OCT 12	STR	203839	26 3/4N56 1/2E					
OCT								
OCT 22	ISS	224730	38.9N 45.9E	5 1/4		48	0.7- 76.0	
OCT 22	MOS	224729	38.9N 45.8E					
OCT 22	STR	224729						
OCT 22	SSK	224729	38.9N 45.8E					
OCT 22	KV	224729	38.9N 45.8E	N 4.6				
OCT 22	NA	224733.5	38.78N 45.78E	35		42		2.21
OCT								
OCT 27	SSK	205223	37.0N* 58.5E*					
OCT								
OCT 30	ISS	234329	40.2N 46.0E	5 1/2-5 3/4	102		0.6-121.5	
OCT 30	USCGS	234327	40 N 46 E					
OCT 30	STR	234329	40 1/2N461/4E					
OCT 30	MOS	234329	40.4N 45.8E					
OCT 30	JER	2343		6				
OCT 30	UPP	2343		5 1/2-5 3/4				
OCT 30	HRB	2343		5.5				
OCT 30	SSK	234329	40.4N 45.8E	4 3/4				
OCT 30	KV	234329	40.4N 45.8E	N 5.1(4)				
OCT 30	NA	234329.1	40.26N 45.93E	00		95		2.04
OCT								
OCT 31	MOS	013806	40.4N 45.8E					
OCT 31	STR	013805						
OCT 31	SSK	013806	40.4N 45.8E					
OCT 31	KV	013806	40.4N 45.8E	N 4.6				

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OCT								
OCT 31	MOS	1042	40.4N 45.8E					
NOV								
NOV 01	*ISS	2110	37.1N 57.3E		5.5			
NOV 01	USCGS	210958	37 N 57 E					
NOV 01	STR	211000	37 3/4N57.0E					
NOV 01	KIR	2110			5 1/2			
NOV 01	MOS	210958	37.1N 57.3E		5.5			
NOV 01	SSK	210958	37.1N 57.3E		4 1/2			
NOV 01	RJ	210958	37.1N 57.3E		N 5.5			
NOV 01	NA	210958.6	37.56N 57.31E	00		20		1.90
NOV								
NOV 11	USCGS	051410						
NOV 11	STR	051422	27 1/4N53 1/4E					
NOV 11	RJ	051410	27.3N 53.3E		N 5.5			
NOV 11	NA	051428.7	27.23N 53.24E	46		25		1.33
NOV								
NOV 13	MOS	1343	40.4N 46.0E					
NOV								
NOV 23	STR	050621	29 1/2N52 E					
NOV								
NOV 27	SSK	141841	39.5N 48.4E					
NOV								
NOV 29	ISS	1223	40.4N 45.9E					
DEC								
DEC 25	SSK	165847	39.2N 44.2E					
DEC								
DEC 27	SSK	003702	36.5N 58.5E					
DEC								
DEC 27	SSK	135818	38.7N 44.1E					
DEC								
DEC 30	SSK	202819	38.2N 44.0E					
1955								
JAN								
JAN 04	MOS	120700	27 1/2N52 1/2E					
JAN								
JAN 07	MOS	1639	40.3N 46.0E					
JAN								
JAN 09	SSK	043130	38.5N 43.9E		4 1/4			
JAN 09	MOS	0431	38.5N 43.9E		4.5			
JAN 09	KV	043130	38.5N 43.9E		N 4.5			
JAN								
JAN 11	SSK	040618	38.1N 47.9E					
JAN								
JAN 11	SSK	074844	38.7N 44.3E					
JAN								
JAN 12	SSK	062723	39.1N 44.0E					
JAN								
JAN 13	SSK	023937	38.8N 44.2E					
JAN								
JAN 16	STR	161416	30 N 54 E					
JAN								
JAN 23	SSK	194440	40.4N 44.3E					
JAN								
JAN 23	SSK	222406	40.3N 46.0E					
JAN								
JAN 23	SSK	223049	40.3N 46.0E					
JAN								
JAN 23	SSK	223224	40.3N 46.0E					
JAN								
JAN 26	SSK	160950	40.3N 45.2E					

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DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
JAN								
JAN 29	SSK	005755	37.1N 58.8E					
FEB								
FEB 01	MOS	143635	38.7N 48.3E					
FEB 01	SSK	143635	38.7N 48.3E					
FEB								
FEB 02	SSK	191558	40.3N 45.0E					
FEB								
FEB 15	SSK	202432	39.4N 45.9E					
FEB								
FEB 23	ISS	015151	40.4N 45.9E					
FEB								
FEB 24	SSK	143856	39.3N 44.0E					
FEB								
FEB 25	SSK	120934	39.7N 44.7E					
FEB 25	MOS	120934	39.7N 44.7E					
MAR								
MAR 05	SSK	034759	39.6N 47.9E					
MAR								
MAR 13	USCGS	165800						
MAR 13	BCIS	165805	28 N 56 3/4E					
MAR 13	MOS	165808	27 1/2N57 E		5			
MAR 13	STR	165805	28 N 56 3/4E					
MAR 13	NA	165808.4	27.72N 56.83E	46		16		2.16
MAR								
MAR 15	SSK	224824	38.2N 46.2E					
MAR								
MAR 23	SSK	093027	40.3N 46.4E					
MAR								
MAR 27	ISS	0417	39.3N 46.1E					
MAR 27	SSK	041742	39.3N 46.1E					
MAR								
MAR 27	SSK	192240	38.6N 44.9E					
APR								
APR 03	SSK	032038	39.7N 43.7E					
APR 03	MOS	0320	39.7N 43.7E					
APR								
APR 04	STR	213027	28 1/2N58 E					
APR								
APR 08	STR	215800	36 N 52 E					
APR								
APR 10	SSK	041221	38.1N 45.3E					
APR								
APR 12	SSK	124709	39.3N 46.5E					
APR								
APR 13	SSK	120028	39.6N 45.9E					
APR								
APR 14	SSK	124446	40.3N 46.0E					
APR								
APR 18	USCGS	191607	28 N 52 1/2E					
APR 18	MOS	191610	27 1/2N52 1/2E		5			
APR								
APR 19	ISS	1121	40.2N 45.7E					
APR 19	SSK	112116	40.2N 45.7E					
MAY								
MAY 04	SSK	151125	39.6N 47.7E					
MAY								
MAY 10	SSK	113228	38.6N 48.0E					
MAY								
MAY 11	SSK	213959	39.1N 48.7E					
MAY								
MAY 15	SSK	130235	40.3N 45.5E					
MAY 15	MOS	1302	40.3N 45.5E					

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MAY								
MAY 21	MOS	1556	40.0N 52.0E		4 1/4			
MAY 21	UPP	1556						
MAY 21	SSK	155636	40.0N 52.0E		4 1/4			
MAY								
MAY 25	SSK	164148	39.1N 46.0E					
MAY								
MAY 31	SSK	200856	39.3N 45.9E					
JUN								
JUN 08	SSK	175059	39.9N 51.0E					
JUN								
JUN 18	MOS	202104	34 N 58 1/2E		5			
JUN 18	STR	2021						
JUN								
JUN 22	SSK	094924	39.7N 45.4E					
JUN								
JUN 26	ISS	103521	40.0N 52.0E					
JUN 26	SSK	103521	40.0N 52.0E		4			
JUN								
JUN 28	SSK	203236	38.8N 44.2E					
JUN								
JUN 28	SSK	233448	38.4N 45.8E					
JUN								
JUN 30	SSK	015159	38.9N 45.7E					
JUN								
JUN 30	SSK	163847	39.3N 46.1E					
JUL								
JUL 02	SSK	183705	40.3N 44.9E					
JUL								
JUL 06	SSK	051401	38.5N 44.2E					
JUL								
JUL 06	SSK	103053	39.3N 44.8E					
JUL								
JUL 09	SSK	202018	39.8N 43.8E					
JUL								
JUL 20	ISS	0750	40.1N 46.1E					
JUL 20	SSK	075008	40.1N 46.1E					
AUG								
AUG 01	SSK	115757	39.3N 44.4E					
AUG								
AUG 02	SSK	164502	38.2N 44.7E					
AUG 02	MOS	1645	38.2N 44.7E					
AUG								
AUG 04	SSK	163724	39.8N 47.8E					
AUG								
AUG 08	SSK	154156	38.4N 45.0E					
AUG 08	MOS	1542	38.4N 45.0E					
AUG								
AUG 22	SSK	121905	36.0N 56.0E					
AUG								
AUG 23	SSK	155056	39.2N 46.1E					
AUG								
AUG 30	SSK	135945	39.1N 46.2E					
SEP								
SEP 26	SSK	070426	38.7N 48.6E					
SEP								
SEP 28	SSK	142940	38.2N 45.8E					
OCT								
OCT 28	SSK	220053	39.7N 44.2E					
NOV								
NOV 12	SSK	103305	39.2N 44.3E					
NOV								
NOV 13	SSK	034048	38.3N 50.1E					
NOV								
NOV 18	SSK	135451	38.6N 44.5E					

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
NOV								
NOV 21	SSK	052026	39.8N 47.9E					
NOV								
NOV 24	SSK	083651	39.2N 44.6E					
NOV								
NOV 24	SSK	084426	39.0N 44.7E					
DEC								
DEC 02	SSK	045840	40.0N 48.7E					
DEC								
DEC 04	SSK	123218	40.2N 45.0E					
DEC								
DEC 04	ISS	140205	33.5N 48.7E		5 1/4-5 1/2	53	7.0-124.8	
DEC 04	USCGS	140208	34 N 49 E		5			
DEC 04	MOS	140210	33 1/2N49 E		5			
DEC 04	ROM	1402			5 1/4			
DEC 04	UPP	1402			6(2)			
DEC 04	RJ	140205	33.5N 48.7E	N 6				
DEC 04	NA	140212.1	33.37N 48.80E	65		50		2.06
DEC								
DEC 13	MOS	143603	40.3N 45.9E					
DEC								
DEC 07	SSK	122512	38.3N 45.4E					
DEC								
DEC 13	SSK	143603	40.3N 45.9E					
DEC								
DEC 15	SSK	034021	40.3N 45.5E					
DEC 15	MOS	034021	40.3N 45.5E					
DEC								
DEC								
DEC 17	USCGS	080642	33 1/2N49 E					
DEC 17	BCIS	080644	33.7N 48.8E					
DEC 17	KIR	0806			5 3/4			
DEC 17	SHI	080642	33 N 49 E		5 1/4			
DEC 17	STR	080644	33.7N 48.8E					
DEC 17	RJ	080642	33.5N 49.0E	N 5.7				
DEC 17	NA	080651.2	33.55N 48.85E	82		23		2.26
1956								
JAN								
JAN 24	SSK	014948	40.0N 48.0E					
FEB								
FEB 03	ISS	131602	33.1N 46.6E		5 1/4	54	6.4- 97.1	
FEB 03	USCGS	131602						
FEB 03	KSA	131555	34.0N 45.5E		5			
FEB 03	MOS	1316			5			
FEB 03	QUE	131600	36 N 46 E					
FEB 03	SHL	1316	34 N 47 E					
FEB 03	STR	131601	33.5N 46.5E					
FEB 03	RJ	131602	33.1N 46.6E	N				
FEB 03	NA	131611.4	33.29N 46.70E	79		46		1.64
FEB								
FEB 15	ISS	154925	27.9N 52.9E		5 1/2	76	11.0-129.2	
FEB 15	USCGS	154927	28 N 53 E					
FEB 15	KSA	154922	28 N 53 E		5.9(1)L			
FEB 15	MOS	1549			5 1/4			
FEB 15	QUE	154924						
FEB 15	SHL	154923	27.5N 52.7E					
FEB 15	STR	1549						
FEB 15	UPP	1549			5.7(2)			
FEB 15	RJ	154925	27.9N 52.9E	N 5.7				
FEB 15	NA	154930.6	27.89N 52.87E	47		73		1.80
FEB								
FEB 16	ISS	2316	37.4N 55.9E					
FEB 16	SSK	231600	37.4N 55.9E					

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEPTH DEGREES	FOCAL MAGNITUDE DEPTH KM	NO. OF OBS	DELTA RANGE DEGREES	SD
FEB							
FEB 23	STR	173130	27 N 53 1/2E				
FEB 23	USCGS	173130					
FEB							
FEB 25	SSK	071406	39.6N 43.8E				
FEB							
FEB 26	STR	133930	38 N 45 E				
FEB							
FEB 29	SSK	021327	40.1N 48.5E				
MAR							
MAR 01	ISS	124756	27.8N 53.0E	5 1/4	43	12.4-129.3	
MAR 01	USCGS	124756					
MAR 01	KSA	124750	27.5N 52.75E				
MAR 01	MOS	124750	27 N 52 E	5 1/2			
MAR 01	ROM	1247		5.4			
MAR 01	SHL	124746	28.5N 52 E				
MAR 01	STR	124757	27 1/2N52 3/4E				
MAR 01	NA	124756.0	27.85N 52.97E	00	39		2.72
MAR							
MAR 01	STR	155350	27 N 52 E				
MAR							
MAR 01	STR	160409					
MAR							
MAR 06	ISS	085528	27.8N 52.8E	5 1/2	73	11.1-129.2	
MAR 06	USCGS	085528	28 N 52 1/2E				
MAR 06	KSA	085538	27.50N 52.50E	5.5(1)L			
MAR 06	MOS	085529	27 1/2N52 1/2E	5 1/4			
MAR 06	SHL	085516	26.5N 51 E				
MAR 06	STR	0855					
MAR 06	UPP	0855		5.8(2)			
MAR 06	RJ	085528	27.8N 52.8E	N 5.8			
MAR 06	NA	085533.1	27.83N 52.87E	36	65		1.45
MAR							
MAR 06	USCGS	090940	28 N 52 1/2E				
MAR							
MAR 06	STR	091432	28 N 52 1/2E				
MAR							
MAR 06	USCGS	205312	28 N 52 1/2E				
MAR 06	MOS	205312		4 1/2			
MAR 06	KSA	205322	27 1/2N52 1/2E				
MAR							
MAR 07	STR	034326	28 N 52 1/2E				
MAR 07	KSA	034528	27 1/2N52 1/2E				
MAR							
MAR 07	STR	140430					
MAR 07	NDI	140430	26.5N 51.0E				
MAR 07	KSA	140434	27 1/2N52 1/2E				
MAR							
MAR 08	SSK	133918	38.6N 44.7E				
MAR							
MAR 09	STR	1533	30 N 51 1/2E				
MAR 09	USCGS	153326					
MAR 09	MOS	1533		4 1/2			
MAR 09	KSA	153338	27 1/2N52 1/2E				
MAR							
MAR 09	USCGS	164450					
MAR 09	MOS	1644		4 1/2			
MAR 09	NDI	164450	26 N 53 1/4E	5.5			
MAR 09	QUE	164454	26 N 53 1/2E				
MAR 09	STR	164454	28 0N 52 3/4E				
MAR 09	UPP	1644		5.3(2)			
MAR 09	RJ	164450	26.0N 53.3E	N 5.4			
MAR 09	NA	164454.6	27.81N 52.84E	27	26		1.15

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MAR								
MAR 11	STR	080606	28 52 1/2					
MAR 11	KSA	080608	27 1/2N52 1/2E					
MAR								
MAR 21	USCGS	045446	41 N 48 1/2E					
MAR 21	MOS	045448	40.7N 48.3E		5			
MAR 21	UPP	0454			6(2)			
MAR								
MAR 26	SSK	234650	36.9N 56.9E					
MAR 26	MOS	2346	36.9N 56.9E					
MAR								
MAR 30	SSK	081709	37.2N 57.2E					
MAR 30	MOS	0817	37.2N 57.2E					
APR								
APR 07	STR	060906	35 N 48 E					
APR 07	KSA	060954	37 1/4N50 1/4E					
APR								
APR 08	SSK	125840	38.0N 44.5E					
APR								
APR 12	ISS	223446	37.3N 50.2E		5 1/2	84	1.8-102.5	
APR 12	USCGS	223444	37 N 50 E					
APR 12	MOS	223446	37.0N 50.0E		5			
APR 12	STR	223448	37 1/2N50 1/4E					
APR 12	RJ	223446	37.3N 50.2E		N 6			
APR 12	NA	223449.5	37.33N 50.26E	30		82		1.88
APR								
APR 13	SSK	093814	38.5N 48.4E					
APR								
APR 14	SSK	075331	40.2N 48.2E					
APR								
APR 18	ISS	07	37.7N 57.6E					
APR								
APR 18	SSK	231923	39.7N 43.6E					
MAY								
MAY 04	ISS	0549	37.0N 56.4E					
MAY								
MAY 05	MOS	0753	35.9N 59.8E					
MAY								
MAY 08	ISS	205001	27.8N 53.0E		5 1/4	45	12.4- 86.2	
MAY 08	USCGS	205000						
MAY 08	MOS	205008	28 N 53 E		4 1/2			
MAY 08	STR	205004	28.0N 52.8E					
MAY 08	NA	205006.3	27.77N 53.02E	36		45		1.19
MAY								
MAY 17	MOS	201953	36.7N 56.8E					
MAY								
MAY 19	MOS	141425	27 1/2N52 1/2E		5			
MAY 19	STR	141425	28 N 52 3/4E					
MAY 19	NA	141423.4	27.79N 52.73E	09		25		1.24
MAY								
MAY 24	SSK	135232	39.2N 44.2E					
MAY 24	MOS	1352	39.2N 44.2E					
MAY								
MAY 24	SSK	144436	39.2N 44.2E					
MAY								
MAY 24	SSK	152125	39.2N 44.2E					
MAY								
MAY 24	SSK	152236	39.2N 44.2E					
MAY								
MAY 25	SSK	073345	39.6N 44.8E					
MAY								
MAY 27	SSK	112236	38.7N 44.3E					
MAY								
MAY 30	SSK	174618	39.9N 43.1E					

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JUN								
JUN 20	KSA	103905						
JUN								
JUN 11	SSK	055744	40.4N 44.9E					
JUN 11	MOS	0557	40.4N 44.9E					
JUN								
JUN 14	SSK	140355	39.9N 44.8E					
JUN								
JUN 20	NA	103952.1	27.27N 60.43E	123		23		0.68
JUN 20	STR	103943	27 1/4N60 E					
JUN								
JUN 22	ISS	0644	35.7N 56.6E					
JUN 22	MOS	0645	35.7N 56.6E					
JUN								
JUN 25	ISS	125204	32.0N 60.4E		4 3/4-5	26	5.8- 81.0	
JUN 25	USCGS	125207						
JUN 25	MOS	125154	31 1/2N60 1/2E		5			
JUN 25	STR	125204	31 1/2N59 E					
JUN 25	NA	125202.9	31.89N 60.38E	00		23		1.44
JUN								
JUN 29	ISS	021832	28.6N 57.2E		5 1/4	49	8.6-132.9	
JUN 29	USCGS	021828	28 N 57 E					
JUN 29	MOS	021838	28 1/2N57 1/2E		5 1/2			
JUN 29	STR	021832	28 1/2N57 1/4E					
JUN 29	KSA	021823	28 N 57 E					
JUN 29	NA	021841.8	28.53N 57.34E	89		45		1.17
JUN								
JUN 30	USCGS	113706						
JUN 30	KSA	113700						
JUN 30	MOS	113710	35 N 56 1/2E		5			
JUN 30	STR	113706	35 1/2N57 1/4E					
JUN 30	NA	113707.7	35.45N 57.01E	16		16		1.17
JUL								
JUL 01	SSK	154043	38.4N 45.1E					
JUL								
JUL 01	SSK	154934	38.4N 45.1E					
JUL								
JUL 01	SSK	162529	38.4N 45.1E					
JUL								
JUL 01	SSK	164147	38.4N 45.1E					
JUL								
JUL 01	SSK	175035	38.4N 45.0E					
JUL								
JUL 01	SSK	182000	38.4N 45.0E					
JUL								
JUL 02	SSK	193307	38.1N 44.1E					
JUL								
JUL 07	MOS	103022			4 1/2			
JUL 07	STR	103034	37 1/2N56 1/4E					
JUL 07	SSK	103033	37.3N 56.1E		4 1/2			
JUL 07	NA	103032.2	37.24N 55.98E	00		30		2.29
JUL								
JUL 14	SSK	120253	39.7N 46.0E					
JUL								
JUL 14	SSK	122906	38.9N 53.7E					
JUL 14	MOS	1229	38.9N 53.7E					
JUL								
JUL 16	BCIS	051756.0	28 1/2N54 1/2E					
JUL 16	KSA	051756.0						
JUL 16	STR	051756	28 1/2N54 1/2E					
JUL								
JUL 21	SSK	165008	38.3N 57.4E					
AUG								
AUG 08	STR	113804	32.4N 48.9E					
AUG 08	NA	113803.3	31.96N 49.75E	00		24		1.53

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AUG								
AUG 24	SSK	240639	38.2N 46.8E					
SEP								
SEP 21	SSK	160922	38.2N 48.1E					
OCT								
OCT 10	SSK	114212	38.4N 44.8E					
OCT								
OCT 20	SSK	051707	37.9N 57.4E					
OCT								
OCT 31	ISS	140343	27.25N 54.43E			184	11.2-132.7	
OCT 31	USCGS	140338	26 1/2N54 1/2E					
OCT 31	MOS	140350	26 N 55 E		6			
OCT 31	PAS	1403			6 3/4			
OCT 31	PRA	1403			6 1/4			
OCT 31	ROM	1403			6.7			
OCT 31	STR	140344	24 1/4N54 1/2E					
OCT 31	UPP	1403			6.8(2)			
OCT 31	RJ	140343	27.3N 54.4E	N	6.8			
OCT 31	NA	140344.8	27.21N 54.39E	05		164		2.38
OCT								
OCT 31	ISS	142223	27.30N 54.60E		5 1/2	63	11.2 135.2	
OCT 31	USCGS	142219	27 N 54 1/2E					
OCT 31	STR	142219	27 N 54 1/2E					
OCT 31	NA	142225.2	27.27N 54.52E	18		57		1.92
OCT								
OCT 31	STR	153954	27 N 54 E					
OCT								
OCT 31	STR	173318	27 N 54 E					
OCT								
OCT 31	STR	180512	27 N 54 E					
OCT								
OCT 31	STR	193954	27 N 54 E					
OCT								
OCT 31	STR	214318	27 N 54 E					
OCT								
OCT 31	KSA	233646	27 1/4N54 1/2E					
OCT 31	STR	233248	27 N 54 E					
NOV								
NOV 01	USCGS	055234	27 1/2N54 E					
NOV 01	KSA	055232.0	27 1/4N54 1/2E					
NOV 01	MOS	0552	27.5N 54.0E		5			
NOV								
NOV 01	KSA	161414.0	27 1/4N54 1/2E					
NOV 01	STR	161407	27 N 54 E					
NOV								
NOV 01	SSK	215759	38.9N 48.3E		4			
NOV 01	MOS	2158	38.9N 48.3E		4			
NOV								
NOV 03	SSK	174015	37.9N 58.1E					
NOV								
NOV 04	SSK	215610	38.2N 58.3E					
NOV								
NOV 07	SSK	104030	38.0N 58.2E					
NOV								
NOV 07	USCGS	170755						
NOV 07	STR	170724	30 N 54 E					
NOV								
NOV 09	SSK	054625	39.6N 48.3E					
NOV								
NOV 10	STR	081855	25.9N 54.7E					

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NOV								
NOV 16	BCIS	1404	27 3/4N54 3/4E					
NOV 16	MOS	140408						
NOV 16	KSA	140410						
NOV 16	STR	140406	27 3/4N54 3/4					
NOV 16	NA	140406.7	27.23N 54.70E	00		26		2.19
NOV								
NOV 16	SSK	161038	37.9N 58.0E					
NOV								
NOV 21	SSK	114530	38.0N 58.3E					
DEC								
DEC 01	SSK	041944	39.6N 44.6E					
DEC								
DEC 05	SSK	201611	37.9N 58.3E					
DEC								
DEC 14	SSK	043024	37.9N 58.1E					
DEC								
DEC 14	SSK	122055	38.0N 58.3E					
DEC								
DEC 19	SSK	105438	38.0N 58.0E					
DEC								
DEC 19	SSK	151238	40.3N 45.1E					
DEC								
DEC 19	SSK	162045	40.2N 45.1E					
DEC								
DEC 19	SSK	211537	40.3N 45.1E					
DEC								
DEC 19	SSK	214216	40.3N 45.1E					
DEC								
DEC 19	SSK	220203	40.3N 45.1E					
DEC								
DEC 22	SSK	071120	37.9N 58.1E					
DEC								
DEC 26	SSK	030423	38.0N 58.1E					
1957								
JAN								
JAN 18	SSK	145247	39.9N 43.9E					
JAN								
JAN 20	SSK	164757	39.9N 43.8E					
JAN								
JAN 31	STR	213247	38 3/4N47 E					
FEB								
FEB 04	SSK	105655	39.4N 48.5E					
FEB								
FEB 09	SSK	210701	38.6N 48.3E					
FEB								
FEB 14	SSK	215043	40.3N 44.7E					
FEB								
FEB 16	SSK	210010	40.3N 45.1E					
MAR								
MAR 02	BCIS	064636	27 1/2N53 1/2E					
MAR								
MAR 02	USCGS	071210	27 1/2N53 1/2E					
MAR								
MAR 02	BCIS	0712						
MAR 02	NA	071216.7	27.62N 53.71E	25		20		1.86
MAR								
MAR 05	SSK	063607	39.8N 44.3E					
MAR								
MAR 05	SSK	173917	39.0N 44.8E					
MAR								
MAR 06	SSK	054844	39.1N 44.7E					

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MAR								
MAR 16	ISS	004342	34.94N 52.93E		5 1/2	66	7.9-128.0	2.23
MAR 16	USCGS	004341	35 N 53 E					
MAR 16	BCIS	004342	34 1/2N52 1/2E					
MAR 16	MOS	004337	33 1/2N52 1/2E		5			
MAR 16	STR	004342	34 1/2N52 1/2E					
MAR 16	NA	004348.2	34.91N 52.87E	46		63		1.40
MAR								
MAR 16	SSK	220841	39.2N 48.7E					
MAR								
MAR 26	USCGS	044920	28 N 52 1/2E					
MAR 26	BCIS	044722	27 1/2N52 1/4E					
MAR 26	MOS	044915						
MAR 26	STR	044922	27 1/2N52 1/4E					
MAR 26	NA	044927.3	27.68N 52.48E	30		24		1.70
MAR								
MAR 29	SSK	153949	39.3N 44.6E					
APR								
APR 03	BCIS	013400	27.0N 53.5E					
APR 03	STR	013400	27.0N 53.5E					
APR 03	NA	013404.4	27.44N 53.66E	13		12		1.22
MAY								
MAY 05	BCIS	192545	31.5N 49.5E					
MAY 05	MOS	1926						
MAY								
MAY 06	SSK	141950	37.2N 51.8E		4 1/2			
MAY								
MAY 06	ISS	150651	36.46N 51.51E		5 1/2	72	3.1- 94.6	3.96
MAY 06	USCGS	150647	36 N 51 E					
MAY 06	BCIS	150647	36 N 51 E					
MAY 06	MOS	150657	37 N 52 E		5			
MAY 06	STR	150647	36 N 51 E					
MAY 06	SSK	150637	37.1N 51.7E		5			
MAY 06	RJ	150651	36.5N 51.5E	N 5.5				
MAY 06	NA	150648.7	36.23N 51.56E	00		64		3.07
MAY								
MAY 19	STR	220154	32 N 58 E					
MAY 19	MOS	220207	29 N 57 1/2E					
MAY								
MAY 24	STR	030254	37 1/4N42 1/4E					
MAY								
MAY 29	BCIS	100255	38 N 45 1/2E					
MAY 29	MOS	100255	38.3N 45.1E		4 1/4			
MAY 29	STR	100255	38 N 45 1/2E					
MAY 29	SSK	100255	38.3N 45.1E					
MAY 29	NA	100313.6	38.63N 45.84E	176		13		2.79
JUN								
JUN 23	BCIS	202213	37 1/2N45 1/2E					
JUN 23	NA	202211.9	37.06N 45.10E	76		17		1.59
JUL								
JUL 02	ISS	004222	36.21N 52.72E	00		344	4.0-136.0	2.14
JUL 02	USCGS	004223	36 N 53 E					
JUL 02	BCIS	004224	36.1N 52.3E					
JUL 02	MOS	004227	36 N 52 1/2E		6 1/2			
JUL 02	LWI	0042			7 1/4			
JUL 02	MAT	0042			7.5			
JUL 02	PAS	0042			7 1/4-7 1/2			
JUL 02	PRA	0042			7.1			
JUL 02	SHL	004221	37.0N 52.5E		6.8			
JUL 02	UPP	0042			7.2(2)			
JUL 02	SSK	004226	36.0N 52.7E		6 1/2			
JUL 02	RJ	004222	36.2N 52.7E	N 7.1				
JUL 02	NA	004223.0	36.14N 52.70E	10		306		1.79

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JUL								
JUL 02	BCIS	011654	36 N 53 E					
JUL 02	SSK	011654	36.0N 52.7E		4 1/2			
JUL 02	NA	011651.3	36.08N 52.37E	00		18		2.36
JUL								
JUL 02	BCIS	045608	36 N 53 E					
JUL 02	MOS	045613	36.3N 52.8E		4 1/2			
JUL 02	SSK	045610	36.0N 52.8E		4 1/2			
JUL 02	NA	045603.5	35.98N 52.87E	00		20		0.93
JUL								
JUL 02	BCIS	050908	36 N 53 E					
JUL 02	MOS	050924	36.5N 52.5E		4			
JUL 02	SSK	050922	35.9N 52.7E					
JUL 02	NA	050949.4	36.57N 51.90E	262		20		0.58
JUL								
JUL 02	MOS	142240	36 N 53 E		4			
JUL 02	SSK	142243	36.0N 52.7E		4 1/4			
JUL 02	NA	142240.3	36.16N 52.26E	00		20		1.53
JUL								
JUL 04	MOS	224347	36 N 52 E		4 1/4			
JUL 04	STR	224348						
JUL 04	SSK	224347	35.9N 52.2E		4 1/4			
JUL								
JUL 07	SSK	181250	36.0N 52.7E		4 1/4			
JUL								
JUL 09	SSK	090911	36.0N 52.7E		4 1/4			
JUL								
JUL 21	SSK	150817	38.5N 43.0E		4 1/4			
JUL 21	NA	150832.8	39.14N 46.05E	37		11		0.68
JUL								
JUL 30	BCIS	014314	33 N 48 E					
JUL 30	MOS	014314	33 N 48 E					
JUL 30	NA	014318.3	33.06N 48.40N	47		16		
AUG								
AUG 09	SSK	000206	39.9N 53.9E		4 1/4			
AUG								
AUG 19	USCGS	072226	38 1/2N50 E					
AUG 19	BCIS	072227	38 N 49 E					
AUG 19	MOS	072224	38 N 49.5E		4 1/2			
AUG 19	SSK	072224	38.0N 49.5E		4 1/2			
AUG 19	NA	072218.7	37.49N 49.71E	00		34		1.24
AUG								
AUG 24	STR	2150						
AUG 24	SSK	215000	37.1N 56.8E					
SEP								
SEP 03	BCIS	204530	31 N 47 1/2E					
SEP 03	MOS	204530	31 N 47 1/2E					
SEP								
SEP 05	ISS	113605	28.51N 53.61E		5 1/2	66	10.2-122.5	2.75
SEP 05	USCGS	113607						
SEP 05	MOS	113559	27 1/2N53 E		5 1/2			
SEP 05	STR	113604	28.2N 53.7E					
SEP 05	SHL	1136	29 1/2N53 1/2E					
SEP 05	RJ	113605	28.5N 53.6E	N D				
SEP 05	NA	113609.3	28.53N 53.69E	33		61		2.15
OCT								
OCT 02	BCIS	130907	26 1/2N55 E					
OCT 02	MOS	130907	26 1/2N55 E					
OCT 02	NA	130908.5	26.70N 54.80E	46		17		1.12
OCT								
OCT 08	SSK	114724	36.4N 54.5E					

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OCT								
OCT 11	BCIS	194430	31 N 55 E					
OCT 11	MOS	194410	28 1/2N53 E		4 3/4			
OCT 11	STR	194359	28 N 53 1/2E					
OCT 11	NA	194409.8	28.35N 53.56E	96		12		1.93
OCT								
OCT 11	STR	200654	28 N 53 1/2E					
OCT								
OCT 25	SSK	082420	36.4N 53.2E		4 1/2			
NOV								
NOV 18	BCIS	030058	27 3/4N54 3/4E					
NOV 18	MOS	030102	27 1/2N54 1/2E					
NOV 18	NA	030102.7	27.94N 54.53E	86		10		0.48
DEC								
DEC 13	ISS	014505	34.41N 47.67E	42		254	4.4-138.2	2.39
DEC 13	USCGS	014459	34 1/2N48 E					
DEC 13	BCIS	014459	34.6N 47.8E					
DEC 13	ATH	0145			7.4			
DEC 13	DSH	0145			6 3/4			
DEC 13	JSA	014503	34.0N 47.9E					
DEC 13	KEW	0145			7.0			
DEC 13	LWI	0145			6 1/2			
DEC 13	MOS	014503	34 N 47 E		6 1/2			
DEC 13	MAT	0145			6 3/4-7			
DEC 13	OBM	0145			6			
DEC 13	QUE	0145			6 3/4-7			
DEC 13	PAS	0145			7 1/4			
DEC 13	PRA	0145			7.0			
DEC 13	ROM	0145			7.1			
DEC 13	SHL	014500	34 N 48 E					
DEC 13	SPC	0145			6 1/4			
DEC 13	UPP	0145			7.1(2)			
DEC 13	RJ	014505	34.4N 47.7E	42	7.2			
DEC 13	NA	014504.6	34.35N 47.67E	40		218		1.75
DEC								
DEC 13	STR	041257	34 1/2N47 3/4E					
DEC								
DEC 14	STR	001924	34 1/2N47 3/4E					
DEC								
DEC 16	USCGS	230528	34 N 48 E					
DEC 16	BCIS	2305	34 N 48 E					
DEC 16	MOS	230532	34 N 47 1/2E					
DEC 16	NA	230536.3	34.33N 47.67E	68		31		1.43
DEC								
DEC 25	BCIS	112639	34 1/2N47 1/2E					
DEC 25	NA	112639.6	34.35N 47.72E	53		11		1.66
1958								
JAN								
JAN 02	USCGS	154522	34 1/2N48 E					
JAN 02	BCIS	154524						
JAN 02	MOS	154525	34 N 47 1/2E		4 3/4			
JAN 02	NA	154528.9	34.49N 47.84E	53		31		1.63
JAN								
JAN 02	BCIS	221438						
JAN 02	NA	221445.7	34.25N 47.56E	85		10		1.67
JAN								
JAN 06	USCGS	095413						
JAN 06	BCIS	095412						
JAN 06	STR	095412	34 1/2N48 E					
JAN 06	NA	095418.9	34.23N 47.87E	89		22		2.01

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JAN								
JAN 15	USCGS	131531	40 N 51 1/2E					
JAN 15	BCIS	131532	40 N 51 1/2E					
JAN 15	MOS	131533	40 N 51.2E		4 1/4			
JAN 15	NA	131538.9	39.94N 51.32E	69		22		1.16
JAN								
JAN 16	USCGS	020424						
JAN 16	BCIS	020416	34 N 50 E					
JAN 16	MOS	020422	35.8N 52.3E		4 3/4			
JAN 16	RJ	020424	36.5N 53.0E	N D				
JAN 16	NA	020429.2	36.13N 52.55E	45		22		2.00
JAN								
JAN 28	USCGS	171500	36 N 58 1/2E					
JAN 28	BCIS	171502	36 N 58 1/2E					
JAN 28	MOS	171502	35.8N 58.1E		4 3/4			
JAN 28	NA	171459.5	35.64N 58.38E	00		40		1.56
FEB								
FEB 03	ISS	192711	32.28N 55.62E		5-5 1/4	43	6.1-122.1	2.56
FEB 03	USCGS	192712	32 1/2N56 E					
FEB 03	BCIS	192712	32 N 55 1/2E					
FEB 03	MOS	192718	32 1/2N56 E		5			
FEB 03	RJ	192711	32.3N 55.6E	N D				
FEB 03	NA	192711.1	32.25N 55.60E	00		38		2.15
MAR								
MAR 01	ISS	092648	27.70N 54.91E		5 1/2	66	10.8-131.0	1.64
MAR 01	BCIS	092649	27.5N 55.0E					
MAR 01	USCGS	092646	28 N 54 1/2E					
MAR 01	MOS	092650	27 N 54 1/2E		5 1/2			
MAR 01	NA	092650.5	27.68N 54.96E	22		63		1.33
MAR								
MAR 03	BCIS	134753	34 N 58 1/2E					
MAR 03	NA	134802.2	29.48N 58.93E	80		12		1.30
APR								
APR 09	ISS	043630	29.05N 52.01E		5 1/2	81	11.4-128.3	2.06
APR 09	USCGS	043629	29 N 52 E					
APR 09	BCIS	043632	29.0N 52.0E					
APR 09	MOS	043633	29 N 52 E		5			
APR 09	QUE	043640	27 1/2N51 1/2E					
APR 09	NA	043635.4	29.07N 52.03E	43		76		1.74
APR								
APR 15	BCIS	061418	40 N 45 E					
APR								
APR 28	BCIS	181424	40 N 45 E					
APR 28	MOS	181425	38.8N 44.4E					
APR 28	NA	181446.9	38.81N 44.55E	191		10		1.48
MAY								
MAY 02	USCGS	212013	28 1/2N55 E					
MAY 02	BCIS	212013	28 N 55 E					
MAY 02	MOS	212017	27 1/2N55 1/2E		5			
MAY 02	NA	212013.7	27.61N 55.25E	25		31		1.98
MAY								
MAY 05	ISS	052130	35.57N 44.71E		5 1/2-5 3/4	97	3.7-135.0	2.60
MAY 05	USCGS	052133	36 1/2N45 1/2E					
MAY 05	MOS	052138	36 N 44 1/2E		5			
MAY 05	UPP	0521			5.5(2)			
MAY 05	RJ	052130	35.6N 44.7E	N 5.5				
MAY 05	RJ	052133	36.5N 45.5E	N D				
MAY 05	NA	052137.2	35.69N 44.79E	64		88		1.65
JUN								
JUN 10	ISS	070402	30.27N 51.11E		5 1/2	78	10.0-130.0	2.61
JUN 10	USCGS	070402	30 1/2N51 1/2E					
JUN 10	BCIS	070405	30 1/2N51 E					
JUN 10	KEW	0704			5 1/2			
JUN 10	MOS	070406	30 N 51 E		5			
JUN 10	RJ	070402	30.3N 51.1E	N 5.5				
JUN 10	NA	070409.2	30.29N 51.12E	58		74		1.81

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JUN								
JUN 17	BCIS	165501	36 1/4N53.0E					
JUN 17	MOS	165503	36.4N 52.9E		4 1/2			
JUN 17	NA	165500.2	36.21N 52.76E	00		23		1.24
JUN								
JUN 24	BCIS	035618	27 1/2N56 E					
JUN								
JUN 25	ISS	011401	36.24N 52.83E		5 1/4	64	3.9- 77.9	2.06
JUN 25	BCIS	011400	36 N 53 E					
JUN 25	MOS	011400	36.0N 52.7E		4 1/2-4 3/4			
JUN 25	NA	011401.7	36.27N 52.80E	04		59		1.69
JUL								
JUL 02	NA	221401.2	30.60N 51.12E	78		10		1.91
JUL								
JUL 26	BCIS	155300	31 N 52 E					
JUL 26	NA	155327.5	31.57N 50.03E	182		10		2.11
AUG								
AUG 14	ISS	112659	34.15N 47.74E		5 3/4	111	5.5-130.1	2.40
AUG 14	USCGS	112700						
AUG 14	BUC	1127			6.0			
AUG 14	KEW	1127			5 3/4-6 B			
AUG 14	LVV	1127			5.0			
AUG 14	MAT	1127			5 3/4-6			
AUG 14	MOS	112704	34 N 47 1/2E		5 1/4-5 1/2			
AUG 14	PRA	1127			5 3/4			
AUG 14	STR	112700	34 1/2N48 E		5 1/2			
AUG 14	RJ	112659	34.2N 47.7E	N 5.7				
AUG 14	NA	112705.3	34.27N 47.78E	39		97		1.62
AUG								
AUG 14	ISS	152620	34.45N 47.85E		5 1/2-5 3/4	95	5.2-124.0	2.38
AUG 14	USCGS	152619	34 N 47 1/2E					
AUG 14	MOS	152626	34 N 46 1/2E		5 1/4			
AUG 14	NA	152627.3	34.46N 47.92E	57		93		1.55
AUG								
AUG 14	ISS	232658	29.18N 63.45E	103 5		43	12.7- 75.4	1.78
AUG 14	BCIS	232648	28 1/4N64 E	100				
AUG 14	MOS	232656	29 N 64 E	100				
AUG 14	RJ	232658	29.2N 63.5E	N D				
AUG 14	NA	232702.5	29.27N 63.44E	148		38		1.21
AUG								
AUG 15	BCIS	042300	33 1/2N48 1/2E					
AUG 15	MOS	042255	32 1/2N47 E		4 1/4-4 1/2			
AUG 15	NA	042314.4	34.11N 48.24E	87		12		2.93
AUG								
AUG 16	BCIS	170910	34 1/2N48 1/4E					
AUG 16	MOS	170910	33 1/2N47 E		4 3/4			
AUG 16	NA	170919.6	34.29N 48.01E	58		27		1.63
AUG								
AUG 16	ISS	191344	34.38N 47.83E			276	7.7-138.1	2.45
AUG 16	USCGS	191345	34 1/2N48 E					
AUG 16	BCIS	191344	34.0N 48.0E					
AUG 16	BUC	1913			7.1-7.2			
AUG 16	CLL	1913			6.1			
AUG 16	KEW	1913			6.5 B			
AUG 16	LVV	1913			6.0			
AUG 16	MAT	1913			6 3/4-7			
AUG 16	MOS	191349	34 1/2N47 1/2E		6 1/2			
AUG 16	OBM	1913			6.3			
AUG 16	PAS	1913			6 3/4			
AUG 16	PRA	1913			6.7			
AUG 16	UPP	1913			6.7(2)			
AUG 16	RJ	191344	34.4N 47.8E	N 6.7				
AUG 16	NA	191343.8	34.36N 47.86E	00		237		1.81

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AUG								
AUG 17	BCIS	034740	34 N 48 E					
AUG 17	MOS	034738	34 N 48 1/2E					
AUG 17	NA	034745.7	34.25N 47.91E	51		25		0.72
AUG 17	NA	034745.6	34.25N 47.91E	50		21		0.78
AUG								
AUG 17	BCIS	035100	34 N 48 E					
AUG 17	NA	035108.7	34.50N 48.17E	92		10		1.24
AUG								
AUG 17	NA	064654.5	34.71N 47.34E	143		13		1.55
AUG								
AUG 19	BCIS	155450	34 1/4N 48 1/4E					
AUG 19	MOS	155458	34 N 48 E					
AUG 19	NA	155458.5	34.19N 48.18E	86		18		1.47
AUG								
AUG 24	USCGS	080230	34 N 48 1/2E					
AUG 24	BCIS	080230	34 N 48 E					
AUG 24	MOS	080238	34 N 48 1/2E					
AUG 24	NA	080241.4	34.37N 48.08E	79		21		1.23
AUG								
AUG 25	BCIS	040445	34 N 48 E					
AUG 25	MOS	040423	32 N 46 E					
AUG								
AUG 31	USCGS	091815	28 1/2N 62 E					
AUG 31	BCIS	091815	28 1/4N 61 3/4E					
AUG 31	NA	091821.7	27.69N 62.05E	81		27		1.53
SEP								
SEP 01	QUE	083709	27 3/4N 63 E					
SEP 01	NA	083710.4	27.78N 62.72E	170		14		0.94
SEP								
SEP 03	USCGS	013406	34 N 47 E					
SEP 03	BCIS	013406	33.8N 47.5E					
SEP 03	MOS	013416	34 N 47 E		5			
SEP 03	NA	013421.1	34.64N 47.89E	86		36		2.03
SEP								
SEP 10	BCIS	034939						
SEP 10	MOS	034927	32 1/2N 47 1/2E		4 1/2			
SEP 10	NA	034945.0	34.33N 48.01E	73		20		1.19
SEP								
SEP 16	ISS	142231	34.59N 59.43E		4 3/4	35	7.7- 78.6	3.11
SEP 16	USCGS	142230	34 1/2N 59 1/2E					
SEP 16	MOS	142240	34 1/2N 59 1/2E		4 3/4			
SEP 16	STR	1422			5.1			
SEP 16	RJ	142231	34.6N 59.4E	N D				
SEP 16	NA	142229.5	34.37N 59.52E	00		25		1.97
SEP								
SEP 21	MOS	161835	34 1/2N 46 1/2E		4 1/2			
SEP 21	USCGS	161830	36 N 49 E					
SEP 21	RJ	161830	36.0N 49.0E	N D				
SEP 21	NA	161830.8	34.52N 47.42E	71		29		2.10
SEP								
SEP 28	STR	123600	26 1/2N 50.0E					
OCT								
OCT 06	ISS	092921	37.32N 54.39E		5 1/2	75	2.3-137.1	2.69
OCT 06	USCGS	092922	37 1/2N 54 1/2E					
OCT 06	MOS	092927	37.6N 54.3E		4 3/4			
OCT 06	SSK	092928	36.5N 54.0E		5 1/4			
OCT 06	NA	092921.9	37.41N 54.48E	03		78		1.72
OCT								
OCT 23	ISS	154255	33.63N 46.21E		5 1/2	70	8.1-133.1	2.61
OCT 23	USCGS	154300	34 1/2N 47 E					
OCT 23	MOS	154304	34 N 46 E		5			
OCT 23	QUE	1543			5.5			
OCT 23	STR	1543			5.2			
OCT 23	RJ	154255	33.6N 46.2E	N D				
OCT 23	NA	154256.3	33.63N 46.19E	11		66		2.01

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OCT								
OCT 26	ISS	124031	37.35N 44.50E		4 3/4-5	34	2.6- 77.7	2.64
OCT 26	USCGS	124030	37 1/2N44 1/2E					
OCT 26	MOS	124036	37.5N 44.5E		4 1/2			
OCT 26	QUE	1240			5.6			
OCT 26	RJ	124031	37.4N 44.5E		N D			
OCT 26	NA	124036.2	37.37N 44.49E	40		32		1.48
NOV								
NOV 02	BCIS	091428	36 3/4N51 1/2E		4 1/2-4 3/4			
NOV 02	MOS	091433	36 1/2N51 E					
NOV 02	NA	091434.9	36.61N 51.42E	63		21		1.91
DEC								
DEC 18	STR	073320	27 N 54 E					
DEC 18	NA	073323.5	27.01N 54.04E	04		22		1.30
DEC								
DEC 21	BCIS	041814	27 N 54 E					
DEC 21	NA	041821.3	26.82N 54.12E	51		18		1.48
DEC								
DEC 25	ISS	183323	26.94N 54.07E		4 3/4-5	30	11.7-116.8	1.38
DEC 25	BCIS	183324	27 N 54 E					
DEC 25	MOS	183325	26 1/2N54 1/2E		5			
DEC 25	QUE	183340	27 N 55 1/4E					
DEC 25	NA	183327.7	26.91N 54.13E	42		29		1.10
1959								
JAN								
JAN 07	ISS	051310	27.04N 54.11E		32 5 1/2	76	11.6-126.9	2.15
JAN 07	USCGS	051301	26 1/2N54 E					
JAN 07	BCIS	051305	27 N 53 3/4E					
JAN 07	MOS	051325	28 1/2N55 E		5			
JAN 07	NA	051308.9	27.02N 54.18E	27		72		1.60
JAN								
JAN 07	QUE	202943	31 N 56 1/2E					
JAN 07	NA	202952.0	31.20N 57.17E	70		10		1.73
FEB								
FEB 03	BCIS	083706	26 N 57 1/2E					
FEB								
FEB 20	BCIS	104331	32 1/2N48 3/4E					
FEB 20	NA	104349.9	32.76N 49.71E	236		14		1.48
MAR								
MAR 02	ISS	112237	33.12N 49.46E		5 1/4	54	6.8-132.8	2.90
MAR 02	USCGS	112234	33 1/2N50 E					
MAR 02	MOS	112230	32 N 49 E		4 3/4			
MAR 02	RJ	112237	33.5N 49.5E		N D			
MAR 02	NA	112242.6	33.14N 49.45E	50		52		2.03
MAR								
MAR 02	BCIS	213119	40 N 48 1/2E					
MAR 02	MOS	213121	40.0N 48.7E		4			
MAR 02	NA	213124.6	40.29N 49.91E	50		17		2.18
MAR								
MAR 08	USCGS	144850	36 N 53 E					
MAR 08	MOS	144853	35 1/2N53 E		5			
MAR 08	NA	144859.8	35.49N 52.78E	111		31		2.31
MAR								
MAR 18	BCIS	113906	27 N 56 E					
MAR								
MAR 25	BCIS	064110	32 3/4N50 E					
MAR 25	NA	064113.6	37.44N 49.63E	66		17		0.67
APR								
APR 01	BCIS	223657	39 1/4N49 E					
APR 01	NA	223658.5	39.06N 49.64E	31		19		1.43

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APR								
APR 19	USCGS	085917	40 N 43 E					
APR 19	MOS	085916	39.5N 42.5E		4 1/2			
APR 19	NA	085920.7	39.64N 42.35E	28		46		2.15
APR								
APR 29	ISS	002345	26.99N 54.76E		4 3/4-5	34	11.2- 86.8	2.01
APR 29	USCGS	002350	28 N 55 E					
APR 29	NA	002353.5	26.99N 54.80E	77		32		1.67
MAY								
MAY 01	ISS	082403	36.45N 51.23E		44 5 3/4	112	7.1-136.2	2.78
MAY 01	USCGS	082357	36 1/2N52 E					
MAY 01	MOS	082400	36 1/2N51 1/2E		5			
MAY 01	PEK	082404	37 N 51 1/1E					
MAY 01	PRU	0824						
MAY 01	UPP	0824			5.5(2)			
MAY 01	RJ	082403	36.5N 51.2E	44	5.5			
MAY 01	NA	082402.1	36.38N 51.16E	33		111		2.12
MAY								
MAY 14	BCIS	210725	34 1/2N57 E					
MAY 14	MOS	210720	34 1/2N56 1/2E		4 1/4			
MAY 14	NA	210730.0	34.90N 57.23E	88		14		2.88
MAY								
MAY 29	STR	2347						
MAY 29	NA	234704.9	33.20N 50.96E	85		23		1.96
MAY								
MAY 31	ISS	130144	37.70N 48.99E		5	41	2.7- 93.0	2.49
MAY 31	USCGS	130144	37 1/2N49 E					
MAY 31	MOS	130141	37 1/2N49 E		4 1/2			
MAY 31	NA	130144.2	37.67N 48.94E	00		41		2.08
MAY								
MAY 31	BCIS	130748	37 1/2 49 E					
MAY								
MAY 31	NA	130740.3	37.04N 49.24E	00		12		2.15
JUN								
JUN 24	QUE	160236	31 3/4N50 1/4E					
JUN 24	NA	160241.8	30.55N 50.81E	79		10		1.37
JUL								
JUL 18	MOS	035103	24 1/2N54 E					
JUL 18	STR	035153	30 N 51 1/2E					
JUL 18	NA	035203.0	29.81N 51.40E	88		22		1.51
JUL								
JUL 24	MOS	071930	28 N 50 E		4 1/2			
JUL 24	STR	071940	30 3/4N50 1/4E					
JUL 24	NA	071953.9	30.88N 51.03E	118		19		2.33
JUL								
JUL 31	ISS	102802	38.83N 49.38E		5 1/4	53	1.9-124.4	2.31
JUL 31	BCIS	102804	38.5N 49.0E					
JUL 31	MOS	102800	38 N 49.1E		4 1/2			
JUL 31	NA	102806.4	38.86N 49.38E	35		46		1.91
AUG								
AUG 13	ISS	003308	39.80N 48.53E		5 3/4	119	0.8-139.4	2.89
AUG 13	USCGS	003309	40 N 49 E					
AUG 13	BCIS	003311	40.0N 48.0E					
AUG 13	MOS	003311	39.8N 48.2E		4 1/2			
AUG 13	UPP	0033			5.8(2)			
AUG 13	RJ	003308	39.8N 48.5E	N 5.8				
AUG 13	NA	003313.3	39.85N 48.51E	48		104		1.65
AUG								
AUG 22	BCIS	234814	27 1/4N63 1/4E					
AUG 22	NA	234812.7	27.61N 62.26E	61		27		1.18
SEP								
SEP 19	BCIS	160225	30 N 50 1/2E					
SEP 19	MOS	160127	30 1/2N51 1/2E					
SEP 19	NA	160225.4	29.12N 51.27E	95		28		3.47

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SEP								
SEP 30	MOS	102415	30 N 46 E					
SEP 30	STR	102434	32.5N 49.0E					
OCT								
OCT 09	BCIS	032940	28 N 57 E					
OCT 09	MOS	032946	28 N 57 E		4 1/2			
OCT 09	NA	032937.7	28.08N 56.67E	00		10		1.43
OCT								
OCT 14	MOS	072827	35 1/2N59 1/2E		4 1/2			
OCT								
OCT 14	MOS	081943	35 1/2N59 1/2E		4 1/4			
OCT								
OCT 23	ISS	165422	33.34N 58.84E	5		29	6.5-127.9	2.29
OCT 23	USCGS	165423	33 1/2N59 E					
OCT 23	MOS	165423	33 N 59 1/2E		4 1/2			
OCT 23	NA	165430.3	33.18N 58.87E	75		26		1.88
NOV								
NOV 13	BCIS	084930	34 1/2N46 1/2E					
NOV 13	MOS	084922	34 N 46 1/2E		4 1/2			
NOV 13	NA	084920.1	34.42N 47.92E	00		16		3.01
NOV								
NOV 13	BCIS	092057	34 1/2N46 1/2E					
NOV 13	MOS	0921			4 1/2			
NOV 13	NA	092056.3	34.65N 47.64E	62		11		2.29
DEC								
DEC 08	ISS	125047	31.00N 57.03E		5-5 1/4	46	8.6- 94.9	2.28
DEC 08	USCGS	125045	31 N 57 E					
DEC 08	MOS	125030	28 N 58 E		5			
DEC 08	PEK	125048						
DEC 08	NA	125050.2	30.97N 57.05E	23		44		1.58
1960								
JAN								
JAN 02	BCIS	144135	25 3/4N55 E					
JAN 02	NA	144142.5	26.74N 54.92E	42		10		1.32
JAN								
JAN 06	MOS	225648	26 N 54 1/2E					
JAN 06	QUE	225710						
JAN 06	STR	225651	27 1/2N55 E					
JAN 06	NA	225700.8	27.37N 54.63E	60		29		3.60
JAN								
JAN 26	MOS	014936	32 N 58 1/2E		4 1/4			
JAN 26	QUE	014836						
JAN 26	STR	014830	27 3/4N55 3/4E					
JAN 26	NA	014835.8	27.83N 55.72E	46		12		1.50
FEB								
FEB 04	USCGS	070720						
FEB 04	BCIS	070726	29 N 52 E					
FEB 04	NA	070728.3	28.95N 52.42E	24		23		1.07
FEB								
FEB 20	BCIS	144008	37 1/2N44 1/2E					
FEB 20	NA	144016.1	37.86N 43.03E	00		10		1.80
MAR								
MAR 07	ISS	005140	34.84N 55.35E		5 1/4	52	4.2- 91.6	3.63
MAR 07	USCGS	005140	34 1/2N55 E					
MAR 07	MOS	005125	32 1/2N56 E		5			
MAR 07	PRU	0051			4.7			
MAR 07	NA	005140.4	34.37N 55.47E	05		52		2.19
MAR								
MAR 14	USCGS	201433	29 N 49 1/2E					
MAR 14	MOS	201444	29 1/2N50 1/2E					
MAR 14	NA	201448.2	29.71N 50.40E	47		25		1.13
MAR								
MAR 20	BCIS	104118	39 N 44 E					

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MAR							
MAR 20	STR	223219	36.1/4N 44.1/2E				
MAR 20	NA	223234.2	35.33N 44.15E	187	15		2.06
APR							
APR 02	ISS	223557	34.28N 48.24E	5	46	5.9- 83.6	3.06
APR 02	USCGS	223608	36 N 50 E				
APR 02	BCIS	223600	34 N 48 E				
APR 02	MOS	223553	33 N 47 1/2E	4 1/2			
APR 02	QUE	223605	33 1/2N 48 1/2E				
APR 02	SHI	223542	34.7N 48.0E				
APR 02	RJ	223608	34.7N 48.0E	N D			
APR 02	NA	223559.8	34.25N 48.25E	25	50		1.63
APR							
APR 02	ISS	233308	34.20N 48.19E		45	5.8- 84.8	2.44
APR 02	USCGS	233309	34 1/2N 48 1/2E				
APR 02	BCIS	233311					
APR 02	MOS	233305	33 N 47 1/2E	4 1/2			
APR 02	QUE	233309	34 N 47 3/4				
APR 02	SHI	233254					
APR 02	TEH	233309					
APR 02	NA	233313.0	34.20N 48.17E	40	47		1.60
APR							
APR 23	USCGS	062616	31 1/2N 50 1/2E				
APR 23	BCIS	062616	31 1/2N 50 1/2E				
APR 23	NA	062620.6	31.13N 50.33E	84	19		2.28
APR							
APR 24	ISS	121427	27.71N 54.43E		193	2.6-130.6	1.81
APR 24	USCGS	121426	28 N 54 1/2E	5 1/2-6			
APR 24	BUC	1214		5.9			
APR 24	DSH	1214		5.5			
APR 24	COL	1214		5 1/4			
APR 24	KEW	1214		6.1 B			
APR 24	KEW	1214		5.8 S			
APR 24	LWI	1214		6.2			
APR 24	MAT	1214		6 1/4			
APR 24	MOS	121426	26 1/2N 54 E	5 3/4			
APR 24	PRA	1214		5.6			
APR 24	PRU	1214		5.7			
APR 24	QUE	121440	27 1/2N 55 E	7-7 1/4			
APR 24	ROM	1214		5.6			
APR 24	SHI	1214	27.6N 54.1E				
APR 24	SHL	121430	28 N 54.4E				
APR 24	STR	1214		5 1/2-5 3/4			
APR 24	TEH	121430					
APR 24	RJ	121426	27.6N 54.1E	N 6			
APR 24	NA	121431.8	27.72N 54.44E	31	149		1.31
APR							
APR 27	USCGS	173932	28 N 54 1/2E				
APR 27	BCIS	173929	27 3/4N 54 1/4E				
APR 27	MOS	173932	27 N 54 E	4 1/4			
APR							
APR 27	BCIS	180917	27 3/4N 54 1/4E				
MAY							
MAY 02	BCIS	224839	27 1/2N 54 E				
MAY 02	NA	224832.0	27.51N 54.83E	00	11		1.46
MAY							
MAY 03	ISS	065855	27.63N 54.39E	5-5 1/4	44	2.6-130.6	2.07
MAY 03	USCGS	065904	29 1/2N 55 E				
MAY 03	MOS	065845	26 N 54 E	4 1/2			
MAY 03	SHI	0659	27.7N 54.2E				
MAY 03	TEH	065854					
MAY 03	RJ	065904	27.7N 54.2E	N D			
MAY 03	NA	065901.4	27.72N 54.39E	44	43		1.54

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MAY								
MAY 10	USCGS	215155	27 N 47 1/2E					
MAY 10	MOS	215140	32 N 51 E		4 1/2			
MAY 10	STR	215225	31 3/4N51 E					
MAY 10	RJ	215155	31.8N 50.8E		N D			
MAY 10	TEH	215201						
MAY 10	NA	215235.4	31.31N 50.80E	121		23		1.97
MAY								
MAY 18	ISS	084101	27.12N 53.13E		5 1/2	74	2.6-129.5	3.27
MAY 18	USCGS	084057	27 N 52 1/2E					
MAY 18	BCIS	084105	27 1/2N52 1/2E					
MAY 18	MOS	084103	27 N 53 E		5			
MAY 18	OBM	084059						
MAY 18	PRU	0841			4.8			
MAY 18	TEH	084100						
MAY 18	NA	084107.9	27.22N 53.15E	51		64		1.59
MAY								
MAY 20	ISS	041430	27.45N 53.13E	53	5 1/4	62	2.3-118.7	2.10
MAY 20	USCGS	041433	27 1/2N53 E	100				
MAY 20	BCIS	041433	27 1/2N53 E	100				
MAY 20	MOS	041420	26 1/2N53 E		5			
MAY 20	TEH	041419	27 N 52 1/2E					
MAY 20	NA	041428.8	27.38N 53.15E	49		58		1.48
MAY								
MAY 25	BCIS	125000	27 1/4N54 1/4E					
MAY 25	MOS	125000	26 1/2N54 1/2E		4 1/2			
MAY 25	SHI	125004	27 N 54 1/2E					
MAY 25	NA	125002.6	27.22N 54.46E	33		23		1.05
MAY								
MAY 28	TEH	194201	29.8N 52.3E					
JUN								
JUN 02	ISS	072227	33.17N 60.34E		5 1/4	83	6.4- 79.8	2.23
JUN 02	USCGS	072230	33 1/2N60 E					
JUN 02	BCIS	072230	33 1/2N60 E					
JUN 02	MOS	072235	33 N 61 1/2E					
JUN 02	NA	072227.4	33.17N 60.42E	08		42		1.47
JUN								
JUN 02	ISS	124238	33.05N 48.78E		5 1/4-5 1/2	79	3.4-132.7	2.08
JUN 02	USCGS	124238	33 1/2N49 E					
JUN 02	BCIS	124238	33 1/2N49 E					
JUN 02	MOS	124245	33 N 48 1/2E					
JUN 02	TEH	1242			4 3/4			
JUN 02	RJ	124238	33.5N 49.0E		N D			
JUN 02	NA	124244.5	33.04N 48.78E	53		69		1.59
JUL								
JUL 04	BCIS	034335	30 N 52 E					
JUL 04	MOS	034328	28 N 53 E		4 1/2-4 3/4			
JUL 04	NA	034331.3	29.46N 52.15E	00		17		2.20
JUL								
JUL 09	BCIS	033330	28 N 52 1/2E					
JUL 09	MOS	033318	26 1/2N53 E		4 1/4			
JUL 09	NA	033329.8	27.39N 52.84E	73		11		2.34
JUL								
JUL 10	MOS	134921	26 1/2N52 1/2E		5			
JUL 10	BCIS	134921	26 1/2N53 E					
JUL 10	NA	134926.5	27.18N 53.12E	36		33		1.70
JUL								
JUL 14	BCIS	080820	27 3/4N54 1/4E					
JUL 14	NA	080826.3	27.93N 54.46E	51		12		1.33
JUL								
JUL 25	BCIS	164930	32 1/2N48 1/2E					

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JUL								
JUL 25	USCGS	211136	32 N 56 1/2E					
JUL 25	MOS	211134	30 1/2N56 1/2E		5			
JUL 25	PRU	2111			4.8			
JUL 25	RJ	211136	32.0N 56.5E		N D			
JUL 25	NA	211144.3	31.68N 56.46E	27		36		1.85
JUL								
JUL 28	NA	170006.3	30.40N 57.57E	73		13		2.28
JUL								
JUL 29	USCGS	164543	27 1/2N54 1/2E	100				
JUL 29	MOS	164530	27 N 54 E					
JUL 29	NA	164539.8	27.82N 54.38E	37		22		0.92
JUL								
JUL 30	BCIS	123712	32 N 56 E					
JUL 30	MOS	123655	31 N 58 1/2E					
JUL 30	NA	123708.2	31.45N 56.30E	00		12		2.79
JUL								
JUL 31	ISS	222653	28.07N 54.42E		5 1/4	68	2.3-130.5	2.68
JUL 31	USCGS	222649	28 N 55 E					
JUL 31	MOS	222650	27 1/2N54 E		4 3/4			
JUL 31	PRU	2226			5.0			
JUL 31	ROM	2226			5.3			
JUL 31	NA	222659.9	28.13N 54.47E	55		58		1.90
AUG								
AUG 01	ISS	022050	28.12N 54.38E	62	6	114	2.2-130.5	1.73
AUG 01	USCGS	022050.3	28.0N 54.3E	67				
AUG 01	BRA	0221			5 1/2			
AUG 01	KEW	0221			6 B			
AUG 01	KEW	0221			5 3/4S			
AUG 01	MAT	0221			6.7			
AUG 01	MOS	022043	27 1/2N54 1/2E		5 1/2			
AUG 01	PRA	0221			4.7			
AUG 01	PRU	0221			5 1/2			
AUG 01	QUE	022054	27 1/2N55 E		7			
AUG 01	ROM	0221			6.7			
AUG 01	RJ	022050	28.0N 54.3E	67	6.2			
AUG 01	NA	022047.9	27.99N 54.33E	48		95		1.48
AUG								
AUG 01	BCIS	035201	28 N 54 1/4E	60				
AUG								
AUG 01	BCIS	235300	27 1/2N56 E					
AUG								
AUG 22	USCGS	134228.9	39.2N 41.4E	112				
AUG 22	NA	134209.6	38.65N 42.56E	00		12		2.40
AUG								
AUG 23	ISS	085812	29.33N 60.01E	51	5 1/2	78	6.1-119.2	3.04
AUG 23	USCGS	085811.2	29.1N 59.8E	64				
AUG 23	MOS	085814	29 1/2N60 E		5 1/4			
AUG 23	RJ	085811.2	29.1N 59.8E	64	D			
AUG 23	NA	085809.1	29.02N 60.00E	49		72		2.15
AUG 23	PRU	0858			5.3			
SEP								
SEP 14	USCGS	125852.6	36.6N 57.7E	34				
SEP 14	MOS	125847	36.0N 57.8E		4 1/2			
SEP 14	NA	125856.7	36.18N 57.77E	64		24		1.73
SEP								
SEP 14	BCIS	224242	27 3/4N53 E					
SEP								
SEP 21	USCGS	230503.8	31.8N 50.5E	65				
SEP 21	MOS	230500	31 1/2N50 E		4 1/2			
SEP 21	NA	230507.3	32.03N 50.39E	52		32		1.38

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SEP								
SEP 25	USCGS	083627.6	28.4N 53.2E	53				
SEP 25	MOS	083628	28 N 53 1/2E		4 1/2			
SEP 25	NA	083624.9	27.85N 53.11E	34		20		0.99
SEP								
SEP 27	BCIS	092136	28 1/2N53 E					
NOV								
NOV 19	SHI	192516	30 1/2N51 1/2E					
NOV 19	NA	192507.5	30.54N 51.49E	07		10		1.37
1961								
JAN								
JAN 04	MOS	041603	38.1N 45.3E					
JAN								
JAN 19	MOS	033722	39.9N 54.7E		4.2			
JAN								
JAN 23	BCIS	094730	34 N 57 E					
JAN								
JAN 31	MOS	075652	40.3N 44.6E					
FEB								
FEB 12	USCGS	103136.8	36.9N 44.4E	60				
FEB 12	MOS	103138	36.7N 44.2E		4 1/2			
FEB 12	BCIS	103118	38 N 47 E					
FEB 12	NA	103141.2	36.70N 45.96E	00		12		3.80
FEB								
FEB 15	MOS	124940	40.3N 43.8E					
MAR								
MAR 03	MOS	123325	39.2N 44.1E					
MAR								
MAR 03	MOS	123849	39.1N 44.0E					
MAR								
MAR 06	MOS	091629	40.5N 48.2E					
MAR								
MAR 24	BCIS	111100	26 1/2N53 E					
MAR 24	KSA	1111						
MAR 24	NA	111059.9	26.58N 54.41E	00		10		2.83
MAR								
MAR 26	MOS	110351	40.2N 44.5E					
APR								
APR 02	USCGS	125210.6	26.9N 55.1E	33				
APR 02	STR	125212	26 3/4N54 1/2E					
APR								
APR 04	USCGS	115908.8	30.3N 50.5E	25				
APR 04	BCIS	115908.8	30.1N 50.5E	25				
APR 04	NA	115831.2	30.27N 50.73E	230		13		1.65
APR								
APR 06	ISS	181239	28.20N 56.78E	29		146	4.7-131.0	3.89
APR 06	USCGS	181240.7	27.9N 56.7E	36				
APR 06	BCIS	181240.7	27.8N 56.7E	109				
APR 06	APA	181221	26.0N 56.5E	20	5.2			
APR 06	BRÁ	1812			5.2			
APR 06	KEW	1812			5-5 1/4			
APR 06	KSA	181240.7	27.8N 56.7E		5.8(1)L			
APR 06	MAT	1812			5 3/4-6			
APR 06	MOS	181238	28 N 56 1/2E		5			
APR 06	QUE	181222	27 3/4N55 1/4E		6.6			
APR 06	RJ	181240.7	27.8N 56.7E		N 5.9			
APR 06	NA	181236.5	27.80N 56.70E	32		121		1.65
APR								
APR 28	USCGS	065626.6	31.2N 57.2E	20				
APR 28	MOS	065630	31.0N 56.7E		4 1/4			
APR 28	KSA	0656						

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MAY								
MAY 01	USCGS	013739.2	35.0N 59.0E	33				
MAY 01	BCIS	013736	34 3/4N59 E					
MAY 01	MOS	013741	36.0N 59.2E		4 1/2			
MAY 01	KSA	013739	37 N 59 E					
MAY 01	NA	013738.8	35.24N 58.90E	00		22		2.66
MAY								
MAY 21	USCGS	194413.6	30.1N 57.2E	32				
MAY 21	BCIS	194419	30 3/4N57 E					
MAY 21	KSA	1944	28 N 55 E		4.5(1)L			
MAY 21	MOS	1944			4 3/4			
MAY 21	NA	194418.5	30.45N 56.89E	44		16		2.15
JUN								
JUN 05	ISS	033100	27.88N 54.79E	57		66	2.8-127.7	2.61
JUN 05	USCGS	033056.0	27.9N 55.1E	30				
JUN 05	BCIS	033056.0	27.9N 55.1E	30				
JUN 05	MOS	033059	27.5N 54.5E		5			
JUN 05	KSA	033101.4	28.3N 54.8E					
JUN 05	NA	033057.8	27.83N 54.68E	40		57		1.67
JUN								
JUN 05	USCGS	061132.9	28.5N 54.9E	36				
JUN 05	BCIS	061132.9	28.5N 54.9E	36				
JUN 05	KSA	0611						
JUN								
JUN 06	USCGS	094618.6	30.1N 52.4E	25				
JUN 06	KSA	094618.6	29.9N 52.4E	25				
JUN								
JUN 11	ISS	051023	27.93N 54.51E			309	8.3-132.9	3.4
JUN 11	USCGS	051026.3	27.9N 54.6E	37				
JUN 11	ATH	0510			6.8			
JUN 11	BCIS	051023	27.9N 54.5E					
JUN 11	BRA	0510			6.7			
JUN 11	BUC	0510			7 3/4			
JUN 11	CLL	0510			6.5			
JUN 11	HRB	0510			6.3			
JUN 11	KEW	0510			6.8			
JUN 11	KSA	051026.0	28.9N 54.6E		6 1/2			
JUN 11	MAT	0510			7 1/4			
JUN 11	MOS	051023	27.6N 54.5E		6.5			
JUN 11	PAL	0510			6 1/4-6 1/2			
JUN 11	PAS	0510			6 1/2-6 3/4			
JUN 11	PRU	0510			6.5			
JUN 11	QUE	051029	28 N 54 3/4E		7.6			
JUN 11	ROM	0510			6 1/4-6 1/2			
JUN 11	SHL	051012	28 N 53 E					
JUN 11	SPC	0510			6.3			
JUN 11	ROX	0510			6.2			
JUN 11	STR	0510			6 1/4-6 1/2			
JUN 11	TEH	0510			6.5			
JUN 11	UPP	0510			7(2)			
JUN 11	WEL	0510			6.2			
JUN 11	RJ	051026	27.9N 54.7E	37	6.8			
JUN 11	NA	051022.3	27.90N 54.53E	00		191		2.30
JUN								
JUN 11	ISS	053015	27.92N 54.90E	68		56	8.3-129.9	2.18
JUN 11	USCGS	053014.5	27.8N 55.0E	62				
JUN 11	BCIS	053010						
JUN 11	MOS	053008	27 1/2N55 E					
JUN 11	TEH	0530			5.8			
JUN 11	NA	053012.5	27.85N 54.83E	40		54		1.48
JUN								
JUN 11	USCGS	061042.3	27.8N 54.9E	46				
JUN 11	BCIS	061039						
JUN 11	KSA	0610						

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JUN								
JUN 11	KSA	0619						
JUN 11	NA	061929.1	27.83N 55.05E	51		54		1.19
JUN 11	BCIS	061924	28 N 55 E					
JUN								
JUN 11	BCIS	063158	28 N 55 E					
JUN 11	KSA	0632						
JUN								
JUN 11	ISS	064648	27.69N 54.98E	39		55	8.6-112.6	1.73
JUN 11	USCGS	064648	27.7N 55.1E	41				
JUN 11	BCIS	064647						
JUN 11	MOS	064644	27.4N 54.9E		5			
JUN 11	TEH	0646			5.1			
JUN 11	NA	064648.5	27.69N 54.96E	46		54		1.54
JUN								
JUN 11	USCGS	065129.6	27.8N 54.9E	49				
JUN 11	BCIS	065126						
JUN 11	MOS	065125	27 1/2N55 E					
JUN 11	TEH	0651			5.1			
JUN 11	NA	065120.3	27.22N 55.40E	00		14		2.05
JUN								
JUN 11	USCGS	080410.0	27.6N 55.3E	70				
JUN 11	BCIS	080410.0						
JUN 11	KSA	0804	29.3N 55.6E		4.4(1)L			
JUN								
JUN 11	BCIS	083842	28 N 55E					
JUN 11	KSA	0839	28 N 55 E					
JUN								
JUN 11	USCGS	092139.4	27.8N 55.0E	48				
JUN 11	BCIS	092139.4						
JUN 11	KSA	0921	28 N 55 E					
JUN 11	TEH	0921			4.7			
JUN 11	MOS	0921			4 1/2			
JUN 11	NA	092140.3	27.76N 54.91E	62		24		1.86
JUN								
JUN 11	USCGS	100306.3	27.7N 55.0E	42				
JUN 11	BCIS	100304						
JUN 11	MOS	100304	27.4N 55.0E		4			
JUN 11	NA	100304.6	27.79N 54.90E	26		31		1.00
JUN								
JUN 11	USCGS	112409.4	28.1N 54.7E	33				
JUN 11	BCIS	112409.4						
JUN 11	KSA	112410	28.5N 54.6E	31	4.8(1)L			
JUN 11	MOS	112411	27.7N 54.5E		4 3/4			
JUN 11	TEH	1124			4.8			
JUN 11	NA	112409.3	27.82N 54.63E	33		38		1.63
JUN								
JUN 11	ISS	123020	27.67N 54.59E			59	8.5-127.5	3.67
JUN 11	USCGS	123023.5	27.8N 54.4E	35				
JUN 11	MOS	123020	27 1/2N55 E					
JUN 11	NA	123019.4	27.85N 54.36E	03		59		1.22
JUN								
JUN 11	ISS	123126	27.89N 54.49E	12		155	8.2-130.6	
JUN 11	USCGS	123126.8	28.2N 54.6E	36				
JUN 11	BCIS	123123						
JUN 11	BUC	1231			5 1/4			
JUN 11	BRA	1231			5.7			
JUN 11	KEW	1231			5 1/4			
JUN 11	MOS	123130	28 N 54 1/2E		5 1/2			
JUN 11	KEV	1231			5 1/4			
JUN 11	KSA	123126.8	28.0N 54.6E	36	5.7(1)L			
JUN 11	MAT	1231			5 3/4-6			
JUN 11	PRA	1231			5.3			
JUN 11	PRU	1231			5.2			
JUN 11	TEH	1231			5.9			
JUN 11	TIF	1231			5 3/4			
JUN 11	UPP	1231			6.2(2)			
JUN 11	RJ	123126.8	28.2N 54.6E	36	6.1			
JUN 11	NA	123124.0	27.85N 54.54E	11		114		1.26

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JUN								
JUN 11	USCGS	124258.7	30.4N 55.3E	61				
JUN 11	BCIS	124242						
JUN 11	TEH	1242			4.2			
JUN 11	NA	124247.7	27.85N 54.90E	65		10		0.73
JUN								
JUN 11	ISS	135801	27.89N 54.74E	54		112	8.3-127.7	1.92
JUN 11	USCGS	135758.3	27.8N 54.6E	34				
JUN 11	BCIS	135757						
JUN 11	MOS	135757	27.5N 54.7E		5 1/4			
JUN 11	KEW	1358			5			
JUN 11	KSA	135758.6	27.6N 54.6E	63	5.1(1)L			
JUN 11	PRU	1358			4.6			
JUN 11	TEH	1358			5.6			
JUN 11	NA	135757.8	27.85N 54.79E	23		107		1.36
JUN								
JUN 11	USCGS	150616.7	27.8N 54.5E	39				
JUN 11	BCIS	1506						
JUN 11	KSA	150617.3	27.8N 54.6E	63	4.7(1)L			
JUN 11	MOS	150614	27 1/2N54 1/2E		4 1/2			
JUN 11	NA	150616.5	27.79N 54.50E	39		38		1.73
JUN								
JUN 11	USCGS	231307.8	27.8N 54.9E	42				
JUN 11	BCIS	231305	28 N 55 E					
JUN 11	MOS	231305	27 1/2N55 E		4 1/4			
JUN 11	KSA	231307.7	28.5N 54.6E	25	4.4(1)L			
JUN 11	TEH	2313			4.3			
JUN 11	NA	231307.2	27.79N 54.89E	37		22		1.17
JUN								
JUN 12	BCIS	035157	28 N 55 E					
JUN 12	KSA	0352	28 N 54 1/2E					
JUN								
JUN 12	BCIS	152912	28 N 55 E					
JUN								
JUN 12	BCIS	130112	28 N 55 E					
JUN 12	KSA	130114	28 N 54 1/2E					
JUN								
JUN 12	USCGS	170456.0	27.1N 54.9E	49				
JUN 12	BCIS	170506						
JUN 12	KSA	170456.0	26.9N 54.9E	49	4.5(1)L			
JUN 12	NA	170450.2	26.64N 55.19E	00		21		2.71
JUN								
JUN 12	USCGS	210238.5	27.5N 54.3E	33				
JUN 12	BCIS	210238						
JUN 12	KSA	210247.5	28.8N 54.8E		4.7(1)L			
JUN 12	NA	210233.9	27.45N 54.27E	00		13		1.86
JUN								
JUN 12	USCGS	214830.1	27.5N 55.1E	35	4.3			
JUN 12	KSA	214834.8	28.6N 55.1E	35	4.4(1)L			
JUN 12	MOS	214831	27 1/2N55 E		4 1/2			
JUN 12	NA	214829.8	27.41N 55.00E	37		28		0.90
JUN								
JUN 12	BCIS	231712	28 N 55 E					
JUN 12	KSA	2317	28 N 54 1/2E		4.6(1)L			
JUN								
JUN 13	BCIS	011206	28 N 55 E					
JUN								
JUN 14	USCGS	002427.3	27.9N 55.0E	36				
JUN 14	KSA	002430.8	28.3N 54.9E	62				
JUN 14	MOS	002425	27 1/2N55 E		4 3/4			
JUN 14	NA	002426.9	27.76N 54.72E	40		33		1.41
JUN								
JUN 14	USCGS	090337.0	28.0N 55.0E	34				
JUN 14	BCIS	090335	28 N 54 1/2E					
JUN 14	KSA	090340	28.7N 55.3E	60				
JUN 14	MOS	090338	28 N 55 E		4 1/2			
JUN 14	NA	090336.7	27.80N 54.84E	38		30		1.68

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JUN								
JUN 15	ISS	062135	27.7N 54.8E	37		53	2.8-127.5	2.18
JUN 15	USCGS	062135.6	27.8N 54.8E	35				
JUN 15	BCIS	062121.5						
JUN 15	KSA	062140.1	27.8N 54.8E	113				
JUN 15	MOS	062141	27.9N 54.6E		5			
JUN 15	NA	062135.0	27.70N 54.78E	38		47		1.53
JUN								
JUN 15	BCIS	195636	28 N 56 E					
JUN 15	KSA	1957	28 N 54 1/2E					
JUN								
JUN 16	USCGS	084529.7	27.2N 54.5E	37				
JUN 16	BCIS	084530						
JUN 16	KSA	084537.3	28.7N 55.1E					
JUN 16	NA	084532.8	27.62N 54.59E	41		11		1.41
JUN								
JUN 17	ISS	080554	27.94N 54.86E	46		79	2.7-127.8	2.60
JUN 17	USCGS	080553.0	27.9N 55.0E	38				
JUN 17	BCIS	080553	27.9N 55.0E	38				
JUN 17	MOS	080554	27.9N 55.0E		5			
JUN 17	PRU	0805			4.6			
JUN 17	NA	080553.4	27.84N 54.88E	41		62		1.41
JUN								
JUN 18	USCGS	101008.8	27.8N 55.2E	33				
JUN 18	BCIS	101006						
JUN 18	KSA	101013.8	29.0N 55 E					
JUN 18	MOS	101013	28 N 55 E		4 3/4			
JUN 18	NA	101008.7	27.77N 55.18E	30		23		1.50
JUN								
JUN 18	USCGS	105203.0	27.3N 54.7E	33				
JUN 18	BCIS	105206						
JUN 18	KSA	105207.5	28.3N 54.6E					
JUN 18	MOS	105205	27 1/2N 54 1/2E					
JUN 18	NA	105206.2	27.82N 54.89E	36		20		1.56
JUN								
JUN 18	USCGS	145132.1	28.0N 54.9E	27				
JUN 18	BCIS	145136						
JUN								
JUN 20	USCGS	101558.5	28.9N 54.7E	45				
JUN 20	KSA	1016	28 N 55 E					
JUN								
JUN 21	ISS	063924	27.88N 54.71E	39		111	2.6-127.7	1.35
JUN 21	USCGS	063923.0	27.8N 54.8E	40				
JUN 21	BCIS	063920	27 3/4N 54 1/2E					
JUN 21	KSA	063922.8	27.9N 55.0E		5.1(1)L			
JUN 21	MOS	063922	27.7N 54.7E		5			
JUN 21	APA	063920	27.5N 55.5E		5.2			
JUN 21	QUE	063925	27 1/2N 55 E					
JUN								
JUN 21	USCGS	154046.6	34.1N 48.3E	33				
JUN 21	KSA	1541	35 N 49 E					
JUN								
JUN 21	ISS	191438	27.81N 54.84E	47		48	2.7-117.6	2.30
JUN 21	USCGS	191434.9	27.5N 54.8E	45				
JUN 21	BCIS	191435	27 1/2N 54 3/4E					
JUN 21	KSA	191441.9	28.6N 55.2E	86				
JUN 21	MOS	191440	27.4N 54.7E		5			
JUN 21	APA	191433	27.5N 55 E		4.8			
JUN 21	QUE	191440	28 N 54 3/4E					
JUN 21	NA	191435.8	27.75N 54.76E	40		46		1.75
JUN								
JUN 21	BCIS	154046	35 N 49 E					

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JUN								
JUN 22	USCGS	090515.1	28.0N 54.9E	43				
JUN 22	BCIS	090515						
JUN								
JUN 23	ISS	163634	27.78N 55.03E	121		98	2.9-129.7	2.95
JUN 23	USCGS	163622.8	27.6N 55.1E	32				
JUN 23	BCIS	163624						
JUN 23	KSA	163628.0	28.5N 55.5E	54	5.2(1)L			
JUN 23	MOS	163620	27.1N 54.8E		5			
JUN 23	APA	163623	27.5N 55.0E		5.2			
JUN 23	PRU	1636			4.6			
JUN 23	UPP	1636			5.8			
JUN 23	RJ	163622.8	27.6N 55.1E	32	5.8			
JUN 23	NA	163624.7	27.68N 55.08E	38		78		2.04
JUN								
JUN 25	USCGS	124023.7	27.9N 53.7E	54				
JUN 25	BCIS	124018						
JUN 25	MOS	124019	27.3N 53.8E		4 1/2			
JUN 25	APA	124015	27.0N 53.5E		4.5			
JUN 25	NA	124018.3	27.73N 53.80E	12		26		0.97
JUN								
JUN 27	USCGS	004900	33.5N 49.3E					
JUN 27	BCIS	004918						
JUL								
JUL 05	USCGS	081753	27.7N 54.8E	30				
JUL 05	KSA	081753	27.7N 54.8E					
JUL 05	NA	081749.4	27.60N 54.97E	09		19		2.46
JUL								
JUL 06	MOS	233248	40.0N 42.8E					
JUL								
JUL 06	MOS	235616	40.0N 44.1E					
JUL								
JUL 07	MOS	121707	39.2N 46.0E					
JUL								
JUL 08	BCIS	063704	26 1/2N 54 1/4E					
JUL 08	KSA	0637						
JUL								
JUL 09	ISS	080542	27.55N 55.20E	35		90	3.1-127.4	2.57
JUL 09	USCGS	080537	29.0N 54.7E	25				
JUL 09	KSA	080545.9	29.0N 54.7E	25	5.1(1)L			
JUL 09	MOS	080539	27.5N 55.0E		4 3/4-5			
JUL 09	STR	080540	27 3/4N 54 3/4E					
JUL 09	NA	080543.1	27.70N 55.09E	42		76		1.78
JUL								
JUL 10	MOS	004424	38.3N 45.3E					
JUL								
JUL 13	USCGS	092848	27.4N 54.9E	33				
JUL 13	KSA	092853.0	27.4N 54.9E	33				
JUL 13	MOS	092848	26.5N 54 1/2E					
JUL 13	NA	092900.1	27.92N 54.94E	68		35		1.96
JUL								
JUL 17	ISS	051334	27.55N 55.28E	140		49	3.3-113.3	3.02
JUL 17	USCGS	051321.3	27.8N 55.1E	16				
JUL 17	KSA	051321.3	27.8N 55.1E		4.9(1)L			
JUL 17	MOS	051326	27.8N 55.0E		4 1/2			
JUL 17	NA	051324.3	27.69N 55.10E	44		45		1.70
JUL								
JUL 19	MOS	030130	38.0N 47.0E					
JUL								
JUL 19	MOS	181547	39.1N 44.3E					
JUL								
JUL 20	MOS	032937	40.5N 45.6E					

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JUL								
JUL 20	BCIS	202841.	27 1/2N55 1/2E					
JUL 20	KSA	202841						
AUG								
AUG 07	MOS	104357	40.0N 42.5E					
AUG								
AUG 22	MOS	234434	39.2N 44.2E					
SEP								
SEP 02	MOS	124612	39.8N 43.2E					
SEP								
SEP 04	MOS	090107	40.5N 43.2E					
SEP								
SEP 04	BCIS	232712	38 N 43 E					
SEP 04	NA	232739.2	36.79N 42.77E	286		10		1.89
SEP								
SEP 05	USCGS	140951.8	36.8N 54.5E	33				
SEP 05	BCIS	140950	36 3/4N54 1/2E	33				
SEP 05	MOS	140950			4			
SEP 05	NA	140952.8	36.74N 54.18E	26		45		1.95
SEP								
SEP 13	BCIS	140525	32 N 47 E					
SEP 13	MOS	140529	32.3N 47.1E		4 3/4			
SEP 13	NA	140541.5	32.90N 47.62E	96		34		2.50
SEP								
SEP 13	USCGS	154823.7	33.0N 47.3E	33				
SEP 13	MOS	154828	33.2N 47.9E		4 1/2			
SEP 13	NA	154828.3	33.07N 47.56E	81		31		1.81
SEP								
SEP 14	ISS	080312	32.83N 47.54E	90		71	4.3-105.7	2.52
SEP 14	USCGS	080308.7	33.0N 47.4E	33				
SEP 14	BCIS	080310	33 N 47 1/4E					
SEP 14	KSA	080309.0	33.6N 48.8E	30	5.4(1)L			
SEP 14	MOS	080320	33.3N 47.5E	135				
SEP 14	NA	080311.4	32.80N 47.51E	78		62		2.15
SEP								
SEP 17	USCGS	053009.6	37.5N 57.5E	33				
SEP 17	NA	053006.6	37.53N 57.46E	06		10		1.32
SEP								
SEP 19	MOS	131158	40.3N 44.3E					
SEP								
SEP 21	BCIS	052224	32 N 48 E					
SEP 21	KSA	0522						
SEP								
SEP 21	MOS	192003	40.3N 46.1E					
SEP								
SEP 22	MOS	234434	39.2N 44.2E					
SEP								
SEP 27	USCGS	082159.6	28.5N 54.7E	33				
SEP 27	NA	082153.8	28.38N 54.82E	00		14		1.90
SEP								
SEP 28	ISS	223627	27.43N 57.02E	51		87	4.5-120.7	2.71
SEP 28	USCGS	223624.7	27.2N 57.1E	41				
SEP 28	MOS	223628	27.5N 57.1E		4 3/4			
SEP 28	RJ	223624.7	27.2N 57.1E	41	D			
SEP 28	NA	223625.1	27.27N 57.07E	41		75		1.14
OCT								
OCT 02	SHI	1808	37.1N 45.1E					
OCT								
OCT 03	USCGS	093452.2	34.3N 47.9E	59				
OCT 03	MOS	093446	33.6N 47.1E		4.8			
OCT 03	NA	093453.1	34.38N 47.81E	69		19		1.28
OCT								
OCT 08	MOS	015836	39.5N 45.1E					

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OCT								
OCT 09	BCIS	212454	29 N 56 E					
OCT								
OCT 12	MOS	070951	38.7N 44.1E					
OCT								
OCT 14	USCGS	070039.4	33.6N 48.1E	33				
OCT 14	RJ	0700	33.90N 48.77E	N				
OCT 14	NA	070050.6	34.11N 48.46E	84		10		3.26
OCT								
OCT 15	BCIS	094135	27 3/4N 56 1/2E					
OCT 15	KSA	0942						
OCT								
OCT 22	MOS	044311	40.1N 44.6E					
OCT								
OCT 22	USCGS	225631.8	27.5N 54.6E	33				
OCT 22	MOS	225636	28 N 55 1/2E		4 3/4			
OCT 22	NA	225636.0	27.88N 54.18E	34		27		1.92
OCT								
OCT 23	USCGS	044022.1	27.9N 54.5E	33				
OCT 23	MOS	044023	27.8N 54.5E		4 3/4			
OCT 23	NA	044021.8	27.87N 54.41E	26		40		1.55
OCT								
OCT 23	MOS	052748	40.6N 47.9E					
OCT								
OCT 28	ISS	104643	33.33N 48.74E	59		110	3.2-130.9	3.15
OCT 28	USCGS	104642.2	33.6N 48.5E	52				
OCT 28	MOS	104643	33.7N 48.8E		5			
OCT 28	BUC	1046			4.7			
OCT 28	RJ	104642.2	33.6N 48.5E	52 D				
OCT 28	NA	104641.6	33.56N 48.50E	43		93		1.37
NOV								
NOV 01	MOS	134136	40.5N 44.9E					
NOV								
NOV 05	USCGS	083631.6	27.8N 55.0E	44				
NOV 05	NA	083632.0	27.63N 55.11E	91		13		0.98
NOV								
NOV 05	BCIS	084042	34 N 49 E					
NOV 05	MOS	084044	33.4N 48.3E					
NOV 05	STR	084040	34 1/4N 48 3/4E					
NOV 05	NA	084047.8	33.63N 48.23E	80		17		2.08
NOV								
NOV 07	USCGS	083935.6	27.8N 54.5E	33				
NOV 07	NA	083937.6	27.96N 54.73E	36		13		1.77
NOV								
NOV 07	MOS	192159	40.4N 45.7E					
NOV								
NOV 09	MOS	065508	39.4N 46.0E					
NOV								
NOV 14	MOS	115724	40.6N 44.8E					
NOV								
NOV 21	BCIS	014506	32 1/2N 53 E					
NOV								
NOV 21	MOS	025141	40.0N 45.3E					
NOV								
NOV 27	BCIS	002900	28 N 56 E					
NOV 27	KSA	0029						
DEC								
DEC 17	MOS	143324	38.5N 50.5E	5				
DEC 17	NA	143319.8	38.31N 51.00E	47		11		1.63

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1962								
JAN								
JAN 01	ZEM	181824	38.3N 46.6E		3.6			
JAN								
JAN 19	MOS	033722	39.6N 54.5E		4 1/4			
JAN 19	ZEM	033722	39.6N 54.5E		4 1/4			
JAN 19	NA	033723.3	39.65N 54.58E	11		31		2.00
JAN								
JAN 20	USCGS	033124.6	31.2N 48.9E	33				
JAN 20	MOS	033110	29 N 49 1/2E		4 1/2			
JAN 20	NA	033134.0	30.67N 49.26E	163		30		1.78
FEB								
FEB 02	BCIS	035538	27 3/4N54 1/2E					
FEB								
FEB 03	SHI	030000	30 1/4N52 E					
FEB								
FEB 08	MOS	201015	31 N 49 E		4 1/2			
FEB								
FEB 09	ZEM	074531	40.4N 45.0E					
FEB								
FEB 27	ZEM	231158	38.8N 44.7E					
MAR								
MAR 07	USCGS	210803.1	26.9N 57.2E	33				
MAR 07	MOS	210806	27 N 57 1/2E		4 1/2			
MAR 07	NA	210802.2	26.44N 57.42E	22		15		3.05
MAR								
MAR 08	ZEM	124321	39.6N 45.1E					
MAR								
MAR 13	ZEM	065308	39.0N 46.7E					
MAR								
MAR 15	USCGS	150140.1	28.4N 51.6E	20				
MAR								
MAR 19	USCGS	230514.8	37.5N 54.2E	48				
MAR 19	MOS	230511	37.0N 54.5E		4-4 1/4			
MAR 19	NA	230514.8	37.46N 54.25E	45		10		1.64
MAR								
MAR 19	ZEM	230508	37.5N 54.5E		4 1/2			
MAR								
MAR 26	ZEM	071702	37.8N 56.9E					
MAR								
MAR 28	MOS	052544	36.8N 58.0E		3 1/2			
MAR 28	ZEM	052543	37.0N 57.4E					
MAR								
MAR 31	USCGS	233644.3	34.0N 48.0E	25				
MAR 31	NA	233645.3	34.07N 47.94E	35		14		1.57
APR								
APR 01	ISS	004509	33.37N 58.93E			110	4.6-129.7	2.00
APR 01	USCGS	004514.6	33.6N 59.0E	33				
APR 01	MOS	004510	33.2N 58.6E		5 1/2-5 3/4			
APR 01	APA	004502	32 N 59 E		5.5			
APR 01	KEW	0045			5 1/2			
APR 01	MAT	0045			6 1/4			
APR 01	PEK	004507	32 1/2N59 E					
APR 01	SHI	0045	34.0N 58.5E					
APR 01	SHL	004500	33 N 59 E					
APR 01	STR	0045			5.3			
APR 01	UPP	0045			5.8(2)			
APR 01	RJ	004514.6	33.6N 59.0E	N 5.8				
APR 01	NA	004508.9	33.39N 58.87E	00		94		1.85
APR								
APR 07	ZEM	030552	38.5N 44.3E		3.2			
APR								
APR 07	ZEM	055344	39.2N 44.2E		2.6			

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APR								
APR 09	ZEM	201900	37.0N 55.8E					
APR								
APR 10	ZEM	234931	40.1N 45.0E					
APR								
APR 10	ZEM	235440	40.4N 45.1E					
APR								
APR 19	ZEM	081422	38.6N 44.2E					
APR								
APR 19	USCGS	115527.3	38.6N 44.0E	25				
APR 19	MOS	115522	38.5N 44.1E		4 1/2			
APR 19	PRU	1155			4.4			
APR 19	STR	1155			4.6			
APR 19	ZEM	115521	38.6N 44.0E		4.8			
APR 19	NA	115526.4	38.64N 44.20E	18		48		1.46
APR								
APR 21	SHI	0026	32.0N 49.0E					
APR								
APR 21	ZEM	145309	38.8N 44.2E		3.4			
APR 21	MOS	145307	38.2N 44.5E		3 1/2			
APR								
APR 25	MOS	011445	37.2N 56.5E		4			
APR 25	NA	011449.4	37.29N 56.57E	46		11		1.63
APR 25	ZEM	011415	37.2N 56.6E		4			
APR								
APR 26	USCGS	155312.2	28.5N 57.2E	41				
APR 26	MOS	155259	28.1N 56.6E					
APR 26	NA	155319.1	28.99N 57.60E	95		19		2.12
MAY								
MAY 01	SHI	232900	34 1/2N48 E					
MAY								
MAY 02	ZEM	115720	38.6N 56.7E					
MAY								
MAY 09	ZEM	120204	39.3N 46.0E					
MAY								
MAY 12	ZEM	014926	37.0N 55.0E		3 1/2			
MAY 12	MOS	014926	37.0N 55.0E		3 1/2			
MAY								
MAY 13	ZEM	112326	37.9N 56.3E					
MAY								
MAY 18	ZEM	164213	38.7N 43.9E					
MAY								
MAY 19	ZEM	171548	38.3N 44.7E					
MAY								
MAY 24	MOS	093950	37 N 55 1/2E		4			
MAY 24	ZEM	093950	37.0N 55.5E		4			
MAY								
MAY 25	SHI	0729	27.6N 54.2E					
MAY								
MAY 29	ZEM	172635	40.4N 45.8E					
JUN								
JUN 01	ZEM	174418	40.4N 46.0E					
JUN								
JUN 06	ZEM	235647	39.2N 44.0E					
JUN								
JUN 08	ZEM	104539	37.2N 55.85E					
JUN								
JUN 10	ZEM	192813	37.6N 55.9E					
JUN								
JUN 10	ZEM	201149	37.6N 55.9E					
JUN								
JUN 10	SHI	2114	36.5N 52.5E					
JUN								
JUN 12	BCIS	092418	27 N 55 E					
JUN 12	SHI	092418	27.0N 55.0E					

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JUN								
JUN 13	ZEM	120703	39.2N 46.0E					
JUN								
JUN 15	ZEM	100907	37.9N 58.5E					
JUN								
JUN 15	MOS	102012	38.0N 58.5E		3 1/2			
JUN 15	ZEM	102011	37.9N 58.5E					
JUN								
JUN 20	ZEM	175615	38.4N 45.2E		3.5			
JUN								
JUN 23	USCGS	050459.2	29.7N 49.2E					
JUN 23	BCIS	050459	29.8N 49.2E					
JUN 23	MOS	050458	29.6N 49.2E					
JUN 23	NA	050501.1	29.75N 49.34E	55		43		0.89
JUN								
JUN 26	ZEM	113656	38.6N 44.3E		3.1			
JUN								
JUN 27	ZEM	132511	39.0N 46.0E					
JUN								
JUN 29	ISS	223546	32.36N 48.83E	60		116	4.0-121.2	2.29
JUN 29	USCGS	223542.3	32.0N 48.8E	52				
JUN 29	BCIS	223542	32.0N 48.8E					
JUN 29	MOS	223542	32.0N 48.8E		5			
JUN 29	APA	223541	31.5N 48.5E		4.7			
JUN 29	MAT	2235			5 1/4			
JUN 29	PEK	223541	31 N 49 E					
JUN 29	PRA	2235			5.2			
JUN 29	STR	2235			4.7			
JUN 29	UPP	2235			5.6			
JUN 29	RJ	223542.3	32.0N 48.8E	52	5.6			
JUN 29	NA	223545.7	32.34N 48.80E	58		102		1.81
JUN								
JUN 30	USCGS	094550.2	27.6N 57.7E	25				
JUN 30	BCIS	094544	26.5N 57.6E					
JUN 30	APA	094545	27.0N 57.5E		4-4.5			
JUN 30	MOS	094554	27.6N 57.5E		4-4 1/2			
JUN 30	NA	094622.9	29.68N 57.40E	198		30		2.15
JUL								
JUL 03	USCGS	063108.5	28.0N 56.2E	25				
JUL 03	MOS	063111	28.1N 56.0E		4-4 1/4			
JUL 03	NA	063116.9	28.47N 55.88E	69		33		1.29
JUL								
JUL 03	ZEM	214736	39.0N 44.2E					
JUL								
JUL 14	USCGS	064426.5	27.3N 56.7E	30				
JUL 14	APA	064437	27.8N 56.8E		4-4.5			
JUL 14	MOS	064423	26.3N 56.5E		4 1/2			
JUL 14	NA	064433.5	27.43N 56.59E	73		44		1.77
JUL								
JUL 17	ZEM	193631	38.6N 44.5E					
JUL								
JUL 21	USCGS	030703.5	37.0N 55.4E	33				
JUL 21	MOS	030658	37.0N 55.1E		4 1/2			
JUL 21	ZEM	030658	37.0N 55.1E		4 1/2			
JUL 21	NA	030700.1	37.05N 55.21E	00		28		2.03
JUL								
JUL 23	MOS	012345	39.0N 53.7E		3 1/2			
JUL								
JUL 23	SHI	0257	36.6N 53. E					
JUL								
JUL 23	ZEM	012345	39.0N 53.7E		3 1/2			
JUL								
JUL 27	ZEM	021142	39.3N 46.0E					

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JUL								
JUL 27	ZEM	060458	38.7N 43.3E					
JUL								
JUL 31	ZEM	203230	39.1N 44.2E					
AUG								
AUG 01	ZEM	042851	36.3N 46.3E		3.3			
AUG								
AUG 03	ZEM	134029	36.7N 56.3E					
AUG								
AUG 06	ZEM	143847	37.9N 45.2E					
AUG								
AUG 12	ZEM	081605	36.2N 55.0E					
AUG 12	MOS	081616	37.0N 55.5E		3 1/2			
AUG								
AUG								
AUG 14	USCGS	072744.8	28.0N 55.6E	43				
AUG 14	MOS	072745	28.0N 55.8E	5				
AUG								
AUG 22	ZEM	103510	38.5N 57.5E					
AUG								
AUG 27	SHI	2349	37.1N 58.4E					
SEP								
SEP 01	ISS	192040	35.58N 49.88E	29		368	1.2-137.1	2.40
SEP 01	USCGS	192038.7	35.6N 49.9E	20	7 1/4			
SEP 01	BCIS	192039.9	35.6N 49.9E	27				
SEP 01	APA	192037	35.0N 49.5E	18	7			
SEP 01	ATH	1920			7.3			
SEP 01	BMO	192038.8	35.6N 50.0E	21				
SEP 01	BRA	1920			7.3			
SEP 01	BRK	1920			7 3/4			
SEP 01	CLL	1920			7.0			
SEP 01	KEW	1920			7.1			
SEP 01	IST	1920			6-6 1/4			
SEP 01	LWI	1920			7 1/4-7 1/2			
SEP 01	MAT	1920			7 1/2			
SEP 01	MOS	192040	35.6N 49.9E		6 3/4			
SEP 01	PAL	1920			7			
SEP 01	PAS	1920			7-7 1/2			
SEP 01	PEK	192025	35 N 48 3/4E	7				
SEP 01	QUE	192022	35 3/4N48 E					
SEP 01	SAN	1920			7 1/2			
SEP 01	SHL	192030	36 N 49 E		7 1/2			
SEP 01	UPP	1920			7.2(2)			
SEP 01	STR	1920			7.0			
SEP 01	ROM	1920			7.0			
SEP 01	RJ	192038.5	35.6N 50.0E	21	7.3			
SEP 01	NA	192039.0	35.59N 49.85E	21		217		1.41
SEP								
SEP 01	USCGS	202740	35.6N 49.4E	31				
SEP 01	BCIS	202737	35.6N 49.9E		4 1/4			
SEP 01	BMO	202737.2	35.3N 49.6E	33				
SEP 01	MOS	202738	35.6N 49.9E					
SEP 01	APA	202736	35 N 49 1/2E					
SEP 01	STR	2027			4 1/2			
SEP 01	NA	202740.9	35.86N 49.93E	40		52		1.67
SEP								
SEP 02	USCGS	071202.6	35.6N 49.4E	31				
SEP 02	BCIS	071203	35.7N 49.4E					
SEP 02	MOS	071203	35.6N 49.4E		4 1/2			
SEP 02	APA	071200	35 N 49 1/2E					
SEP 02	BMO	071202.4	35.6N 49.2E	33				
SEP 02	RJ	071202.1	35.6N 49.2E	N D				
SEP 02	NA	071203.9	35.59N 49.33E	48		44		2.06

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SEP								
SEP 02	MOS	132126	35 1/2N 49 1/2E		4 1/4			
SEP 02	APA	132118	35 N 49 1/2E					
SEP 02	NA	132135.1	36.03N 48.64E	105		18		1.65
SEP								
SEP 03	MOS	010155	35.4N 49.8E					
SEP 03	NA	010158.3	35.68N 49.89E	37		11		2.55
SEP								
SEP 03	BCIS	020826	35 3/4N 50 E					
SEP 03	MOS	020833	35.6N 49.9E					
SEP								
SEP 03	ZEM	231939	40.5N 46.1E					
SEP								
SEP 04	USCGS	133014.5	35.6N 49.7E	53				
SEP 04	BCIS	133012						
SEP 04	APA	133009	35 N 49 1/2E					
SEP 04	BMO	133010.9	35.6N 49.7E	24				
SEP 04	MOS	133013	35.6N 49.9E		5 1/4			
SEP 04	PEK	133007	35 N 50 E					
SEP 04	PRA	1330			5			
SEP 04	PRU	1330			5			
SEP 04	STR	1330			4.9			
SEP 04	UPP	1330			5.6(2)			
SEP 04	RJ	133010.9	35.6N 49.7E	N 5.6				
SEP 04	NA	133013.9	35.58N 49.71E	43		89		1.86
SEP								
SEP 04	USCGS	225919.5	39.9N 43.9E					
SEP 04	BCIS	225917	40.0N 44.0E					
SEP 04	APA	225913	39.7N 44.1E		5.2			
SEP 04	BMO	225919.4	39.9N 44.2E	33				
SEP 04	BRA	2259			5.4			
SEP 04	KSA	2259			5.3			
SEP 04	KEW	2259			5			
SEP 04	LVO	2259			4.7			
SEP 04	MAT	2259			5 3/4-6			
SEP 04	MOS	225913	39.7N 44.1E		5 1/2			
SEP 04	PRA	2259			4.9			
SEP 04	PRU	2259			5.1			
SEP 04	STR	2259			5.0			
SEP 04	UPP	2259			5.8(2)			
SEP 04	ZEM	225913	39.9N 44.1E		5 1/4			
SEP 04	RJ	225919.4	39.5N 43.55E	N 5.8				
SEP 04	NA	225917.3	39.88N 44.09E	17		103		1.58
SEP								
SEP 04	ZEM	230641	39.7N 44.1E					
SEP								
SEP 04	ZEM	230832	39.7N 44.1E					
SEP								
SEP 04	ZEM	231235	39.7N 44.1E					
SEP								
SEP 04	ZEM	232251	39.7N 44.1E					
SEP								
SEP 04	ZEM	233854	39.8N 44.1E					
SEP								
SEP 04	ZEM	235122	39.8N 44.1E					
SEP								
SEP 05	ZEM	000022	39.8N 44.1E					
SEP								
SEP 05	ZEM	001724	39.8N 44.1E					
SEP								
SEP 05	ZEM	004337	39.7N 44.1E					
SEP								
SEP 05	ZEM	011926	39.7N 44.0E					
SEP								
SEP 05	BCIS	021205	40 N 44 E					
SEP 05	ZEM	021205	39.7N 44.1E	4				

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SEP								
SEP 05	ZEM	021647	39.7N 44.1E					
SEP								
SEP 05	MOS	021205	39.9N 44.2E		4			
SEP								
SEP 05	ZEM	022427	39.8N 44.1E					
SEP								
SEP 05	BCIS	022817	40 N 44 E		4			
SEP 05	ZEM	022817	39.7N 44.1E					
SEP								
SEP 05	ZEM	023840	38.7N 44.0E					
SEP								
SEP 05	ZEM	030343	39.8N 44.1E					
SEP								
SEP 05	ZEM	033702	39.7N 44.1E					
SEP								
SEP 05	ZEM	034611	39.7N 44.1E					
SEP								
SEP 05	ZEM	063406	39.7N 44.1E					
SEP								
SEP 05	ZEM	073912	39.7N 44.1E					
SEP								
SEP 05	ZEM	100240	39.7N 44.1E					
SEP								
SEP 05	ZEM	104520	39.8N 44.0E					
SEP								
SEP 05	ZEM	114423	39.7N 44.1E					
SEP								
SEP 05	ZEM	130518	39.8N 44.1E					
SEP								
SEP 05	ZEM	150047	39.7N 44.1E					
SEP								
SEP 05	ZEM	182407	39.7N 44.1E					
SEP								
SEP 05	ZEM	204635	39.7N 44.1E					
SEP								
SEP 05	ZEM	230309	39.8N 44.1E					
SEP								
SPE 06	ZEM	061311	39.8N 44.1E					
SEP								
SEP 06	MOS	073035	36 N 52 E					
SEP								
SEP 06	ZEM	092959	39.8N 44.0E					
SEP								
SEP 06	ZEM	112921	39.7N 44.1E					
SEP								
SEP 06	BCIS	115024						
SEP 06	MOS	115021	39.9N 44.1E		4			
SEP 06	ZEM	115021	39.9N 44.0E		4-4 1/4			
SEP 06	NA	115023.3	40.03N 44.04E	00		11		1.86
SEP								
SEP 06	ZEM	122310	39.8N 44.1E					
SEP								
SEP 06	MOS	170425	36.0N 49.5E		4			
SEP								
SEP 06	ZEM	203621	39.8N 44.1E					
SEP								
SEP 07	ZEM	005556	39.7N 44.1E					
SEP								
SEP 07	MOS	063320	35 1/2N50 E					

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SEP								
SEP 07	MOS	121534	39.9N 44.2E		3 1/2			
SEP 07	ZEM	121533	39.7N 44.1E		4.3			
SEP 07	NA	121537.7	39.97N 44.30E	00		10		0.63
SEP								
SEP 08	MOS	190858	41 N 44 E					
SEP								
SEP 09	ZEM	131855	39.5N 44.1E		2-3			
SEP								
SEP 09	ZEM	182505	39.7N 44.1E					
SEP								
SEP 10	ZEM	054220	39.7N 44.1E					
SEP								
SEP 11	USCGS	001738.4	40.0N 44.2E	34				
SEP 11	BMO	001737.2	29.9N 43.9E					
SEP 11	MOS	001734	39.9N 44.1E		4 1/4			
SEP 11	APA	001735	40.1N 44.1E		4.5			
SEP 11	ZEM	001734	40.0N 44.1E		4.2			
SEP 11	NA	001734.7	40.00N 44.19E	00		46		1.84
SEP								
SEP 11	ZEM	014139	40.0N 44.1E		2.3			
SEP								
SEP 11	ZEM	065335	40.0N 44.1E		3.1			
SEP								
SEP 11	USCGS	111504.9	35.4N 49.9E	33				
SEP 11	MOS	111509	36.0N 49.9E		4 1/2			
SEP 11	APA	111455	34.7N 48.8E	4				
SEP 11	NA	111502.2	35.58*N49.81E	00		32		2.15
SEP								
SEP 11	ZEM	160941	40.0N 44.1E		2.8			
SEP								
SEP 11	ZEM	180103	39.9N 44.2E					
SEP								
SEP 12	MOS	021545	35.7N 49.0E		4 1/2			
SEP								
SEP 12	ZEM	093547	40.0N 44.1E		2.5			
SEP								
SEP 12	ZEM	094054	39.6N 44.7E		2.4			
SEP								
SEP 12	ZEM	175655	40.0N 44.2E		2.4			
SEP								
SEP 13	ZEM	021801	40.0N 44.2E		2.0			
SEP								
SEP 13	ZEM	225346	40.2N 44.2E		2.1			
SEP								
SEP 15	ZEM	231506	39.7N 44.2E		2.7			
SEP								
SEP 16	BCIS	120145	33 1/2N49 1/2E					
SEP								
SEP 16	ZEM	174434	40.0N 44.2E					
SEP								
SEP 16	ZEM	215853	40.0N 44.2E					
SEP								
SEP 18	ZEM	054043	39.9N 44.3E					
SEP								
SEP 19	ISS	072843	30.14N 50.40E	62		58	1.9-109.2	1.71
SEP 19	USCGS	072841.2	30.2N 50.3E	34				
SEP 19	MOS	072844	30.1N 50.4E	72				
SEP 19	APA	072837	29.5N 50.0E	5				
SEP 19	NA	072849.7	30.27N 50.31E	114		50		1.96
SEP								
SEP 19	MOS	141356	39.9N 44.2E	4				
SEP 19	ZEM	141358	40.0N 44.2E					

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SEP								
SEP 19	ZEM	150202	39.9N 44.2E		1.8			
SEP								
SEP 19	ZEM	160458	40.0N 44.2E		3.1			
SEP								
SEP 19	ZEM	194039	40.0N 44.2E		2.4			
SEP								
SEP 19	ZEM	204649	39.9N 44.2E		1.7			
SEP								
SEP 19	ZEM	205007	40.0N 44.2E					
SEP								
SEP 20	ZEM	110554	40.0N 44.2E					
SEP								
SEP 20	MOS	131013	35.5N 58.6E		4-4 1/2			
SEP								
SEP 20	ZEM	223115	40.0N 44.2E					
SEP								
SEP 21	ZEM	131113	38.9N 46.2E					
SEP								
SEP 24	ZEM	051230	38.8N 44.8E					
SEP								
SEP 24	ZEM	130950	39.7N 44.1E					
SEP								
SEP 28	ZEM	101244	39.9N 44.3E		2.5			
SEP								
SEP 29	USCGS	065356.6	28.2N 57.4E	50				
SEP 29	APA	065347	27 N 57 E		5.5			
SEP 29	MOS	065350	27.7N 57.4E		5 1/2			
SEP 29	RJ	065356.1	28.2N 57.4E	50 D				
SEP 29	NA	065359.9	28.29N 57.48E	83		36		1.06
SEP								
SEP 29	MOS	192322	36.0N 53.3E		4 1/2			
SEP 29	ZEM	192322	36.0N 53.3E		4 1/2			
SEP 29	NA	192321.7	36.03N 53.46E	00		20		1.80
OCT								
OCT 01	ISS	121401	27.95N 54.78E	40		190	8.3-130.9	1.72
OCT 01	USCGS	121357.4	27.9N 54.9E	16				
OCT 01	BCIS	121350	27.0N 54 3/4E					
OCT 01	KEW	1213			5 1/2			
OCT 01	MAT	1213			5 3/4-6			
OCT 01	MOS	121355	27.8N 54.8E		5 3/4			
OCT 01	APA	121353	27 N 55 E		5.7			
OCT 01	PEK	121357	26 1/2N 54 1/2E		5 3/4			
OCT 01	PRU	1214			5.6			
OCT 01	QUE	121406	28 N 55 1/2E					
OCT 01	ROM	1213			5.6			
OCT 01	SHL	121345	28.0N 52.7E					
OCT 01	STR	1214			5.6			
OCT 01	TUL	1213			5 1/2			
OCT 01	UPP	1213			6.5(2)			
OCT 01	RJ	121357.4	27.9N 54.9E	16	6.5			
OCT 01	NA	121357.9	27.91N 54.77E	18		147		1.21
OCT								
OCT 01	ZEM	185018	39.9N 44.3E		1.7			
OCT								
OCT 03	ZEM	083038	37.2N 57.1E					
OCT								
OCT 03	ZEM	084248	37.2N 57.1E					
OCT								
OCT 04	ZEM	110009	38.6N 58.1E					

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OCT								
OCT 05	ISS	200223	35.22N 58.73E			90	2.7-125.0	2.05
OCT 05	USCGS	200227.6	35.2N 58.8E	33				
OCT 05	BCIS	200222	35.1N 58.6E					
OCT 05	APA	200226	35.0N 58.5E	5				
OCT 05	MOS	200226	35.0N 58.7E	5				
OCT 05	PEK	200222	35 N 58 1/4E					
OCT 05	QUE	200205	35 N 56 3/4E					
OCT 05	STR	2002		4.7				
OCT 05	RJ	200226	35.1N 58.6E	N D				
OCT 05	NA	200222.9	35.19N 58.76E	00		70		1.53
OCT								
OCT								
OCT 06	ZEM	022518	40.0N 44.3E	2.0				
OCT								
OCT 07	ZEM	154524	40.0N 44.3E	2.5				
OCT								
OCT 09	ZEM	065616	39.6N 44.7E	4.0				
OCT								
OCT 10	USCGS	204337.3	27.9N 54.9E	47				
OCT 10	NA	204336.9	27.90N 54.91E	41		17		1.79
OCT								
OCT 13	ISS	102338	35.7N 50.07E	35		149	1.1-135.4	1.82
OCT 13	USCGS	102338.2	35.5N 49.8E	33				
OCT 13	BCIS	102337	35.8N 50.3E					
OCT 13	APA	102342	36 N 50 E	5.5				
OCT 13	BRA	1023		5.4				
OCT 13	MOS	102340	36.0N 50.2E	5 1/2				
OCT 13	KEW	1023		5 1/4				
OCT 13	HRB	1023		6.5				
OCT 13	LWI	1023		5 1/4				
OCT 13	PEK	102330	36 N 49 1/2E					
OCT 13	PRA	1023		5.4				
OCT 13	PRU	1023		5.3				
OCT 13	SHL	102330	36.8N 49.7E					
OCT 13	STR	1023		5 1/4				
OCT 13	TUL	1023		5.5				
OCT 13	UPP	1023		5.7				
OCT 13	RJ	102338.2	35.5N 49.8E	N 5.7				
OCT 13	NA	102338.0	35.74N 50.09E	32		114		1.37
OCT								
OCT 14	ZEM	031404	37.6N 56.9E					
OCT								
OCT 14	BCIS	1403						
OCT 14	MOS	140345	37.1N 44.5E	4 1/4				
OCT 14	NA	140341.8	37.14N 44.47E	00		14		1.97
OCT								
OCT 14	ZEM	162019	37.6N 56.8E					
OCT								
OCT 16	SHI	0724	35.2N 58.4E					
OCT								
OCT 16	USCGS	115845.6	30.6N 57.3E					
OCT 16	MOS	115846	30.8N 57.4E	4 1/2				
OCT 16	NA	115841.3	30.63N 57.36E	00		22		2.61
OCT								
OCT 23	ZEM	121707	38.5N 45.3E	3.6				
OCT								
OCT 24	SHI	1425	37.8N 56.9E	10 3 1/2				
OCT 24	ZEM	142504	37.8N 56.9E					
OCT								
OCT 25	SHI	01	36.7N 53.3E					
OCT								
OCT 25	USCGS	214934.4	33.4N 46.0E	20				
OCT 25	BCIS	214930.5	33.3N 46.1E					
OCT 25	NA	214935.7	33.42N 46.08E	23		11		1.96

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OCT								
OCT 26	ZEM	142221	38.4N 44.3E		3.7			
OCT								
OCT 27	ZEM	040811	39.1N 48.7E					
OCT								
OCT 30	ZEM	140350	36.5N 56.8E					
NOV								
NOV 03	BCIS	033748	28 N 56 1/2E					
NOV								
NOV 05	SHI	0403	28.3N 55.2E					
NOV								
NOV 05	ZEM	063512	37.8N 57.1E					
NOV								
NOV 06	ISS	000949	28.12N 55.51E	36		116	3.0-131.5	2.05
NOV 06	USCGS	000947.7	28.0N 55.6E	30				
NOV 06	APA	000940	26.5N 55.5E		5.2			
NOV 06	LWI	0009			5 3/4			
NOV 06	KEW	0009			5 1/4			
NOV 06	MAT	0009			5 3/4-6			
NOV 06	MOS	000947	27.9N 55.5E		5 1/2			
NOV 06	PEK	000946	26 1/2N56 E		5 1/4			
NOV 06	PRU	0009			5 1/2			
NOV 06	QUE	000948	27 3/4N55 1/2E					
NOV 06	SHL	000940	30 N 55 E					
NOV 06	STR	0009			5 1/2			
NOV 06	RJ	000947.2	28.0N 55.6E	N 5.8				
NOV 06	NA	000948.6	28.09N 55.57E	40		99		1.51
NOV								
NOV 09	ISS	011105	33.53N 47.16E	56		114	4.1-133.1	2.31
NOV 09	USCGS	011103.4	33.5N 47.2E	44				
NOV 09	APA	011100	33 N 47 E		5.2			
NOV 09	MOS	011100	33.2N 47.1E		5			
NOV 09	QUE	0111			5			
NOV 09	PEK	011057	32 1/2N48 E					
NOV 09	PRU	0111			4.9			
NOV 09	STR	0111			4.9			
NOV 09	RJ	011102.1	33.4N 47.2E	N D				
NOV 09	NA	011103.2	33.54N 47.23E	38		89		1.54
NOV								
NOV 09	ZEM	134535	38.1N 56.9E					
NOV								
NOV 10	USCGS	013203.7	27.9N 55.7E	33				
NOV 10	NA	013204.9	27.91N 55.56E	55		17		0.75
NOV								
NOV 17	SHI	2139	35.5N 52.1E					
NOV								
NOV 19	ZEM	092720	38.9N 44.5E		2.9			
NOV								
NOV 20	SHI	1156	31.9N 51.3E					
NOV								
NOV 20	SHI	1552	37.5N 45.1E					
NOV								
NOV 20	USCGS	204546.9	27.9N 54.9E	34				
NOV 20	MOS	204544	27.4N 54.8E		4 1/2			
NOV								
NOV 22	SHI	1406	28.5N 53.5E					
NOV								
NOV 22	ZEM	145515	39.7N 44.1E		2.3			
DEC								
DEC 02	STR	2212						
DEC 02	BCIS	221214	35 3/4N50 E					

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DEC								
DEC 02	USCGS	222129.5	35.8N 50.1E					
DEC 02	MOS	222131	35.6N 50.0E		5			
DEC 02	BCIS	222131	35.6N 50.0E					
DEC 02	APA	222131	35.6N 50.0E		5			
DEC 02	NA	222131.1	35.23N 50.06E	53		36		1.64
DEC								
DEC 02	USCGS	233623.7	35.5N 50.1E					
DEC 02	BCIS	233635	35.7N 50.0E					
DEC 02	APA	233641	37.4N 51.3E		4			
DEC 02	MOS	233631	36.0N 50.3E		4 1/4			
DEC 02	NA	233624.6	35.58N 50.00E	24		25		2.04
DEC								
DEC 03	ZEM	132403	39.8N 44.0E					
DEC								
DEC 08	USCGS	090254.4	36.5N 55.0E					
DEC 08	MOS	090254	36.5N 54.7E		5			
DEC 08	APA	090254	36.5N 54.7E		5			
DEC 08	WRS	0902			5.1			
DEC 08	RJ	090254.4	36.5N 55.0E		N 5.1			
DEC 08	ZEM	090254	36.6N 54.8E		4 3/4-5			
DEC 08	NA	090253.9	36.56N 54.80E	25		49		1.79
DEC								
DEC 14	ZEM	042335	36.6N 56.5E					
DEC								
DEC 19	ZEM	150943	37.4N 57.2E					
DEC								
DEC 20	ZEM	094006	40.4N 46.2E					
DEC								
DEC 22	ZEM	033249	37.6N 58.0E					
DEC								
DEC 24	ZEM	141426	38.5N 47.7E					
DEC								
DEC 24	ZEM	233648	39.7N 44.3E		2.2			
DEC								
DEC 25	ZEM	000707	38.8N 48.4E					
DEC								
DEC 25	ZEM	205503	38.6N 45.0E		2.5			
DEC								
DEC 27	ZEM	162415	39.8N 45.5E		2.9			
DEC								
DEC 28	ZEM	211302	39.9N 44.2E		2.0			
DEC								
DEC 29	ZEM	121930	37.2N 56.7E					
1963								
JAN								
JAN 01	USCGS	192736.8	35.4N 58.9E	33				
JAN 01	MOS	192732	35.4N 58.8E		4 1/2			
JAN 01	NA	192733.6	35.44N 58.93E	00		12		1.50
JAN								
JAN 02		1738	35.7N 49.9E					
JAN								
JAN 09	ZEM	204132	39.1N 44.7E					
JAN								
JAN 15	ZEM	114625	36.7N 56.6E		3.8			
JAN								
JAN 15	ZEM	163400	38.9N 45.2E					
JAN								
JAN 15	ZEM	182233	38.9N 45.2E					
JAN								
JAN 20	ZEM	003747	39.1N 44.0E					
JAN								
JAN 22	ZEM	021012	39.3N 48.5E					
JAN 22		021012	39 1/4N 48 1/2E		4 1/2			

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JAN								
JAN 24	USCGS	154213.2	28.2N 57.0E	33				
JAN 24	MOS	154205	27.2N 57.2E					
JAN 24	NA	154217.7	28.26N 57.01E	79		34		1.64
FEB								
FEB 04	USCGS	051431	27.6N 54.3E	63				
FEB 04	MOS	051421	26.7N 54.0E					
FEB 04	NA	051426.7	27.29N 54.20E	45		38		1.71
FEB								
FEB 04	USCGS	071809.8	27.6N 54.3E	66				
FEB 04	MOS	071801	26.9N 54.1E		4.5			
FEB 04	NA	071804.4	27.20N 54.19E	46		44		1.71
FEB								
FEB 07	ZEM	133728	39.0N 46.1E					
FEB								
FEB 08	USCGS	060309.7	26.5N 55.2E	33				
FEB 08	COL	0603			4			
FEB 08	NA	060322.1	28.36N 55.57E	54		19		0.48
FEB								
FEB 12	ZEM	164856	37.4N 57.1E					
FEB								
FEB 13	USCGS	030638.7	27.7N 55.4E	33				
FEB 13	BCIS	030638.1	27.6N 55.1E	33				
FEB 13	NA	030607.8	24.84N 56.74E	00		14		0.99
FEB								
FEB 13	ZEM	074037	39.8N 44.0E					
FEB								
FEB 18	ZEM	134030	38.9N 46.3E					
FEB								
FEB 18	USCGS	140340.5	40.1N 47.1E	33				
FEB 18	BCIS	140339	39.9N 46.9E		4			
FEB 18	NA	140337.2	40.07N 47.04E	00		18		2.73
FEB								
FEB 19	ZEM	062831	37.6N 57.5E					
FEB								
FEB 19	ZEM	185223	38.9N 44.7E					
MAR								
MAR 01	USCGS	032002.3	35.8N 59.9E	33				
MAR 01	MOS	032002	35.8N 59.9E		4 1/2			
MAR 01	NA	031958.9	35.88N 59.85E	00		35		1.96
MAR								
MAR 02	ZEM	172901	39.0N 44.6E					
MAR								
MAR 13	ZEM	014853	38.8N 44.7E					
MAR								
MAR 14	ZEM	004520	37.6N 57.4E					
MAR								
MAR 14	ZEM	122002	37.8N 58.0E					
MAR								
MAR 24	ISS	124405	34.44N 47.80E	40		183	3.2-138.1	2.18
MAR 24	USCGS	124400.5	34.3N 47.8E	10	5 1/2-5 3/4			
MAR 24	BCIS	124401	34.8N 48.0E					
MAR 24	COP	1244			5.9			
MAR 24	KEW	1244			5 1/2			
MAR 24	LJU	1244			5.7			
MAR 24	MAT	1244			6 1/4			
MAR 24	MOS	124400	33.9N 47.8E		5 3/4			
MAR 24	PAL	1244			5 1/2-5 3/4			
MAR 24	PRA	1244			5.9-6.1			
MAR 24	PEK	124405	34 1/2N 47 E		5 1/2			
MAR 24	QUE	124359.0	34 1/2N 47 3/4E		5.7			
MAR 24	SHL	124358	37 N 48 E					
MAR 24	TUL	1244			6.1			
MAR 24	RJ	124403.2	34.4N 47.9E	N 6				
MAR 24	NA	124404.6	34.37N 47.80E	37		161		1.85

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MAR								
MAR 28	ZEM	083415	38.3N 58.3E					
MAR								
MAR 31	USCGS	022706.5	37.0N 57.9E	33	4.6			
MAR 31	MOS	022702	36.9N 57.9E		4 1/2			
MAR 31	COL	0227			4.6			
MAR 31	ZEM	022703	37.0N 57.6E		4.3			
MAR 31	RJ	022709.2	36.9N 57.7E	N D				
MAR 31	NA	022703.5	37.00N 57.97E	00		47		1.71
MAR								
MAR 31	ZEM	025342	37.0N 57.5E					
APR								
APR 02	ZEM	170630	38.6N 58.5E					
APR								
APR 06	ZEM	074720	38.2N 57.8E					
APR								
APR 06	ZEM	154001	39.3N 48.4E					
APR								
APR 11	ZEM	122530	38.0N 58.0E					
APR								
APR 12	ZEM	213505	37.2N 53.8E					
APR								
APR 13	ZEM	184952	38.6N 44.2E					
APR								
APR 16	ZEM	034418	40.3N 45.3E					
APR								
APR 16	ZEM	122525	40.3N 45.3E		3.3			
APR								
APR 16	ISS	184708	35.91N 44.38E	60		82	3.9-120.2	2.53
APR 16	USCGS	184707.9	35.9N 44.3E	60	5.2			
APR 16	BCIS	184707	35.8N 44.4E	45				
APR 16	MOS	184703	35.6N 44.2E		5			
APR 16	NA	184708.5	35.93N 44.38E	60		78		1.67
APR								
APR 16	ZEM	204928	40.2N 45.2E					
APR								
APR 17	ZEM	115929	38.0N 58.0E					
APR								
APR 17	ZEM	154857	40.2N 44.8E					
APR								
APR 17	ZEM	162521	40.3N 44.8E					
APR								
APR 17	ZEM	225520	38.0N 58.0E					
APR								
APR 18	ZEM	015247	37.9N 56.7E					
APR								
APR 21	ZEM	020853	36.4N 57.6E					
APR								
APR 23	USCGS	230219.9	39.3N 55.2E	30				
APR 23	BCIS	230219	39.3N 55.0E					
APR 23	ZEM	230211	39.6N 54.7E		4.5			
APR 23	NA	230219.9	39.27N 55.07E	40		19		2.18
APR								
APR 24	USCGS	232220.8	28.2N 55.9E	66				
APR 24	BCIS	232217	27.9N 55.8E					
APR 24	NA	232220.5	28.17N 55.90E	67		13		1.64
APR								
APR 26	ZEM	095518	38.2N 58.4E		3.2			
APR								
APR 27	ZEM	095942	39.8N 54.8E		3.7			
APR								
APR 27	ZEM	115805	37.6N 58.3E					

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APR								
APR 30	ZEM	135802	39.4N 54.6E		3.8			
APR								
APR 30	ZEM	175307	40.0N 46.0E					
MAY								
MAY 02	USCGS	015825.5	28.5N 54.9E	46	5.8			
MAY 02	BCIS	015821	27.7N 54.7E	40				
MAY 02	KEW	0158			5.8			
MAY 02	RJ	015825.5	28.5N 54.9E	45	5.8			
MAY 02	NA	015823.2	28.03N 54.75E	54		26		1.68
MAY								
MAY 03	USCGS	104429.6	30.7N 51.8E	35	5.3			
MAY 03	BCIS	104431	30.8N 51.7E					
MAY 03	COL	1044			4.7			
MAY 03	KEV	1044			5.5			
MAY 03	KEW	1044			5.5			
MAY 03	NUR	1044			5.8			
MAY 03	RJ	104429.6	30.7N 51.8E	25				
MAY 03	NA	104429.9	30.70N 51.62E	35		27		1.95
MAY								
MAY 04	ZEM	070642	39.7N 54.8E		3.8			
MAY								
MAY 11	ZEM	234600	37.8N 58.2E					
MAY								
MAY 12	ZEM	181903	36.4N 57.9E					
MAY								
MAY 15	MOS	140805	40.4N 47.8E		3 1/2			
MAY								
MAY 17	ZEM	073316	37.0N 55.8E		3.2			
MAY								
MAY 17	SHI	2107	35.1N 49.7E					
MAY								
MAY 18	ZEM	125106	37.9N 58.0E					
MAY								
MAY 19	ZEM	044135	37.2N 55.6E		3.4			
MAY								
MAY 19	ZEM	064105	38.0N 57.8E					
MAY								
MAY 19	ZEM	064420	38.1N 57.9E					
MAY								
MAY 20	BCIS	1019	25 3/4N 56 1/2E					
MAY 20	NA	101919.9	27.29N 57.20E	144		16		2.15
MAY								
MAY 22	ZEM	104227	36.8N 56.8E					
MAY								
MAY 22	ZEM	134757	37.3N 56.4E		3.7			
MAY								
MAY 26	SHI	184600	36.55N 52.76E					
MAY								
MAY 28	USCGS	103247.3	35.4N 49.8E	33	4.3			
MAY 28	BCIS	103250	35.7N 49.6E					
MAY 28	MOS	1032			4			
MAY 28	COL	1032			4.3			
MAY								
MAY 29	ISS	004749	28.16N 52.50E	44		72	1.5-116.0	2.39
MAY 29	USCGS	004743.6	28.1N 52.4E	7				
MAY 29	BCIS	004748	27.9N 52.4E					
MAY 29	MOS	004748	28.1N 52.4E		4.1/2			
MAY 29	COL	0047			4.8			
MAY 29	NUR	0047			5.1			
MAY 29	UPP	0047			5.8(2)			
MAY 29	RJ	004743.6	28.1N 52.4E	7	5.8			
MAY 29	NA	004749.0	28.17N 52.48E	43		71		1.38

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MAY							
MAY 29	ISS	083505	27.10N 59.38E	58	127	6.5-130.4	1.65
MAY 29	USCGS	083503.7	27.0N 59.4E	52 5.4			
MAY 29	BCIS	083508	27.2N 59.5E	5.0			
MAY 29	MAT	0835		5 1/2-5 3/4			
MAY 29	MOS	083501	27.0N 59.4E	5			
MAY 29	COL	0835		5			
MAY 29	KEV	0835		6.3			
MAY 29	PEK	083508	26 3/4N 59 E	70 4 3/4			
MAY 29	QUE	083516	27.7N 60.0E	5			
MAY 29	RJ	083503.7	27.0N 59.4E	52 5.7			
MAY 29	NA	083505.4	27.16N 59.43E	57	115		1.24
JUN							
JUN 02	SHI		35 N 48 E				
JUN 05	SHI	2122	37.9N 49.1E				
JUN 06	ZEM	195617	36.8N 57.7E				
JUN 09	ZEM	002341	40.3N 48.1E				
JUN 09	MOS	074545	35 N 58 E	4			
JUN 09	ZEM	103436	38.4N 58.4E				
JUN 10	ZEM	133836	37.4N 58.8E				
JUN 11	ZEM	105002	37.8N 56.3E	3.1			
JUN 13	ZEM	004724	38.4N 44.8E				
JUN 15	ZEM	022704	38.1N 58.0E				
JUN 15	ZEM	140752	40.1N 48.7E	4.1			
JUN 16	ZEM	111047	38.8N 57.0E				
JUN 19	ZEM	175108	38.0N 58.4E				
JUN 19	ZEM	195903	40.3N 46.1E				
JUN 19	ZEM	202807	37.3N 58.8E				
JUN 20	SHI	1329	29 1/4N 51 1/4E				
JUN 23	ZEM	074205	37.1N 56.5E				
JUN 24	ZEM	081303	38.7N 45.3E				
JUN 26	ZEM	221424	37.3N 57.8E				
JUN 27	ZEM	133718	38.6N 44.7E				
JUN 30	USCGS	074107.4	33.2N 49.2E	38 5.1			
JUN 30	BCIS	074110	33.6N 49.2E				
JUN 30	COP	0741		5.5			
JUN 30	NUR	0741		4.7			
JUN 30	RJ	074107	33.2N 49.2E	38 0			
JUN 30	NA	074109.2	33.34N 49.20E	49	49		1.14
JUL							
JUL 05	SHI	0940	36.5N 52.4E				
JUL 05	ZEM	105253	36.5N 57.4E				
JUL 05	ZEM	160950	37.2N 56.3E				

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JUL								
JUL 05	BCIS	234934	35.8N 51.5E					
JUL 05	MOS	234937	36 1/2N52 E					
JUL 05	SHI	2349	36.4N 52.3E					
JUL								
JUL 06	ZEM	090744	36.6N 57.9E					
JUL								
JUL 06	USCGS	133404	28.0N 57.6E	80				
JUL 06	BCIS	133404	27.8N 57.7E	100				
JUL 06	MOS	133405	28 N 58 E	100				
JUL 06	NA	133404.0	27.78N 57.66E	95		27		1.32
JUL								
JUL 07	ZEM	030542	39.1N 47.0E					
JUL								
JUL 08	ZEM	022023	39.3N 44.5E					
JUL								
JUL 08	USCGS	085804.8	26.7N 55.7E	33	4.8			
JUL 08	BCIS	085806	26.7N 55.7E					
JUL 08	MOS	085810	27 N 55 1/2E	5				
JUL 08	QUE	0858		5.3				
JUL 08	NA	085803.9	26.59N 55.65E	30		30		1.26
JUL								
JUL 08	ZEM	201720	38.0N 57.4E					
JUL								
JUL 12	ZEM	052554	39.9N 45.9E					
JUL								
JUL 13	ISS	082425	29.63N 50.88E	43		71	1.4-127.2	1.62
JUL 13	USCGS	082424.7	29.6N 51.0E	44	5.0			
JUL 13	BCIS	082420	29.6N 50.8E					
JUL 13	MOS	082423	29.4N 50.9E		4 1/2			
JUL 13	COL	0824			5.0			
JUL 13	SHI	0824			5.0			
JUL 13	QUE	0824			4.1			
JUL 13	NUR	0824			5.0			
JUL 13	NA	082424.7	29.58N 50.87E	39		72		1.61
JUL								
JUL 13	ZEM	210509	37.7N 57.8E					
JUL								
JUL 14	USCGS	074621.4	29.5N 50.8E	33				
JUL 14	BCIS	074618	29.6N 50.8E					
JUL 14	MOS	074611	28.0N 50.4E					
JUL 14	NA	074622.5	29.55N 50.89E	35		23		1.57
JUL								
JUL 19	BCIS	223040	28.3N 57.8E					
JUL 19	NA	223040.3	28.23N 57.81E	39		11		1.25
JUL								
JUL 21	ZEM	104849	40.3N 44.8E					
JUL								
JUL 21	ZEM	113706	37.4N 58.7E		3.6			
JUL								
JUL 23	ZEM	074156	36.6N 57.6E					
JUL								
JUL 23	ZEM	121920	39.2N 44.4E					
JUL								
JUL 23	ZEM	183836	37.8N 58.2E					
JUL								
JUL 25	ZEM	100446	37.8N 58.2E		3.6			
JUL								
JUL 29	ISS	061027	28.18N 55.72E	51		133	3.2-128.0	2.05
JUL 29	USCGS	061022.6	27.8N 55.6E	37	5.2			
JUL 29	BCIS	061020	28.1N 55.7E					
JUL 29	MOS	061016	27 1/3N55 E	5				
JUL 29	PEK	061021	28 N 56 E		4 3/4			
JUL 29	COL	0610			5.2			
JUL 29	RJ	061022.6	27.8N 55.6E	37	0			
JUL 29	NA	061026.1	28.16N 55.72E	46		124		1.30

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JUL								
JUL 29	SHI	2237	27.8N 54.2					
JUL 31	ZEM	175049	37.2N 57.1E		3.6			
JUL 31	ZEM	203532	37.4N 57.0E		3.6			
AUG 01	ZEM	101532	38.2N 57.1E					
AUG 02	SHI	0735	29.0N 50.8E					
AUG 08	ZEM	173459	37.4N 57.3E					
AUG 10	USCGS	042733.5	28.1N 53.3E	46	4.8			
AUG 10	BCIS	042727	27.9N 53.2E					
AUG 10	MOS	042732	28.0N 53.1E	45	4 3/4			
AUG 10	COL	0427			4.5			
AUG 10	NUR	0427			4.9			
AUG 10	KEV	0427			4.9			
AUG 10	NA	042733.5	28.04N 53.17E	46		70		1.44
AUG 11	USCGS	084348	37.1N 55.2E	33	4.4			
AUG 11	BCIS	084343	36.9N 55.1E					
AUG 11	MOS	084344	36 N 55 E					
AUG 11	ZEM	084344	37.1N 55.0E		4.7			
AUG 11	NA	084343.0	36.98N 55.14E	00		32		2.06
AUG 11	MOS	172247	38.4N 46.0E		3 1/2			
AUG 11	ZEM	172247	38.4N 46.0E					
AUG 12	USCGS	071954.9	27.7N 53.2E	33	5.0			
AUG 12	BCIS	071953	27.9N 53.1E					
AUG 12	MOS	071957	27.9N 53.1E					
AUG 12	NUR	0719			5.0			
AUG 12	NA	072000.3	28.12N 53.10E	50		53		1.40
AUG 12	ZEM	115628	37.1N 55.0E		3.9			
AUG 12	ISS	182936	25.35N 62.70E			95	4.0-133.4	2.57
AUG 12	USCGS	182938.8	25.2N 62.7E	33	5.2			
AUG 12	MOS	182941	25.4N 62.8E		5			
AUG 12	STU	1829			5.3			
AUG 12	NUR	1829			4.9			
AUG 12	BAG	1829			5.5			
AUG 12	RJ	182938.8	25.3N 62.7E	N 5.4				
AUG 12	NA	182934.9	25.27N 62.71E	00		91		1.91
AUG 15	ZEM	152024	38.4N 45.8E					
AUG 15	ZEM	174242	39.4N 57.9E					
AUG 16	ZEM	072455	37.7N 57.7E					
AUG 17	USCGS	215854.4	36.7N 59.7E	33	4.8			
AUG 17	BCIS	215850	36.8N 59.8E					
AUG 17	MOS	215850	36.8N 60.0E		4 1/2			
AUG 17	NUR	2158			5			
AUG 17	STR	2158			4 1/2			
AUG 17	STU	2158			4.5			
AUG 17	ZEM	215850	36.7N 59.7E		4.7			
AUG 17	NA	215850.7	36.82N 59.7E	03		41		1.83
AUG 18	ZEM	225905	36.5N 55.3E					
AUG 19	ZEM	191045	39.1N 55.2E					

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AUG								
AUG 21	ZEM	081340	36.0N 58.2E		3.2			
AUG 24	ZEM	233406	38.0N 58.6E					
AUG 25	ZEM	055112	37.8N 58.4E					
AUG 25	ZEM	055402	38.1N 58.3E					
AUG 25	ZEM	111048	37.9N 58.5E					
AUG 26	ZEM	113021	38.2N 57.8E					
AUG 26	ZEM	125256	38.0N 58.2E					
AUG 28	ZEM	065512	37.7N 57.2E					
AUG 28	ZEM	070933	37.2N 58.1E					
AUG 28	ZEM	134320	39.0N 58.9E		3.3			
SEP 02	ZEM	044643	38.8 44.5		4			
SEP 07	ZEM	200654	39.7N 48.2E					
SEP 09	ZEM	070754	37.9N 57.7E					
SEP 12	ZEM	202032	37.4N 57.3E					
SEP 12	ZEM	223102	37.4N 57.4E		3.6			
SEP 13	MOS	143221	38.2N 58.4E		3 1/2			
SEP 13	ZEM	143225	38.0N 58.3E		3			
SEP 13	ZEM	152844	38.1N 58.3E					
SEP 13	SHI	2230	37 1/2N 57 1/4E					
SEP 14	ZEM	191521	38.1N 58.1E					
SEP 15	ZEM	010635	37.3N 57.3E		3.6			
SEP 15	ZEM	043632	37.4N 56.4E		3.2			
SEP 17	ZEM	191221	37.4N 57.1E		3.2			
SEP 18	ZEM	135815	38.4N 56.7E					
SEP 18	USCGS	154202.7	38.5N 57.2E		33 5.1			
SEP 18	MOS	154200	38.6N 57.1E		4 1/2			
SEP 18	COL	1542			5.1			
SEP 18	NUR	1542			4.8			
SEP 18	KEV	1542			5.3			
SEP 18	ZEM	154156	38.6N 57.1E		4.4			
SEP 18	NA	154158.8	38.67N 57.22E	00		46		1.63
SEP 18	ZEM	190908	38.3N 56.8E					
SEP 18	ZEM	205758	37.3N 56.6E		3			
SEP 18	SHI	2249	26 N 53 E					
SEP 19	ZEM	005037	37.4N 56.6E		3.2			
SEP 19	ZEM	052912	37.8N 58.6E					

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SEP								
SEP 19	ZEM	062235	37.4N 56.6E					
SEP 19	ZEM	071208	37.4N 56.6E					
SEP 19	ZEM	115350	37.4N 57.2E					
SEP 19	SHI	1852	25 N 53 E					
SEP 20	MOS	103243	38.6N 57.1E	4				
SEP 20	ZEM	103240	38.6N 57.0E	4.2				
SEP 20	ZEM	173826	40.4N 45.1E					
SEP 21	ZEM	192828	38.0N 58.3E					
SEP 21	ZEM	200504	37.1N 58.0E					
SEP 22	ZEM	103622	37.4N 57.2E	3.1				
SEP 22	USCGS	104055.8	29.3N 55.3E	33 4.7				
SEP 22	BCIS	104048	27.7N 54.9E					
SEP 22	MOS	104055	28 1/2N55 E	4 1/2				
SEP 22	QUE	1040		5.2				
SEP 22	NUR	1040		4.8				
SEP 22	KEV	1040		4.8				
SEP 22	COL	1040		4.6				
SEP 22	NA	104046.1	27.47N 54.97E	40		43		1.65
SEP 23	USCGS	183347.4	29.6N 50.9E	39 4.7				
SEP 23	BCIS	183346	29.5N 50.8E	35				
SEP 23	COL	1833		4.9				
SEP 23	MOS	183347	29.6N 50.8E	4 1/2				
SEP 23	NUR	1833		4.5				
SEP 23	QUE	1833		4.9				
SEP 23	NA	183347.4	29.61 50.87	39		53		1.40
SEP 24	ZEM	123249	37.5N 57.3E	3.8				
SEP 24	ZEM	193352	37.4N 57.4E					
SEP 28	ZEM	051350	38.2N 58.6E					
OCT 01	ZEM	082701	37.6N 58.4E	3.5				
OCT 01	ZEM	183121	37.3N 56.0E	3.1				
OCT 01	BCIS	184838	37.9N 55.9E					
OCT 01	MOS	184832	37.5N 55.8E	3 1/2-4				
OCT 01	ZEM	184832	37.5N 55.8E	4.2				
OCT 02	ZEM	044643	38.8N 44.5E					
OCT 03	ZEM	094729	39.3N 44.3E					
OCT 05	BCIS	030347	37.6N 55.9E					
OCT 05	MOS	030338	37.8N 55.8E	4				
OCT 05	ZEM	030339	37.5N 55.8E	4.2				
OCT 09	ZEM	000307	37.0N 57.8E					
OCT 09	USCGS	043643.6	39.4N 42.8E	35 4.6				
OCT 09	BCIS	043646	39.9N 43.0E					
OCT 09	MOS	043640	40.1N 43.5E	4				
OCT 09	ZEM	043637	40.0N 43.0E	4.3				
OCT 09	NA	043645.0	39.83 43.11	56		32		2.44

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OCT								
OCT 11	ZEM	211420	37.7N 57.5E					
OCT								
OCT 11	ZEM	221216	37.7N 57.3E					
OCT								
OCT 11	ZEM	233412	37.7N 57.3E					
OCT								
OCT 12	SHI	0345	27.7N 54.3E					
OCT								
OCT 12	ZEM	040715	40.4N 46.0E					
OCT								
OCT 12	SHI	1830	32.9N 59.2E					
OCT								
OCT 13	SHI	06	32.9N 59.2E					
OCT								
OCT 16	ZEM	074432	38.0N 57.9E					
OCT								
OCT								
OCT 16	ZEM	170022	40.0N 43.0E					
OCT								
OCT 16	USCGS	190225.0	28.8N 58.0E	32	4.8			
OCT 16	BCIS	190222	28.2N 57.7E					
OCT 16	COL	1902			4.4			
OCT 16	MOS	190219	27.9N 57.7E					
OCT 16	NUR	1902			4.8			
OCT 16	STU	1902			4.6			
OCT 16	NA	190226.2	28.15N 57.79E	81		50		1.46
OCT								
OCT 17	ZEM	004729	40.3N 48.0E	60				
OCT								
OCT 18	ZEM	011723	38.1N 56.8E		3.1			
OCT								
OCT 19	ZEM	111103	37.6N 58.7E					
OCT								
OCT 20	ZEM	160616	37.2N 57.7E					
OCT								
OCT 21	ZEM	102158	37.2N 56.6E					
OCT								
OCT 22	ZEM	080327	40.5N 45.8E					
OCT								
OCT 23	ZEM	232729	37.2N 57.2E					
OCT								
OCT 24	ZEM	220702	40.0N 43.5E					
OCT								
OCT 25	ZEM	125215	39.7N 58.0E					
OCT								
OCT 27	SHI	0254	34.5N 48.5E					
OCT								
OCT 31	USCGS	095701	27.4N 55.6E	35	5.3			
OCT 31	BCIS	095657	26.5N 55.6E					
OCT 31	KEV	0957			5.3			
OCT 31	RJ	095701.0	27.4N 55.6E	35	D			
OCT 31	NA	095701.1	27.22N 55.59E	43		41		1.27
NOV								
NOV 17	ZEM	163427	39.5N 44.7E					
NOV								
NOV 18	USCGS	014255.9	39.3N 57.0E	33	5.0			
NOV 18	BCIS	014255.9	39.3N 57.0E	33	5.0			
NOV								
NOV 18	SHI	1630	39.3N 44.5E					
NOV								
NOV 20	ZEM	142856	39.6N 44.9E					
NOV								
NOV 22	ZEM	185211	38.6N 57.2E					

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NOV								
NOV 23	ZEM	132052	39.3N 54.6E		3.6			
DEC								
DEC 04	USCGS	023018.1	31.3N 55.4E	46				
DEC 04	BCIS	023018	31.3N 55.4E	35				
DEC 04	NA	023018.1	31.31N 55.39E	38		14		1.52
DEC								
DEC 07	USCGS	090641.3	30.9N 51.3E	64				
DEC 07	MOS	090641	30.8N 51.2E	60				
DEC 07	NA	090642.4	30.91 51.36	71		13		0.90
DEC								
DEC 08	ZEM	081450	38.8N 44.0E					
DEC								
DEC 08	USCGS	110804.7	39.9N 48.7E	33	4.5			
DEC 08	COP	1108			4.8			
DEC 08	MOS	110808	40.1N 48.7E					
DEC 08	UBO	1108			4.8			
DEC 08	ZEM	110805	40.1N 48.7E		4.5			
DEC 08	USCGS	110804.7	39.9N 58.7E*	33	4.5			
DEC 08	RJ	110804.7	39.9N 58.7E*		N D			
DEC 08	NA	110808.3	40.35N 49.02E	09		30		2.61
DEC								
DEC 11	ZEM	220742	38.2N 58.0E					
DEC								
DEC 12	ZEM	110537	38.0N 58.2E					
DEC								
DEC 12	ZEM	200745	37.0N 55.9E		3.3			
DEC								
DEC 13	ZEM	165223	36.6N 56.3E		3.5			
DEC								
DEC 16	ZEM	011335	37.1N 57.1E		3.1			
DEC								
DEC 21	USCGS	045039	33.8N 51.5E	51	4.5			
DEC 21	BCIS	045039	33.7N 51.5E	35				
DEC 21	COL	0450			4.3			
DEC 21	MOS	045038	33.6N 51.6E	41				
DEC 21	NUR	0450			4.7			
DEC 21	STU	0450			4.6			
DEC 21	NA	045037.0	33.59N 51.54E	24		41		2.12
DEC								
DEC 21	ZEM	151807	38.7N 45.4E		4.8			
DEC								
DEC 22	ZEM	235455	40.4N 45.4E					
DEC								
DEC 31	USCGS	151808	38.4N 45.3E		4.5			
DEC								
DEC 31	STU	1518			4.6			
DEC 31	RJ	151808	38.4N 45.3E		N D			
DEC 31	NA	151810.2	38.51N 45.31E	43		47		2.20
DEC								
DEC 31	ZEM	161601	38.6N 45.4E					
1964								
JAN								
JAN 12	ISC	124550.0	31.52N 49.23E	56	5.2	69	3.4-131.2	
JAN 12	BCIS	124551	31.6N 49.2E	55				
JAN 12	USCGS	124551.1	31.5N 49.4E	67	5.2			
JAN 12	MOS	124554	31.2N 49.1E	100				
JAN 12	RJ	124551	31.5N 49.4E	67	D			
JAN 12	NA	124550.6	31.56N 49.19E	56		85		1.42

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JAN								
JAN 19	ISC	091353.9	26.79N 54.00E	38	5.5	101	3.1-130.3	
JAN 19	USCGS	091353.9	26.9N 54.0E		5.6			
JAN 19	BCIS	091354	26.9N 54.0E					
JAN 19	MOS	091350	26.4N 54 E		5 1/4			
JAN 19	RJ	091353.5	26.9N 54.0E		N 6			
JAN 19	NA	091354.6	26.83N 53.98E	43		131		1.24
JAN								
JAN 30	ISC	122312	32.4N 48.2E	33		14	4.2- 82.2	
JAN 30	MOS	122252.0	29.9N 48.2E					
JAN 30	BCIS	122310	32.7N 47.8E					
JAN 30	USCGS	122310.3	32.7N 47.8E	33				
JAN 30	NA	122312.9	32.66N 47.92E	69		15		2.23
FEB								
FEB 05	ISC	102423.3	40.37N 46.1E	9		14	0.3- 45.8	
FEB 05	MOS	102420	40.4N 46.0E		4			
FEB 05	NA	102422.9	40.49N 46.23E	00		18		1.54
FEB								
FEB 05	MOS	112706	40.4N 46.0E		4	6	0.4- 25.2	
FEB								
FEB 08	ISC	062827.5	37.1N 51.04E	40	4.6	37	1.4- 97.7	
FEB 08	USCGS	062825.9	36.8N 50.3E	33	4.7			
FEB 08	MOS	062826	37.0N 51.0E		4 1/4			
FEB 08	NA	062823.9	37.07N 50.99E	11		46		1.89
FEB								
FEB 12	ISC	081919	38.99N 55.61E	33	4.6	34	0.6- 78.6	
FEB 12	USCGS	081924.1	39.8N 53.4E	33	5.2			
FEB 12	MOS	081916	39.0N 55.5E		4 1/4-4 1/2			
FEB 12	RJ	081924	39.8N 53.4E		N D			
FEB 12	NA	081915.6	39.21N 55.61E	00		41		2.50
FEB								
FEB 12	ISC	113356	39.7N 56.1E	33		6	0.5- 27.0	
FEB 12	MOS	113351	39.0N 55.5E					
FEB								
FEB 14	ISC	155112.1	29.2N 54.55E	51		32	1.0- 84.8	
FEB 14	USCGS	155112.1	29.2N 54.5E	47	4.7			
FEB 14	BCIS	155112	29.2N 54.6E	50				
FEB 14	MOS	155109	29.0N 54.8E					
FEB 14	NA	155111.5	29.18N 54.57E	50		35		1.72
FEB								
FEB 16	ISC	001715.5	30.03N 51.17E	33	5.3	75	1.2-113.9	
FEB 16	USCGS	001715.7	30.1N 51.2E	37	5.3			
FEB 16	MOS	001714	29.9N 51.2E		4 1/2			
FEB 16	RJ	001716	30.1N 51.2E	37	5.9			
FEB 16	NA	001716.3	30.09N 51.14E	37		83		1.21
FEB								
FEB 19	ISC	203332	31.2N 50.9E	0		16	2.9- 57.8	
FEB 19	MOS	203303	28.3N 49.0E					
FEB 19	NA	203404.3	31.57N 50.62E	00		15		3.83
FEB								
FEB 21	ISC	010356.6	34.51N 58.06E	0	4.8	35	3.4- 83.2	
FEB 21	USCGS	010400.6	34.4N 58.1E	33	5.0			
FEB 21	MOS	010359	34.3N 58.0E		4 1/4			
FEB 21	NA	010357.8	34.54N 58.07E	06		39		1.67
FEB								
FEB 26	ISC	091653.0	27.26N 54.44E	14	4.8	45	2.9- 90.1	
FEB 26	USCGS	091655.2	27.3N 54.5E	33	4.6			
FEB 26	BCIS	091655	27.3N 54.4E					
FEB 26	MOS	091654	27.1N 54.4E		4 1/2			
FEB 26	NA	091651.1	27.19N 54.42E	06		45		1.29
MAR								
MAR 11	ISC	233423.2	27.9N 57.61E	40	4.8	64	4.8-113.8	
MAR 11	USCGS	233421.2	27.7N 57.5E	42	4.6			
MAR 11	BCIS	233423	27.8N 57.6E	45				
MAR 11	MOS	233418	27.5N 57.7E		4 1/2			
MAR 11	NA	233422.3	27.79N 57.59E	46		75		2.07

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MAR								
MAR 17	ISC	120509.6	26.91N 53.96E	33	4.9	23	9.1- 90.5	
MAR 17	USCGS	120510.2	27.0N 54.1E	33				
MAR 17	BCIS	120511	26.9N 54.0E					
MAR 17	MOS	120508	26.2N 54.1E					
MAR 17	NA	120508.5	27.01N 54.00E	19		25		1.07
MAR								
MAR 20	ISC	031546.8	27.93N 55.21E	64	4.7	26	2.9- 85.8	
MAR 20	USCGS	031545.6	28.2N 55.0E	43	5.8			
MAR 20	BCIS	031543	27.5N 55.1E	50				
MAR 20	MOS	031541	27.6N 55.0E					
MAR 20	RJ	031546	28.2N 55.0E	43	D			
MAR 20	NA	031542.5	27.59N 55.08E	50		23		1.74
MAR								
MAR 21	ISC	102530.7	26.96N 54.02E	22	4.9	15	3.0- 85.2	
MAR 21	USCGS	102532.9	27.1N 54.1E	33				
MAR 21	BCIS	102532	27.0N 54.0E					
MAR 21	NA	102532.6	27.08N 54.04E	31		15		0.56
APR								
APR 13	ISC	011422.5	39.98N 52.0E	51	4.8	43	3.4 74.3	
APR 13	USCGS	011421.1	40.0N 51.9E	33	4.8			
APR 13	MOS	011422	40.1N 52.0E		4 1/2			
APR 13	RJ	011421.1	40.0N 51.9E		N ED			
APR 13	NA	011422.4	40.03N 51.95E	42		54		1.57
MAY								
MAY 09	ISC	074701.2	29.5N 52.40E	17		17	0.2- 82.5	
MAY 09	USCGS	074702.4	29.6N 52.5E	34				
MAY 09	NA	074701.6	29.56N 52.32E	31		14		1.89
MAY								
MAY 11	ISC	060741.1	28.13N 57.38E	68	5.3	81	4.5-128.6	
MAY 11	USCGS	060741.5	28.3N 57.4E	62	4.9			
MAY 11	MOS	060738	27.8N 57.4E	71				
MAY 11	NA	060742.3	28.22N 57.39E	73		83		1.42
MAY								
MAY 15	ISC	015608.0	35.76N 49.86E	29		8	1.2- 78.7	
MAY								
MAY 15	ISC	223159.8	36.3N 58.85E	16		28	1.7- 67.7	
MAY 15	MOS	223156	35.9N 58.6E		4 1/2			
MAY 15	NA	223156.6	36.28N 58.90E	00		28		2.42
MAY								
MAY 27	MOS	030255	40.0N 55.0E	4		1	5.1	
JUN								
JUN 03	ISC	024542.4	33.6N 59.2E	31		18	4.4- 84.2	1.75
JUN 03	MOS	024546	33.8N 59.0E					
JUN								
JUN 05	ISC	001151.9	39.13N 43.19E	42	4.6(9)	70	2.5- 97.1	1.79
JUN 05	USCGS	001151.9	39.1N 43.1E	33	4.6(3)	17		1.2
JUN 05	MOS	001152	39.2N 43.3E		4 1/2			
JUN 05	NA	001151.3	39.08N 43.22E	40		82		1.92
JUN								
JUN 24	ISC	161044	30.6N 52.5E	33		6	1.0- 43.6	4.23
JUL								
JUL 09	ISC	033808.5	28.86N 52.76E	59	4.9(5)	44	0.8-111.2	1.34
JUL 09	USCGS	033810.8	29.3N 52.7E	55		9		0.6
JUL 09	MOS	033808	28.8N 52.8E	50				
JUL 09	NA	033806.3	28.79N 52.80E	42		48		1.71
JUL 09	*NA	033806.3	28.79N 52.80E	43		48		1.71
JUL								
JUL 14	ISC	015739.2	27.56N 54.83E	54		24	2.9- 89.9	1.06
JUL 14	MOS	015734	27.1N 54.7E					
JUL								
JUL 15	NA	070453.7	30.41N 51.93E	00		10		1.38

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JUL								
JUL 21	ISC	114654.8	27.6 N 56.46E	46	4.7(3)	32	4.0- 84.6	2.69
JUL 21	USCGS	114654.0	27.7N 56.5E	50		8		1.3
JUL 21	MOS	114646	26.8N 56.4E		4			
JUL 21	NA	114653.6	27.44N 56.47E	51		31		1.91
JUL								
JUL 22	ISC	044156.6	27.85N 55.01E	59	4.6(4)	35	2.8- 89.6	1.16
JUL 22	USCGS	044155.1	27.6N 55.0E	64	4.9(1)	9		0.2
JUL 22	MOS	044156	27.7N 55.1E	73				
JUL 22	NA	044156.5	27.81N 54.97E	61		35		1.73
AUG								
AUG 04	ISC	231853.1	34.34N 45.95E	31		35	4.7- 80.5	1.56
AUG 04	USCGS	231851.1	34.3N 46.0E	29		12		1.7
AUG 04	MOS	231851	34.0N 45.8E		4 1/2			
AUG 04	NA	231853.4	34.22N 46.02E	43		36		1.52
AUG								
AUG 10	ISC	181840.9	30.1N 57.67E	52		38	4.5- 98.3	3.70
AUG 10	USCGS	181835.6	30.3N 57.7E	13	4.5(1)	8		1.6
AUG 10	MOS	181837	29.8N 57.7E		4 3/4			
AUG 10	NA	181833.9	30.05N 57.72E	00		41		2.48
AUG								
AUG 12	ISC	023423.7	26.9N 56.4E	53		10	9.8- 77.1	2.96
AUG 12	USCGS	023423.7	27.2N 56.4E	44	4.7	7		1.3
AUG 12	NA	023422.3	26.98N 56.41E	38		13		1.55
AUG								
AUG 12	ISC	192626.7	30.93N 49.71E	34	5.1(10)	106	2.8-130.6	1.21
AUG 12	USCGS	192626.1	31.0N 49.8E	33	5.1(3)	14		0.7
AUG 12	MOS	192624	30.6N 49.7E		5			
AUG 12	RJ	192626.1	31.0N 49.8E		N D			
AUG 12	NA	192626.8	30.87N 49.69E	38		109		1.39
AUG								
AUG 16	ISC	155244.6	28.1N 52.48E	52		24	1.5-124.0	1.85
AUG 16	USCGS	155238.7	27.8N 53.0E	31		7		1.6
AUG 16	MOS	155239	27.6N 52.5E					
AUG 16	NA	155245.5	28.22N 52.53E	55		25		1.66
AUG								
AUG 16	ISC	212847.7	39.77N 52.45E	16	4.8(10)	70	3.0-129.6	1.08
AUG 16	USCGS	212849.1	39.7N 52.6E	33	4.8(5)	15		1.0
AUG 16	MOS	212849	39.6N 52.4E		4 1/4			
AUG 16	RJ	212849.1	39.7N 52.6E		N E D			
AUG 16	NA	212849.8	39.65N 52.38E	35		70		1.69
AUG								
AUG 19	ISC	093308.7	28.2N 52.65E	37	5.3(14)	123	7.6-129.0	1.12
AUG 19	USCGS	093310.0	28.2N 52.6E	50	5.6(5)	38		0.9
AUG 19	MOS	093306	28.0N 52.6E		5 1/2			
AUG 19	RJ	093310.0	28.2N 52.6E		50 D			
AUG 19	NA	093310.4	28.21N 52.63E	51		133		1.51
AUG								
AUG 19	ISC	152013.8	28.19N 52.64E	47	5.4(11)	109	1.5-128.0	1.24
AUG 19	USCGS	152013.9	28.2N 52.7E	52	5.6(4)	29		1.1
AUG 19	MOS	152012	27.9N 52.6E		5 1/2			
AUG 19	RJ	152013.9	28.2N 52.7E		52 D			
AUG 19	NA	152013.5	28.15N 52.67E	46		122		1.40
AUG								
AUG 19	ISC	224015.9	28.21N 52.52E	46	5.1(5)	60	1.4-124.3	1.08
AUG 19	USCGS	224017.9	28.4N 52.7	58		18		1.0
AUG 19	MOS	224012	28.1N 52.4E		4 3/4			
AUG 19	NA	224015.2	28.18N 52.50E	41		62		1.31
AUG								
AUG 20	ISC	050849.2	28.15N 52.64E	35	5.3	86	1.5-129.0	
AUG 20	USCGS	050850.3	28.1N 52.6	47	5.1			
AUG 20	MOS	050848	28.1N 52.5		5			
AUG 20	NA	050847.4	28.15N 52.62E	22		93		1.22

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AUG								
AUG 20	ISC	053945.6	28.18N 52.62E	33	5.6(12)	107	7.6-128.9	0.98
AUG 20	USCGS	053947.7	28.2N 52.6E	52	5.5(4)	28		1.0
AUG 20	MOS	053945	28.1N 52.5E		5			
AUG 20	RJ	053947.7	28.2N 52.6E	52	5.8			
AUG 20	NA	053945.5	28.21N 52.61E	31		119		1.22
AUG								
AUG 20	ISC	225450.1	28.8N 52.76E	92		10	7.0-113.7	1.54
AUG 20	USCGS	225448.4	28.7N 52.9E	80		5		0.7
AUG								
AUG 21	ISC	075915.1	28.19N 52.59E	44	5.1(7)	76	7.6-124.4	1.13
AUG 21	USCGS	075917.0	28.3N 52.5E	54	4.9(3)	24		1.0
AUG 21	MOS	075914	28.0N 52.3E		4 3/4-5			
AUG 21	NA	075914.7	28.16N 52.52E	38		85		1.48
AUG								
AUG 27	ISC	115840.2	28.18N 55.85E	63	5.1(8)	83	3.3-127.3	1.09
AUG 27	USCGS	115841.3	28.2N 55.7E	69	5.1(3)	23		1.2
AUG 27	MOS	115834	27.8N 55.8E					
AUG 27	NA	115838.9	28.16N 55.83E	50		85		1.29
AUG								
AUG 27	ISC	125651.8	28.11N 55.88E	51	5.3(8)	97	3.3-127.3	1.38
AUG 27	USCGS	125646.1	27.5N 55.9E	33	5.3(3)	20		0.7
AUG 27	MOS	125648	27.8N 55.8E		5			
AUG 27	NA	125650.1	28.03N 55.89E	37		102		1.52
SEP								
SEP 01	ISC	104003.7	30.94N 50.07E	64		7	2.5- 83.5	2.19
SEP 01	USCGS	104001.3	30.9N 49.9E	42		6		1.2
SEP 01	MOS	104002	30.8N 50.0E					
SEP								
SEP 09	ISC	221943.0	35.03N 45.95E	69	4.3(5)	37	4.5- 79.8	1.53
SEP 09	USCGS	221940.5	34.5N 45.8E	68	4.5	11		1.1
SEP 09	MOS	221937	34.6N 45.7E		4 1/2			
SEP 09	NA	221942.8	35.02N 45.96E	69		41		1.50
SEP								
SEP 14	ISC	152112.4	28.18N 55.86E	49	5.1(6)	67	3.3-118.0	1.70
SEP 14	USCGS	152109.0	28.0N 55.8E	33	4.8(1)	10		1.1
SEP 14	MOS	152108	27.8N 56.1E		4 3/4			
SEP 14	RJ	152109.0	28.0N 55.8E		N 5.7			
SEP 14	NA	152113.0	28.18N 55.86E	57		75		1.70
OCT								
OCT 06	MOS	072327	40.0N 53.6E		4	6	4.6- 95.1	
OCT								
OCT 13	ISC	065757	34.7N 46.0E	147		12	4.6-124.5	4.33
OCT 13	USCGS	065748.7	34.0N 45.1E	96		6		0.5
OCT								
OCT 18	ISC	132021.2	29.64N 50.91E	49	5.1(9)	52	6.1-119.5	0.96
OCT 18	USCGS	132020.3	29.7N 50.8E	33	4.9(4)	17		0.4
OCT 18	BCIS	132014	28 3/4N 51 1/4E					
OCT 18	MOS	132018	29.5N 51.0E					
OCT 18	NA	132027.2	30.16N 50.69E	72		22		1.07
OCT								
OCT 18	ISC	212528.3	27.83N 54.86E	53	4.9(4)	59	2.7-117.7	1.68
OCT 18	USCGS	212529.9	28.0N 54.7E	61	4.8(3)	17		1.0
OCT 18	MOS	212522	27.2N 55.0E					
OCT 18	NA	212528.3	27.94N 54.71E	46		22		1.45
OCT								
OCT 18	ISC	223544.7	29.71N 50.97E	26	5.0(7)	35	1.4- 84.6	1.19
OCT 18	USCGS	223545.5	29.7N 51.0E	36	4.8(3)	21		0.9
OCT 18	MOS	223535	28.0N 51.0E					
OCT 18	NA	223545.7	29.74N 51.03E	36		24		1.23
OCT								
OCT 19	ISC	173843.9	29.82N 51.08E	48		19	1.3- 74.0	0.99
OCT 19	USCGS	173844.0	29.8N 51.2E	54		6		0.9
OCT 19	MOS	173839	29.5N 50.8E					
OCT								
OCT 24	MOS	152727	37.0N 55.1E		4	5	3.3- 31.8	

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OCT								
OCT 26	ISC	012918.6	32.82N 49.19E	20		13	3.4-122.7	1.92
OCT 26	USCGS	012921.1	32.9N 49.2E	33		6		0.9
OCT 26	MOS	012921	32.8N 49.3E					
OCT								
OCT 29	ISC	204724.0	28.20N 55.79E	33		7	8.4- 75.8	1.46
OCT								
OCT 30	ISC	034317.7	27.9N 55.8E	87	4.7(3)	13	3.4- 76.1	3.78
OCT								
OCT 31	ISC	145937.9	27.87N 55.81E	59		27	3.4- 84.5	1.74
OCT 31	USCGS	145935.6	27.7N 55.7E	39		10		1.0
OCT 31	MOS	145933	27.5N 55.8E		4 1/2			
OCT 31	NA	145935.5	27.7 N 55.72E	37		10		0.75
NOV								
NOV 03	ISC	022551.6	29.62N 51.07E	49	5.0(3)	35	1.3-119.5	1.34
NOV 03	USCGS	022550.7	29.7N 51.0E	35		8		1.2
NOV 03	BCIS	022549	29.4N 51.1E					
NOV 03	MOS	022547	29.3N 51.0E					
NOV								
NOV 03	ISC	061428.0	32.8N 59.32E	4		10	6.6- 80.4	2.09
NOV 03	USCGS	061430.6	32.4N 59.1E	33		6		1.6
NOV 03	MOS	061431	33.1N 59.0E					
NOV								
NOV 03	ISC	173608.5	35.63N 50.29E	42	5.1(11)	59	0.9-125.5	1.34
NOV 03	USCGS	173609.5	36.0N 50.6E	33	5.3(3)	11		1.0
NOV 03	BCIS	173608	35.7N 50.0E					
NOV 03	MOS	173611	35.9N 50.4E		4 1/2-5			
NOV 03	RJ	173609.5	36.0N 50.6E		N D			
NOV 03	NA	173606.3	35.86N 50.39E	18		13		1.20
NOV								
NOV 08	ISC	103327.0	29.63N 50.95E	36	5.2(19)	102	1.4-119.5	1.16
NOV 08	USCGS	103327.5	29.7N 51.0E	40	4.8(2)	18		0.9
NOV 08	BCIS	103326	29.4N 50.7E					
NOV 08	MOS	103325	29.4N 50.9E		4 3/4-5			
NOV 08	RJ	103327.5	29.7N 51.0E	40	5.7			
NOV 08	NA	103324.4	29.68N 50.95E	12		25		1.58
NOV								
NOV 09	ISC	080547.7	39.90N 48.52E	50	5.0(11)	102	1.7-134.8	1.27
NOV 09	USCGS	080548.8	39.8N 48.4E	65	5.1(5)	13		0.4
NOV 09	BCIS	080544	40.2N 48.6E					
NOV 09	MOS	080548	39.8N 48.5E	50	4 3/4			
NOV 09	NA	080546.9	40.00N 48.56E	38		17		1.09
NOV								
NOV 10	ISC	154753.0	32.72N 49.16E	55	5.3(14)	81	4.2-122.5	1.31
NOV 10	USCGS	154749.3	32.6N 49.1E	28	5.3(3)	22		0.5
NOV 10	BCIS	154751	32.6N 49.1E	40				
NOV 10	MOS	154751	32.7N 49.1E		4 3/4			
NOV 10	RJ	154749	32.6N 49.1E	28	D			
NOV 10	NA	154751.6	32.78N 49.20E	39		29		1.25
NOV								
NOV 15	ISC	063323.6	35.45N 45.51E	33	4.8(9)	54	4.1-125.3	1.26
NOV 15	USCGS	063323.5	35.6N 45.7E	33	4.7(4)	16		1.4
NOV 15	BCIS	063326	35.8N 45.5E					
NOV 15	MOS	063324	35.4N 45.5E		4 1/2			
NOV 15	NA	063321.5	35.67N 45.60E	05		18		1.77
NOV								
NOV 15	ISC	093347.6	29.81N 50.96E	37	5.1(5)	48	1.4- 84.5	1.69
NOV 15	USCGS	093346.7	29.9N 51.0E	33		11		1.7
NOV 15	BCIS	093343	29.1N 51.0E					
NOV 15	MOS	093343	29.4N 51.0E		5			
NOV 15	NA	093343.3	29.94N 50.91E	00		17		1.93
NOV								
NOV 17	ISC	012626.3	27.57N 55.01E	46		12	3.0- 76.4	0.62
NOV 17	USCGS	012626.2	27.5N 55.0E	45		6		0.1

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NOV								
NOV 22	ISC	221200.6	32.56N 48.78E	36		8	3.8- 82.0	1.01
NOV 22	USCGS	221200.2	32.5N 48.8E	39		6		1.5
NOV								
NOV 26	ISC	044901.7	32.94N 49.09E	99	4.5(3)	13	3.4- 81.6	1.14
NOV 26	USCGS	044855.3	33.1N 49.0E	33	4.7	5		0.3
DEC								
DEC 01	ISC	082153.3	36.8N 54.57E	33		19	2.7- 77.1	2.48
DEC 01	MOS	082153	37.1N 54.3E		4 1/4			
DEC								
DEC 03	ISC	223238.9	36.80N 55.34E	33		34	2.5- 89.8	2.68
DEC 03	USCGS	223237.6	36.6N 55.6E	33	4.7	6		0.9
DEC 03	MOS	223239	36.7N 55.4E		4 1/4-4 1/2			
DEC								
DEC 06	ISC	055435.8	38.2N 57.03E	25		9	1.1- 16.2	3.32
DEC 06	MOS	055435	38.1N 57.0E		4 1/4-4 1/2			
DEC								
DEC 11	ISC	052556.2	28.05N 52.87E	45	4.8(6)	29	1.6-124.7	1.79
DEC 11	USCGS	052558.0	28.1N 52.8E	61	5.0(2)	11		0.8
DEC 11	MOS	052554	28.0N 52.8E					
DEC 11	NA	052558.3	28.28N 52.82E	65		14		1.52
DEC								
DEC 11	ISC	124804.9	28.50N 52.98E	59		18	1.2- 85.5	1.52
DEC 11	USCGS	124808.9	29.0N 53.2E	74		8		0.9
DEC 11	MOS	124812	29.1N 52.8E	96				
DEC								
DEC 12	ISC	070342.5	29.7N 51.1E	55		9	1.2- 84.6	2.45
DEC								
DEC 18	ISC	003522.0	28.2N 52.8E	46		18	1.5- 75.7	3.32
DEC 18	USCGS	003519.1	27.8N 52.8E	33		7		1.5
DEC								
DEC 19	ISC	233155.5	27.5N 56.8E	54		28	4.4- 76.5	2.82
DEC 19	USCGS	233157.3	28.0N 56.9E	50	5.3(1)	10		0.5
DEC 19	MOS	233148	26.9N 57.2E					
DEC 19	RJ	233157.3	28.0N 56.9E	50	D			
DEC 19	NA	233157.2	28.03N 56.85E	46		11		0.71
DEC								
DEC 22	ISC	043635.8	28.20N 56.91E	43	5.6(34)	167	4.1-153.5	1.50
DEC 22	USCGS	043634.7	28.2N 57.0E	42	5.5(8)	38		1.2
DEC 22	BCIS	043634	28.1N 56.9E	30				
DEC 22	MOS	043631	27.8N 57.0E		6			
DEC 22	SHL	043630	28.0N 57.0E					
DEC 22	RJ	043634.7	28.2N 57.0E	42	6.1			
DEC 22	NA	043634.8	28.20N 56.94E	39		54		1.49
DEC								
DEC 23	ISC	105224.0	28.23N 56.74E	70		7	8.8- 75.8	0.27
DEC 23	USCGS	105217.5	27.9N 57.0E	33	4.8	5		0.7
DEC 23	MOS	105222	27.7N 56.7E	70				
DEC								
DEC 24	ISC	020608.0	28.3N 57.41E	64		11	4.5- 75.7	1.67
DEC 24	USCGS	020604.8	28.1N 57.4E	33		6		2.3
1965								
JAN								
JAN 23	ISC	112335.1	39.16N 48.97E	65	4.4	16	3.3- 75.4	
JAN 23	USCGS	112331.7	39.1N 48.4E	33	4.6			
JAN 23	MOS	112334	39.2N 49.0E					
FEB								
FEB 10	ISC	160954.2	37.66N 47.09E	45	5.0(9)	58	1.9-105.6	1.88
FEB 10	USCGS	160954.1	37.6N 47.1E	52	5.1(4)	15		1.4
FEB 10	BCIS	160954	37.6N 47.0E	45				
FEB 10	MOS	160954	37.8N 47.2E		4 1/2			
FEB 10	JR	160954.1	37.6N 47.1E	52	D			
FEB 10	NA	160953.8	37.71N 47.10E	37		17		1.68

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FEB								
FEB 13	ISC	005707.7	38.23N 45.74E	88		19	3.3- 76.7	2.24
FEB 13	USCGS	005701.8	38.4N 45.7E	33		8		1.6
FEB 13	MOS	005702	38.2N 45.6E	4				
FEB								
FEB 20	MOS	181826	37.0N 57.0E	4		3	4.7- 10.7	
FEB								
FEB 26	ISC	013707.6	35.24N 57.54E	33	5.1(13)	63	2.8-128.3	1.86
FEB 26	USCGS	013705.6	35.1N 57.6E	33	5.2(5)			
FEB 26	MOS	013707	35.2N 57.5E	5				
FEB 26	BCIS	013710	35.6N 57.5E					
FEB 26	RJ	013706	35.1N 57.6E	N D				
FEB 26	NA	013700.5	35.09N 57.88E	00		28		1.85
FEB								
FEB 28	ISC	080537.0	27.79N 55.0E	33		12	17.5- 84.4	0.89
FEB 28	USCGS	080536.5	27.6N 55.1E	33		10		1.0
FEB 28	NA	080535.8	27.66N 55.19E	26		11		1.29
MAR								
MAR 10	ISC	054450.6	32.77N 49.11E	54	5.1(14)	83	3.5-122.6	1.38
MAR 10	USCGS	054447.8	32.8N 49.2E	33	5.4(6)			0.4
MAR 10	BCIS	054431	31.4N 50.7E					
MAR 10	MOS	054446	32.5N 49.0E	5				
MAR 10	PEK	054446	32 N 48 3/4E					
MAR 10	RJ	054447.8	32.8N 49.2E	N D				
MAR 10	NA	054454.5	32.62N 49.16E	102		43		2.03
MAR								
MAR 17	ISC	071854.5	27.71N 56.64E	55	4.9(8)	32	4.1- 84.6	1.05
MAR 17	USCGS	071855.9	27.8N 56.5E	60	4.9(1)	15		0.6
MAR 17	NA	071855.6	27.78N 56.61E	58		19		1.23
MAR								
MAR 25	ISC	195413.4	32.24N 50.39E	55	4.7(3)	17	3.2- 72.9	1.65
MAR 25	USCGS	195412.5	32.2N 50.4E	45		9		2.1
MAR 25	NA	195413.6	32.26N 50.44E	53		10		1.58
APR								
APR 11	ISC	015548.2	30.7N 51.9E	76		14	1.2- 83.5	3.05
APR								
APR 19	ISC	012004.6	28.24N 56.58E	36	4.6(3)	16	3.8- 85.2	0.91
APR 19	USCGS	012004.2	28.2N 56.6E	33	4.7(2)	11		0.9
APR 19	NA	012008.9	28.33N 56.29E	66		11		0.53
APR								
APR 25	ISC	163946.3	30.39N 50.64E	47	4.5(5)	28	1.8- 83.9	1.31
APR 25	USCGS	163945.0	30.4N 50.6E	34	4.6(3)	15		1.3
APR 25	NA	163945.8	30.08N 50.56E	41		16		1.28
APR								
APR 26	ISC	220438.2	27.43N 52.35E	33		12	2.2- 84.6	0.71
APR 26	USCGS	220437.6	27.3N 52.3E	33	4.9(1)	10		1.3
APR 26	NA	220432.9	27.32N 52.23E	00		10		0.83
MAY								
MAY 04	ISC	051159.9	32.2N 50.1E	102		12	3.3- 82.3	
MAY 04	USCGS	051148.3	31.7N 49.1E	17				
MAY								
MAY 07	ISC	003848.6	32.4N 48.8E	70		14	3.9- 79.3	
MAY 07	USCGS	003845.0	32.4N 48.7E	52	4.5			
MAY								
MAY 07	ISC	010305.8	36.1N 54.82E	62	4.6	19	2.8- 77.7	
MAY 07	USCGS	010302.8	36.2N 55.0E	33	4.8			
MAY 07	MOS	010303	36.1N 54.7E	4	1/4			
MAY 07	NA	010258.8	36.40N 55.03E	00		10		0.94
MAY								
MAY 11	ISC	054429.8	39.93N 51.04E	27		18	4.2- 74.5	
MAY 11	USCGS	054430.0	39.9N 50.9E	33				
MAY 11	MOS	054430	39.9N 51.4E	4				
MAY 11	NA	054432.2	39.84N 50.97E	53		11		1.55
MAY								
MAY 12	ISC	114427.6	34.35N 47.50E	43	4.5	15	3.5-108.9	
MAY 12	USCGS	114426.1	34.3N 47.4E	33	4.5			

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MAY								
MAY 15	NA	184313.5	40.30N 48.29E	97		11		1.44
MAY								
MAY 26	NA	135803.6	35.37N 44.58E	58		19		1.75
JUN								
JUN 04	ISC	184055	32.32N 55.54E	0	4.7	34	3.7- 71.7	
JUN 04	BCIS	184056	32.5N 55.5E					
JUN 04	USCGS	184058.0	32.4N 55.5E	18	4.8			
JUN								
JUN 07	ISC	160629	31.0N 50.4E	45		7	2.3- 72.8	
JUN 07	USCGS	160620.7	30.6N 49.5E	41				
JUN								
JUN 18	ISC	134937.0	29.72N 51.37E	65	5.0	53	6.0- 82.2	
JUN 18	USCGS	134936.4	29.8N 51.3E	56	4.6			
JUN 18	BCIS	134930	29.8N 51.4E					
JUN 18	NA	134934.9	29.67N 51.38E	48		19		1.45
JUN								
JUN 21	ISC	002114.4	28.12N 55.89E	26	5.7	183	8.5-134.2	
JUN 21	USCGS	002116.1	28.1N 55.9E	40	6.0			
JUN 21	BCIS	002113	28.1N 55.9E					
JUN 21	MOS	002113	27.9N 55.9E		5 1/2			
JUN 21	PEK	002110	27.25N 55.00E					
JUN 21	SHL	002110	28.5N 56 E					
JUN 21	QUE	002105	27.1N 55.2E	60				
JUN 21	RJ	002114.5	28.1N 56.0E	28	6.0			
JUN 21	NA	002113.9	28.14N 55.99E	24		57		1.05
JUN								
JUN 21	ISC	013039.3	28.26N 55.89E	64	4.9	51	8.4-112.9	
JUN 21	USCGS	013038.9	28.4N 55.8E	59	5.0			
JUN 21	MOS	013032	27.8N 56.0E		5			
JUN 21	BCIS	013033	28.1N 55.9E					
JUN 21	NA	013040.8	28.36N 55.77E	70		18		1.20
JUN								
JUN 24	ISC	013941.7	39.79N 49.05E	19		14	2.3- 27.5	
JUN 24	USCGS	013942.0	39.8N 49.0E	25				
JUN 24	MOS	013943	39.5N 48.8E	70				
JUN 24	BCIS	013944	39.8N 49.0E					
JUN								
JUN 24	ISC	105402.7	29.3N 53.00E	105		15	0.6- 88.0	
JUN 24	USCGS	105400.0	28.9N 52.9E	97	4.2			
JUN								
JUN 26	ISC	214111	32.2N 49.4E	26		7	3.7- 82.3	
JUL								
JUL 19	USCGS	085210.6	30.7N 50.1E	35	4.2	14	2.4-122.5	
JUL								
JUL 30	ISC	190706.7	27.9N 57.12E	74	4.8	38	4.4- 76.1	
JUL 30	USCGS	190702.9	27.9N 57.0E	33	4.7			
JUL 30	NA	190705.6	28.14N 57.01E	53		10		0.28
AUG								
AUG 27	NA	042320.4	40.41N 49.07E	00		23		1.55
SEP								
SEP 08	USCGS	053544.6	32.9N 48.4E	50	4.7	9	3.8- 81.7	
SEP								
SEP 20	ISC	232324.6	30.59N 50.14E	54	4.9	31	5.2- 83.8	
SEP 20	USCGS	232322.7	30.5N 50.1E	47	4.6			
SEP 20	BCIS	232325	31.1N 50.3E					
SEP								
SEP 21	ISC	154601.9	27.3N 55.32E	41		24	3.4- 86.4	
SEP 21	USCGS	154556	27.1N 55.4E					
SEP 21	BCIS	154600.4	27.4N 55.3E	19	4.5			
SEP 21	NA	154557.2	27.36N 55.35E	00		13		2.01
OCT								
OCT 29	USCGS	155942.1	37.9N 48.7E	33	4.6	11	3.1- 65.9	

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NOV								
NOV 08	ISC	015727.9	27.92N 56.89E	63	5.0	85	4.2-128.4	
NOV 08	USCGS	015726.9	27.9N 56.9E	56	5.3			
NOV 08	BCIS	015732	28.2N 56.7E					
NOV 08	RJ	015725.0	27.9N 57.0E	38	0			
NOV								
NOV 10	ISC	100333.6	27.0N 54.6E	40	4.3	36	3.2- 86.8	
NOV 10	USCGS	100332.6	27.2N 54.5E	41	4.1			
NOV 10	MOS	100320	25.6N 54.4E	5				
DEC								
DEC 06	MOS	141729	36.8N 55.7E	4		3	3.2- 7.6	
DEC								
DEC 09	MOS	192853	37.5N 44.0E	4		6	2.2- 20.4	
DEC								
DEC 12	ISC	033152.2	34.9N 46.0E	87		18	4.5-124.7	
DEC 12	USCGS	033150.9	35.1N 45.8E	96	4.2			
DEC								
DEC 13	USCGS	050717.1	30.9N 51.1E	33	4.9	17	1.8 83.4	
DEC								
DEC 23	ISC	111001.1	27.63N 54.51E	37	4.7	41	2.7-126.3	
DEC 23	USCGS	111001.3	27.7N 54.6E	42	4.8			
1966								
JAN								
JAN 02	ISC	163310.5	37.9N 56.95E	58		37	1.1- 66.1	3.75
JAN 02	USCGS	163308.6	38.2N 57.1E	58	4.1	15		1.9
JAN 02	MOS	163304	37.9N 56.7E	4	1/2			
JAN 02	ZEM	163304	37.9N 56.7E	4	1/2			
JAN								
JAN 02	ZEM	181112	37.9N 56.8E					
JAN								
JAN 02	ZEM	210028	39.9N 57.8E					
JAN								
JAN 03	ZEM	114830	37.5N 57.0E					
JAN								
JAN 03	ZEM	202803	38.9N 43.9E					
JAN								
JAN 04	ZEM	111316	37.9N 56.7E					
JAN								
JAN 07	ZEM	020136	38.1N 46.2E					
JAN								
JAN 13	ZEM	004000	38.1N 56.9E					
JAN								
JAN 13	ISC	034147	27.6N 57.23E	84		20	4.6- 76.4	1.31
JAN 13	USCGS	034142.0	27.5N 57.1E	33		12		1.0
JAN								
JAN 13	ZEM	155302	40.2N 44.7E					
JAN								
JAN 13	ZEM	165058	40.2N 44.6E					
JAN								
JAN 14	ZEM	083746	37.9N 56.8E					
JAN								
JAN 16	ISC	200213	31.0N 50.5E	61		14	2.2-120.8	2.59
JAN 16	USCGS	200207.0	30.8N 50.3E	21	4.4(2)	7		1.7
JAN								
JAN 17	ZEM	185644	37.5N 56.1E					
JAN								
JAN 18	ISC	205412.8	37.93N 57.03E	33		40	0.9- 66.1	2.58
JAN 18	USCGS	205412.6	37.9N 57.0E	33		23		1.7
JAN 18	MOS	205410	37.8N 56.9E	4	1/2			
JAN 18	ZEM	205410	37.8N 56.9E	4	2			
JAN 18	ZEM	205410	37.8N 56.9E	4	1/2			
JAN								
JAN 18	ZEM	210508	38.1N 56.7E	3	6			
JAN								
JAN 19	ZEM	013514	37.8N 56.7E					

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JAN								
JAN 20	ZEM	175229	40.2N 44.7E					
JAN 23	ZEM	134137	38.3N 56.9E		3.6			
JAN 23	ZEM	221545	37.4N 56.6E					
JAN 31	ISC	123127.3	32.47N 48.79E	11		7	3.9-122.3	0.85
JAN 31	USCGS	123127	32.4N 48.8E	11	4.4	6		0.6
FEB 01	ZEM	025041	37.6N 56.8E		3.8			
FEB 01	ISC	070754.2	34.92N 46.11E	86	4.6(8)	44	4.4- 79.9	2.05
FEB 01	USCGS	070750.4	34.9N 46.1E	50	4.3(3)	19		0.9
FEB 02	ZEM	112125	38.2N 56.6E					
FEB 11	ZEM	161806	37.8N 55.8E					
FEB 11	ZEM	233414	38.7N 57.1E					
FEB 24	ZEM	070559	39.6N 45.0E					
FEB 26	USCGS	205037.3	30.5N 50.8E	57	4.7(5)	32		1.0
FEB 26	ISC	205038.0	30.58N 50.84E	60	4.6(6)	45	1.7-120.4	1.47
FEB 26	BCIS	205037	30.5N 50.6E					
FEB 27	ZEM	034401	39.7N 43.6E					
FEB 28	ZEM	100646	37.6N 57.1E					
MAR 02	ZEM	024522	39.3N 43.8E					
MAR 05	ZEM	212300	37.8N 55.8E					
MAR 16	ISC	103833.6	34.29N 46.17E	84	4.4(6)	29	4.5- 80.5	1.74
MAR 16	USCGS	103829.2	34.3N 46.1E	33	4.2(3)	18		1.3
MAR 19	ZEM	222348	39.4N 44.6E					
MAR 20	ZEM	140627	39.7N 44.6E					
MAR 21	ZEM	041315	39.6N 44.6E					
MAR 22	ZEM	020727	39.3N 44.6E					
MAR 23	ZEM	183608	39.3N 44.6E					
MAR 24	ZEM	022722	39.3N 44.6E					
MAR 28	ZEM	104441	38.4N 57					
MAR 29	ZEM	004546	39.6N 44.7E					
MAR 29	ZEM	162501	39.3N 44.6E					
MAR 29	ZEM	165231	39.3N 44.6E					
MAR 29	ZEM	192330	39.2N 44.6E					
MAR 30	ZEM	114923	37.3N 54.5E					
APR 04	ZEM	233905	39.4N 44.7E					

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APR							
APR 05	ZEM	080923	39.6N 44.3E				
APR							
APR 06	ZEM	105445	39.2N 44.6E				
APR							
APR 06	ZEM	211709	39.6N 44.6E				
APR							
APR 08	ZEM	075243	39.0N 44.0E				
APR							
APR 16	ZEM	194450	37.3N 57.3E				
APR							
APR 21	ZEM	234521	37.2N 56.2E	3.6			
MAY							
MAY 08	ZEM	171757	38.0N 57.5E				
MAY							
MAY 08	ZEM	171926	38.0N 57.4E				
MAY							
MAY 08	ZEM	174130	38.2N 57.4E				
MAY							
MAY 10	ZEM	181626	38.6N 45.5E				
MAY							
MAY 20	ZEM	204659	38.6N 57.3E				
MAY							
MAY 26	ZEM	043735	36.1N 56.9E				
MAY							
MAY 29	ZEM	034957	39.9N 45.6E				
MAY							
MAY 29	ZEM	123308	39.7N 44.2E				
JUN							
JUN 01	ZEM	101812	37.5N 57.3E				
JUN							
JUN 03	ZEM	054326	37.8N 56.7E				
JUN							
JUN 06	ISC	050321.8	40.30N 53.02E	38 4.6	29	2.7-100.9	
JUN 06	USCGS	050321.7	40.3N 53.0E	37 4.7			
JUN							
JUN 08	ZEM	202941	39.0N 53.3E				
JUN							
JUN 09	ISC	222443.2	27.64N 52.60E	35 5.0	60	8.1-124.4	
JUN 09	USCGS	222443.6	27.6N 52.7E	39 5.1			
JUN							
JUN 13	ISC	010351.0	32.09N 54.43E	48	34	2.9- 81.8	
JUN 13	USCGS	010352.7	32.2N 54.4E	56 4.8			
JUN							
JUN 19	ZEM	104909	39.3N 43.6E				
JUN							
JUN 25	ISC	115221.2	32.72N 48.65E	71 4.5	35	3.8-122.5	
JUN 25	USCGS	115216.7	32.6 N 48.7E	36 4.7			
JUN							
JUN 27	ZEM	060446	38.8N 54.5E				
JUN							
JUN 29	ZEM	054009	39.6N 54.4E	3.7			
JUL							
JUL 02	ZEM	010004	38.8N 57.4E				
JUL							
JUL 06	ZEM	165829	37.4N 57.0E	3.7			
JUL							
JUL 08	ISC	035104	26.48N 54.71E	38 4.4(8)	46	3.7- 80.0	1.57
JUL 08	USCGS	035103.9	26.5N 54.6E	38 4.5(4)	29		0.8
JUL							
JUL 09	ISC	170152	28.2N 57.0E	47	22	4.2- 75.8	0.4
JUL 09	USCGS	170146.7	27.8N 57.1E	33	11		1.8

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JUL								
JUL 14	ZEM	030959	38.5N 45.6E					
JUL								
JUL 14	ZEM	082537	38.5N 45.6E					
JUL								
JUL 19	ZEM	194041	39.8N 44.3E					
JUL								
JUL 22	ZEM	134426	39.4N 44.8E					
JUL								
JUL 22	ZEM	191945	37.0N 56.0E					
JUL								
JUL 24	ZEM	124933	40.0N 44.3E					
JUL								
JUL 27	ISC	144903.8	32.68N 48.78E	45	5.1(26)	139	3.7-132.3	1.29
JUL 27	USCGS	144902.1	32.6N 48.8E	33	5.3(13)	81		0.9
JUL 27	BCIS	144901	32.6N 49.0E					
JUL								
JUL 27	ISC	153030.4	32.77N 48.93E	79	4.5(6)	42	3.6-122.6	1.98
JUL 27	USCGS	153026.5	32.6N 48.8E	48	3.9(1)	19		0.8
JUL								
JUL 27	ISC	170603.7	32.68N 49.4E	95		18	3.5- 81.8	1.96
JUL 27	USCGS	170601.6	32.7N 49.3E	67		11		1.2
JUL								
JUL 27	ISC	180638.1	32.85N 48.78E	79	4.6(9)	56	5.6-122.7	1.36
JUL 27	USCGS	180634.9	32.7N 48.7E	53	4.7(4)	33		0.9
JUL								
JUL 27	ISC	194014.4	32.59N 48.96E	100	4.7(9)	57	3.7-106.4	2.37
JUL 27	USCGS	194009.0	32.6N 48.8E	50	5.0(6)	36		0.9
JUL								
JUL 27	ISC	211015	32.7N 49.1E	103		17	3.6-122.5	2.9
JUL 27	USCGS	211006.4	32.4N 48.7E	34		7		0.8
JUL								
JUL 29	ISC	082046.8	28.34N 51.62E	38	4.7(4)	38	1.5- 57.8	1.21
JUL 29	USCGS	082046.2	28.5N 51.7E	33	4.8(4)	21		1.1
JUL								
JUL 31	ZEM	133447	39.0N 55.8E					
AUG								
AUG 02	ZEM	142244	38.5N 48.3E					
AUG								
AUG 04	ZEM	082511	37.3N 56.7E					
AUG								
AUG 09	ISC	002000.3	32.65N 48.90E	58	4.4(4)	49	3.7-122.5	1.94
AUG 09	USCGS	001958.0	32.6N 48.9E	39	4.2(1)	28		1.4
AUG								
AUG 11	ZEM	145458	37.3N 56.6E					
AUG								
AUG 15	ZEM	102159	39.7N 48.2E					
AUG								
AUG 22	ISC	212831	25.1N 61.8E	33		17	6.8-117.7	4.29
AUG 22	USCGS	212829.3	24.9N 61.8E	33	4.7(1)	6		1.9
AUG								
AUG 23	ZEM	115227	37.9N 56.3E					
AUG								
AUG 29	ZEM	075700	38.8N 44.6E					
AUG								
AUG 30	ISC	064225.3	32.1N 56.07E	33		12	5.1-121.9	1.54
AUG 30	USCGS	064225.9	32.2N 56.1E	33		9		1.3
SEP								
SEP 02	ISC	111300	27.68N 52.41E	31	4.9(5)	31	2.0-124.5	1.10
SEP 02	USCGS	111259.1	27.7N 52.4E	22	4.9(3)	23		1.0
SEP								
SEP 03	ZEM	132128	38.9N 44.4E					
SEP								
SEP 05	ZEM	012515	36.2N 58.4E					

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SEP								
SEP 13	ZEM	025307	37.4N 56.5E					
SEP								
SEP 17	ZEM	113306	38.3N 45.6E					
SEP								
SEP 17	ZEM	113935	38.3N 45.6E					
SEP								
SEP 18	ISC	204356.5	27.87N 54.30E	39	5.9(37)	227	2.4-148.4	1.15
SEP 18	USCGS	204353.8	27.9N 54.3E	18	5.9(25)	143		0.8
SEP 18	MOS	204356	27.9N 54.3E		5 1/2			
SEP 18	BCIS	204358	27.8N 54.3E	50				
SEP 18	QUE	204351.4	26.7N 54.0E	33	6.4			
SEP								
SEP 24	ISC	100047.5	27.36N 54.58E	46	5.3(22)	124	2.9-130.9	1.23
SEP 24	USCGS	100046.5	27.4N 54.6E	38	5.3(13)	81		0.9
SEP 24	BCIS	100041	27.3N 54.5E					
SEP								
SEP 27	ZEM	193215	38.7N 44.5E					
SEP								
SEP 28	ZEM	040037	38.9N 44.6E					
SEP								
SEP 29	ISC	174437	27.76N 54.38E	46	4.8(5)	20	8.4- 60.5	1.84
SEP 29	USCGS	174433.5	27.8N 54.3 E	20	5.1(3)	16		1.0
SEP								
SEP 30	ZEM	151733	38.3N 48.0E					
OCT								
OCT 03	ISC	170508	35.80N 53.44E	14		37	1.7-125.6	2.27
OCT 03	USCGS	170509.7	35.7N 53.3E	33	4.9(1)	21		1.3
OCT								
OCT 04	ZEM	114212	38.4N 44.7E					
OCT								
OCT 06	ZEM	163759	39.6N 43.6E					
OCT								
OCT 16	ZEM	071337	39.5N 45.5E					
OCT								
OCT 22	ZEM	002355	39.4N 44.6E					
OCT								
OCT 24	ISC	143116	37.32N 59.60E	23	5.0(15)	81	1.0-129.8	1.40
OCT 24	USCGS	143115.0	37.4N 59.6E	14	5.2(8)	53		1.4
OCT 24	BCIS	143112	37.3/4N 59 3/4E					
OCT 24	MOS	143113	37.2N 59.7E		4 3/4			
OCT 24	ZEM	143113	37.2N 59.7E		4 3/4			
OCT 24	ZEM	143113	37.2N 59.6E		4.8			
OCT								
OCT 25	ZEM	211557	38.4N 45.5E					
OCT								
OCT 26	ZEM	053319	39.5N 46.0E					
OCT								
OCT 27	ZEM	112407	37.3N 55.3E		3.6			
OCT								
OCT 30	ZEM	042316	38.4N 45.5E					
OCT								
OCT 31	ZEM	004600	39.9N 45.5E					
NOV								
NOV 06	ZEM	114951	39.5N 56.2E					
NOV								
NOV 08	ZEM	001027	37.4N 57.0E					
NOV								
NOV 08	ISC	031412.8	36.10N 50.74E	41	4.8(8)	55	0.6-122.7	1.50
NOV 08	USCGS	031412.0	36.1N 50.8E	38	5.0(5)	41		1.4
NOV								
NOV 23	ZEM	141139	39.5N 44.2E					
NOV								
NOV 25	ZEM	135123	39.9N 45.9E					

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NOV								
NOV 26	ISC	134930.4	37.81N 58.53E	31	4.8(3)	32	0.2- 94.8	2.51
NOV 26	USCGS	134929.4	37.9N 58.5E	31	4.5(2)	15		1.8
NOV 26	MOS	134929	37.9N 58.5E		4-4 1/4			
NOV 26	ZEM	134930	37.7N 58.7E		4.0			
NOV								
NOV 28	ZEM	042623	39.8N 48.1E					
NOV								
NOV 30	ZEM	200111	38.6N 44.8E					
NOV								
NOV 30	ZEM	232827	36.6N 58.2E		3.8			
DEC								
DEC 02	ISC	030753	28.20N 53.60E	35	4.9(7)	82	1.7-128.3	1.98
DEC 02	USCGS	030750.7	28.2N 53.6E	22	4.9(3)	58		1.4
DEC 02	BCIS	030752	28.4N 53.8E					
DEC								
DEC 07	ZEM	102942	39.9N 44.3E					
DEC								
DEC 08	ZEM	084514	37.9N 56.8E		3.5			
1967								
JAN								
JAN 02	ISC	135009.1	30.71N 50.53E	60	5.1	131	2.0-122.9	
JAN 02	USCGS	135007.1	30.6N 50.4E	47	5.2	90		1.0
JAN 02	BCIS	135007	30.7N 50.4E					
JAN								
JAN 08	ISC	014347	27.7N 55.68E	39	4.8	20	3.4-107.2	
JAN 08	USCGS	014347.1	27.8N 55.7E	53	4.6	12		1.0
JAN								
JAN 09	ISC	015514	27.64N 54.48E	23	5.2	135	2.6-130.6	
JAN 09	USCGS	015515.0	27.6N 54.5E	30	5.3	98		1.1
JAN 09	BCIS	015511	27.8N 54.5E					
JAN								
JAN 11	ISC	112046.1	34.09N 45.67E	39	5.6	215	1.2-129.5	
JAN 11	USCGS	112046.4	34.1N 45.7E	41	5.5	159		1.3
JAN 11	BCIS	112046	34.2N 45.6E					
JAN								
JAN 12	ISC	181422.3	27.94N 54.46E	52	4.8	51	2.4- 90.7	
JAN 12	USCGS	181422.0	28.0N 54.4E	19	4.8	39		1.0
JAN								
JAN 15	ISC	000321	29.96N 51.55E	90	4.7	39	5.8- 84.3	
JAN 15	USCGS	000314.3	29.8N 51.5E		N 4.7	26		0.9
JAN								
JAN 29	ISC	035359	26.50N 55.27E	36	4.9	92	4.0-127.0	
JAN 29	USCGS	035358.0	26.5N 55.2E	26	5.0	54		1.4
JAN								
JAN 29	ISC	070558	26.48N 55.35E	38		23	4.0- 77.5	
JAN 29	USCGS	070558.8	26.5N 55.3E	43	4.9	16		1.6
JAN								
JAN 29	ISC	071205.8	26.56N 55.34E	33	4.7	30	9.8- 87.1	
JAN 29	USCGS	071205.0	26.5N 55.3E		N 4.7	18		1.2
JAN								
JAN 29	ISC	071310.3	26.47N 55.28E	33		31	17.8-114.3	
JAN								
JAN 29	ISC	071338	26.5N 55.3E			39	13.8-127.0	1.39
JAN								
JAN 29	ISC	075640	26.54N 55.21E	34	5.1(12)	166	3.9-131.4	2.52
JAN 29	USCGS	075640.3	26.5N 55.3E	44	5.0(8)	82		1.5
JAN 29	BCIS	075637	26.5N 55.2E		5 1/2			
JAN 29	MOS	075640	26.5N 55.3E	43	5 3/4			
JAN								
JAN 29	ISC	132027	26.5 N 55.34E	4		14	4.0- 77.4	
JAN 29	USCGS	132026.1	26.4N 55.3E	9	4.8	11		1.6
JAN								
JAN 30	USCGS	012027.7	41.0N 44.3E	6	5.1			

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JAN							
JAN 31	ISC	190024	26.52N 55.25E	13 5.0	92	3.9-127.0	
JAN 31	USCGS	190026.3	26.6N 55.2E	37 5.1	61		1.3
JAN 31	BCIS	190022	26 1/2N 55 1/4E				
JAN 31	QUE	190030	26.1N 55.7E	5.9			
JAN							
JAN 31	ISC	200638	26.46N 55.31E	26	27	4.0-126.8	
JAN 31	USCGS	200636.3	26.4N 55.3E	20 5.0	19		1.2
JAN							
JAN 31	ISC	205249	26.68N 55.35E	32	8	3.9- 65.1	
JAN 31	USCGS	205248.2	26.6N 55.4E	27	7		2.0
FEB							
FEB 01	ISC	010720.0	26.58N 55.27E	4.9	114	3.9-127.0	
FEB 01	USCGS	010719.3	26.6N 55.2E	20 4.9	60		1.1
FEB 01	BCIS	010723	26.8N 55.4E				
FEB 01	QUE	010727	26.7N 55.5E	6.1			
FEB							
FEB 01	ISC	142111.0	26.96N 55.20E	71	6	3.6- 45.0	
FEB 01	USCGS	142107.8	26.7N 55.2E	N	5		2.2
FEB							
FEB 03	ISC	111738	36.7N 53.7E	37	14	2.1- 55.1	
FEB 03	USCGS	111732.2	36.2N 53.4E	33	7		1.5
FEB							
FEB 11	ISC	151807.4	30.58N 50.70E	44 5.1	58	1.8-120.4	
FEB 11	USCGS	151806.4	30.5N 50.7E	39 5.0	43		1.0
FEB							
FEB 12	ISC	164611	30.16N 50.5E	102 4.6	19	1.9- 84.2	
FEB 12	USCGS	164604.3	30.3N 50.3E	N 4.8	14		0.8
FEB							
FEB 15	ISC	014730.3	34.55N 47.59E	51 4.9	86	0.4-120.4	
FEB 15	USCGS	014729.2	34.6N 47.6E	41 5.0	58		1.3
FEB							
FEB 16	ISC	115532	35.4N 51.9E	144	9	4.0- 55.9	
FEB 16	USCGS	115519.8	35.7N 51.9E	16	7		1.4
FEB							
FEB 16	ISC	151006	33.8N 48.1E	29 4.3	10	1.0- 69.9	
FEB 16	USCGS	151001.9	33.8N 47.9E	29 4.4	6		1.6
FEB							
FEB 21	ISC	151027.8	31.74N 49.12E	70	35	3.1-121.6	
FEB 21	USCGS	151026.6	31.7N 49.1E	65 4.9	23		1.1
MAR							
MAR 01	ISC	101253.3	28.09N 56.90E	80 5.1	85	4.1-128.4	
MAR 01	USCGS	101248.1	28.0N 56.8E	N 5.1	53		1.2
MAR 01	BCIS	101243	27.7N 56.9E				
MAR							
MAR 02	ISC	075525	31.98N 55.87E	37 4.7	37	3.7-121.8	
MAR 02	USCGS	075524.6	32.0N 55.8E	N 4.9	21		1.5
MAR 02	BCIS	075522	32.1N 55.9E				
MAR							
MAR 03	ISC	073634	30.2N 50.7E	74	7	1.7- 74.9	
MAR 03	USCGS	073628.8	30.8N 50.4E	N	6		1.8
MAR							
MAR 15	ISC	162601	30.5N 50.5E	75	10	2.0- 60.4	
MAR 15	USCGS	162556.8	30.0N 50.5E	42 5.0	6		0.9
MAR							
MAR 20	USCGS	223047.0	35.9N 44.1E	52 5.1	36		1.3
MAR							
MAR 25	ISC	222627.1	28.57N 60.36E	36 4.9	26	6.0- 86.2	
MAR 25	USCGS	222627.4	28.6N 60.4E	43 4.8	21		0.9
APR							
APR 06	ISC	125715	29.91N 51.02E	20 5.2	140	1.3-129.6	
APR 06	BCIS	125711	29.9N 51.0E				
APR							
APR 27	ISC	204747	26.8N 57.99E	19	30	5.6- 80.5	
APR 27	USCGS	204748	26.5N 58.0E	35 4.5	9		1.0

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APR								
APR 28	USCGS	163947	33.6N 44.4E	32	4.6	7		0.7
APR								
APR 28	ISC	193831	27.93N 57.31E	54	4.5	76	4.5- 88.4	
APR 28	USCGS	193829	28.5N 57.5E	24	4.8	16		1.2
APR								
APR 30	ISC	080920	31.6N 49.6E	74		8	3.2- 59.1	
APR 30	USCGS	080917	31.3N 49.4E	73	4.5	5		0.0
MAY								
MAY 17	ISC	042853.4	38.69N 44.29E	54	4.7	74	1.5- 91.9	
MAY 17	USCGS	042851.9	38.7N 44.2E	39	4.6	17		1.5
MAY 17	BCIS	042852	38.2N 44.2E					
MAY 17	MOS	042851	38.6N 44.2E		4 1/2			
MAY								
MAY 20	ISC	214854	29.63N 52.18E	32	4.5	40	0.3- 75.9	
MAY 20	USCGS	214855	29.7N 52.2E	42	4.8	13		0.6
MAY								
MAY 23	ISC	165938.9	30.98N 50.35E	33		8	2.3- 83.4	
MAY 23	USCGS	165938	31.0N 50.7E	33		5		0.8
JUN								
JUN 07	ISC	223517	27.03N 58.05E	36		34	5.5- 80.3	
JUN 07	USCGS	223516	26.9N 58.0E	41	4.4	13		0.8
JUN								
JUN 23	ISC	131508	35.5N 49.6E	38		6	2.4- 55.3	
JUN 23	USCGS	131510	35.7N 49.5E	52	4.4	5		0.4
JUL								
JUL 01	ISC	154338	32.5N 48.8E	70		15	2.4-122.3	7.17
JUL 01	USCGS	154337.1	32.5N 48.9E	38		5		0.2
JUL								
JUL 04	LAO	213034	40 N 49 E		4.5			
JUL								
JUL 10	ISC	105753.1	28.0 N 53.47E	33		12	1.8-110.2	0.72
JUL 10	USCGS	105754	28.2N 53.6E	33	4.4(1)	6		0.8
JUL								
JUL 14	ISC	114643	35.0N 46.3E	108		25	0.9- 79.8	6.20
JUL 14	USCGS	114639	35.2N 46.4E	59	4.6(1)	8		1.1
JUL 14	BCIS	114637	35.0N 46.0E					
JUL								
JUL 25	ISC	130042.6	28.81N 54.60E	71	4.6(6)	38	2.0-118.7	1.44
JUL 25	USCGS	130039	28.9N 54.5E	34	4.5(3)	14		0.7
JUL								
JUL 27	ISC	014055.9	31.61N 50.40E	73	4.9(3)	54	2.7-122.7	2.00
JUL 27	USCGS	014053.6	31.7N 50.8E	65	5.0(3)	8		0.2
AUG								
AUG 01	ISC	165411.9	39.9N 53.4E	33	4.8(8)	47	4.1- 95.3	5.33
AUG 01	USCGS	165415	39.7N 53.3E	33	4.5(3)	13		0.7
AUG 01	BCIS	165412	40.0N 52.9E					
AUG								
AUG 02	USCGS	135514	30.9N 53.5E	33	4.5(5)	8		1.0
AUG 02	ISC	135515	30.70N 53.54E	57	4.5(6)	34	1.4- 60.8	2.02
AUG								
AUG 06	ISC	204013.3	36.9N 54.94E	33	4.5(3)	30	3.8- 67.0	2.42
AUG 06	MOS	204012	36.7N 54.8E		4.5			
AUG								
AUG 25	ISC	122650.5	35.58N 49.33E	55	4.7(5)	49	1.7-125.4	1.56
AUG 25	USCGS	122648.7	35.4N 49.1E	43	4.8(3)	14		0.6
SEP								
SEP 02	ISC	080209	36.71N 54.95E	36		33	2.7-126.5	2.92
SEP 02	USCGS	080209	36.8N 55.1E	33		8		1.6
SEP								
SEP 14	ISC	144947.0	28.40N 57.04E	77	4.7(9)	75	4.1-128.6	1.17
SEP 14	USCGS	144941.9	28.4N 57.1E	33	4.7(5)	24		0.7
SEP 14	BUL	144942	28.4N 57.1E		4.7			

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OCT								
OCT 05	MOS	131622	31.7N 48.8E	33		21	3.0- 72.1	
OCT								
OCT 27	ISC	080514.4	34.3N 46.18E	86	4.9(6)	36	0.8-124.2	1.49
OCT 27	USCGS	080514	34.3N 46.2E	68	5.0(3)	9		1.3
OCT 27	BCIS	080513	34 1/4N46 E					
NOV								
NOV 10	ISC	025052	36.0 N 53.89E	05	4.9(3)	37	2.1-105.3	3.07
NOV 10	USCGS	025056	36.0N 53.8E	33	5.0(3)	10		1.8
NOV 10	BCIS	025052	35 3/4N53 3/4E					
NOV								
NOV 15	USCGS	193546.3	30.7N 51.4E	10	4.6(1)	14		1.0
NOV 15	ISC	193554	30.55N 51.51E	84	4.5(4)	55	1.3- 83.7	3.45
NOV								
NOV 21	ISC	150503	30.5N 50.5E	121	4.6(3)	19	2.0-120.4	2.93
NOV 21	USCGS	150454.7	30.8N 50.4E	33	4.6(6)	8		1.0
NOV								
NOV 22	LAO	061508	26 N 54 E		4.9			
DEC								
DEC 10	ISC	105250	36.19N 53.69E	19	4.9(3)	27	1.9- 45.2	2.63
DEC 10	USCGS	105252.1	36.0N 53.6E	51	5.0(2)	9		1.8
DEC								
DEC 18	ISC	224928.7	33.46N 46.95E	49	4.6(7)	50	0.9- 81.3	1.65
DEC 18	USCGS	224927.6	33.6N 46.9E	39	5.0(2)	12		1.5
1968								
JAN								
JAN 02	ISC	115933	29.52N 52.56E	34	4.8(6)	42	0.1-124.6	1.70
JAN 02	USCGS	115932	29.4N 52.6E	26	5.0(3)	15		0.7
JAN								
JAN 10	ISC	104348	27.3N 56.0E	61		13	3.8- 76.6	2.21
JAN 10	USCGS	104348	27.4N 56.2E	55	4.6(2)	9		1.2
JAN								
JAN 22	ISC	203412.6	33.80N 46.83E	51	4.9(24)	114	0.6-123.6	1.34
JAN 22	USCGS	203410.0	33.8N 46.9E	33	5.0(11)	40		0.9
JAN 22	BCIS	203407	33.7N 48.7E					
JAN								
JAN 22	ISC	212044.1	33.80N 46.80E	51	4.9(21)	101	0.6-123.6	1.39
JAN 22	USCGS	212038.5	33.7N 46.8E	10	5.0(10)	41		1.0
JAN 22	BCIS	212039	33.7N 46.7					
FEB								
FEB 05	USCGS	133411.7	40.9N 47.6E	33	4.7			
MAR								
MAR 26	ISC	044224.8	29.91N 51.84E	62	4.9(5)	52	0.9-167.5	1.77
MAR 26	USCGS	044220	29.6N 51.4E	33	4.9(3)	23		1.0
APR								
APR 03	ISC	133849.2	32.57N 48.72E	34	4.5(4)	19	2.2- 97.0	1.60
APR 03	USCGS	133848	32.5N 48.9E	34	4.5(3)	10		1.0
APR								
APR 23	ISC	123859	27.65N 56.67E	36	4.9(5)	29	4.1- 76.3	0.97
APR								
APR 23	ISC	123949.4	27.68N 56.76E	74	5.1(20)	114	8.9-128.3	1.38
APR 23	USCGS	123947.3	27.7N 56.7E	52	5.1(5)	49		1.1
APR								
APR 26	USCGS	025822.1	35.1N 50.2E	21	5.3(19)	77		1.0
APR 26	BCIS	025819	35.2N 50.2E					
APR 26	ISC	025823.8	35.09N 50.16E	32	5.2(29)	156		1.17
APR								
APR 29	ISC	170155.6	39.24N 44.23E	17	5.3(45)	202	1.0-129.0	1.74
APR 29	USCGS	170157.6	39.2N 44.3E	34	5.3(30)	95		1.1
APR 29	MOS	170153	39.3N 44.2E		5.5(26)			
APR 29	BCIS	170151	39.3N 44.6E					

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MAY								
MAY 19	ISC	164950	36.61N 53.35E	22	4.6(5)	74	1.8-109.8	1.93
MAY 19	USCGS	164950.4	36.3N 53.4E	33	4.7(2)	18		1.0
MAY								
MAY 22	ISC	183607.8	33.16N 49.25E	51	4.6(6)	44	2.1-123.0	1.65
MAY 22	USCGS	183602.6	33.0N 49.1E	6	4.3(2)	16		1.6
MAY								
MAY 30	ISC	001119.0	32.73N 48.26E	54	4.6(12)	51	1.9-122.6	1.12
MAY 30	USCGS	001116.7	32.6N 48.3E	41	4.7(5)	15		0.7
MAY								
MAY 30	ISC	011031.5	27.83N 53.94E	40	5.2(22)	154	2.2-156.2	1.28
MAY 30	USCGS	011030.0	27.8N 54.0E	27	5.2(9)	55		1.1
MAY								
MAY 30	ISC	195305	29.70N 51.24E	22	5.2(13)	115	1.1-123.5	1.53
MAY 30	USCGS	195306.0	29.7N 51.3E	32	5.2(8)	45		1.1
MAY 30	BCIS	195302	29.7N 51.4E					
JUN								
JUN 04	USCGS	014426	37.5N 49.0E	50	4.5(5)	16		0.6
JUN 04	ISC	014425.6	37.50N 49.19E	49	4.6(6)	51	2.3- 92.8	1.74
JUN 04	ISC	065008.3	32.86N 48.28E	45	5.1(20)	94	1.8-122.7	1.55
JUN 04	USCGS	065006.6	32.7N 48.3E	40	5.2(14)			
JUN 04	BCIS	065002	32.7N 48.2E					
JUN								
JUN 09	ISC	005632	39.09N 46.10E	31	5.0(24)	148	0.4-128.9	1.64
JUN 09	USCGS	005633.9	39.0N 46.0E	50	5.0(12)	45		1.4
JUN 09	MOS	005628	39.2N 46.1E		4.9(13) S			
JUN								
JUN 09	ISC	113822	39.24N 46.23E	28		34	0.3-111.4	2.07
JUN 09	USCGS	113822.9	39.0N 46.1E	40	4.2(1)	8		1.0
JUN								
JUN 11	USCGS	060928	38.6N 43.1E	33	4.7	4		0.8
JUN								
JUN 13	ISC	230403.7	29.84N 51.30E	49	4.8(10)	81	1.1-123.5	1.43
JUN 13	USCGS	230400.3	29.7N 51.5E	33	5.0(1)	23		1.2
JUN								
JUN 15	ISC	000829.7	29.80N 51.93E	88		8		0.93
JUN 15	USCGS	000824	29.6N 51.6E	33	4.5(1)	6		1.7
JUN								
JUN 22	ISC	155649.7	29.64N 51.26E	52	4.7(11)	65	1.1-119.5	1.32
JUN 22	USCGS	155646.6	29.6N 51.5E	32	4.8(4)	25		1.1
JUN 22	BCIS	155648	29 3/4N 51 1/2E					
JUN								
JUN 23	ISC	091618	29.76N 51.24E	32	5.3(24)	164	1.1-129.5	1.43
JUN 23	USCGS	091618.6	29.8N 51.2E	34	5.2(12)	52		1.3
JUN 23	BCIS	091611	29.6N 51.4E					
JUN								
JUN 26	ISC	015413	29.74N 51.12E	17	5.0(5)	51	1.2-119.6	1.32
JUN 26	USCGS	015415.3	29.8N 51.1E	33	4.9(2)	25		1.0
JUL								
JUL 01	ISC	234223	29.56N 51.20E		4.6(3)	37	1.2- 84.7	1.46
JUL 01	USCGS	234221	29.9N 51.5E	33	4.7(3)	12		1.1
JUL 01	MOS	234210	28.2N 51.2E					
JUL								
JUL 08	ISC	112731.5	27.98N 56.97E	108	4.7(10)	56	4.2-117.8	1.34
JUL 08	USCGS	112724 .028	28.0N 57.0E	33	4.0(2)	15		0.7
JUL 08	MOS	112744.0	28.8N 57.0E	190				
JUL								
JUL 08	ISC	171527.5	29.71N 51.08E	35	4.8(18)	131	1.3-129.4	1.19
JUL 08	USCGS	171528.3	29.7N 51.1E	44	4.9(7)B	48		1.0
JUL 08	USCGS	171528.3	29.7N 51.1E	44	5.1(1)S	48		1.0
JUL 08	BCIS	171521	29.6N 51.3E					
JUL 08	MOS	171526	29.6N 51.0E					

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JUL								
JUL 12	ISC	103406.1	29.82N 50.73E	45	4.7(6)	63	1.6-128.4	1.57
JUL 12	USCGS	103403.1	29.8N 50.6E	24	4.8(5)	22		0.9
JUL 12	MOS	103404	29.6N 50.7E					
JUL								
JUL 14	ISC	223438	39.1 N 55.71E	46		14	4.1- 92.5	1.81
JUL 14	USCGS	223437.0	39.2N 55.7E	33	4.3(2)	9		1.9
JUL								
JUL 15	ISC	083340.5	32.63N 48.75E	57	4.5(11)	55	2.2-122.5	1.70
JUL 15	USCGS	083337.5	32.5N 48.7E	22	4.6(6)	22		1.3
JUL 15	MOS	083337	32.4N 48.7E					
JUL								
JUL 21	ISC	170035.5	30.18N 51.00E	73	4.4(4)	26	1.4- 73.7	1.76
JUL 21	USCGS	170032	30.1N 50.9E	33		11		1.3
JUL								
JUL 29	ISC	160343.4	36.72N 53.85E	14		36	2.2- 77.3	2.24
JUL 29	USCGS	160342.1	36.5N 53.7E	14	4.8(2)	10		1.6
JUL 29	MOS	160344	36.5N 53.8E					
JUL								
JUL 31	ISC	200500.8	33.64N 60.22E	33	4.3	35		
JUL 31	MOS	200504	34.2N 60.1E					
AUG								
AUG 02	ISC	035927.1	36.85N 49.33E	36	4.7(4)	44	2.0- 97.8	2.22
AUG 02	USCGS	035923.8	36.6N 49.1E	10	4.4(3)	15		1.1
AUG 02	MOS	035923	36.5 N 49.4E					
AUG								
AUG 02	ISC	133023.3	27.54N 60.92E	65	5.7(27)	191	5.9-150.7	1.00
AUG 02	USCGS	133023.3	27.5N 60.9E	62	5.7(10)	50		1.1
AUG 02	MOS	133025	27.6N 60.9E	70				
AUG								
AUG 03	ISC	140140.7	25.19N 62.85E	29	4.7(13)			1.73
AUG 03	USCGS	140146.5	25.8N 62.8E	40	4.7(4)	22		1.0
AUG 03	MOS	140135	25.0 N 63.0E					
AUG								
AUG 10	ISC	042801.4	37.00N 43.13E	42	4.9(18)	83	2.8-126.8	1.25
AUG 10	USCGS	042759.8	36.9N 43.0E	29	5.0(7)	22		0.8
AUG 10	BCIS	042801	36.8N 43.1E	50				
AUG 10	MOS	042759	36.8N 42.9E					
AUG								
AUG 26	ISC	055915	26.7 N 55.28E	92		15	10.4- 77.3	2.65
AUG 26	USCGS	055909.7	26.7N 55.0E	33	4.6(3)	8		1.2
AUG								
AUG 30	USCGS	211120.4	34.9N 59.5E	33	4.3(6)	6		4.3
AUG 30	IGS	211119.0	33.91N 58.40E	33				
AUG								
AUG 31	ISC	104741.3	34.15N 59.01E	25	5.9(29)		2.2 149.7	3.36
AUG 31	USCGS	104737.4	34.0N 59.0E	13	6.0(19)B	56		1.5
AUG 31	USCGS	104737.4	34.0N 59.0E	13	7.3(8)S	56		1.5
AUG 31	BCIS	104739	34.0N 58.7E		7.1			
AUG 31	IGS	104737.5	34.08N 58.87E	15				
AUG 31	BRK	1047			7.7			
AUG 31	CLL	1047			6.7(2)B			
AUG 31	CLL	1047			7.4S			
AUG 31	GOL	1047			7 1/2			
AUG 31	MOS	104742	34.4N 59.1E		7.5(17)S			
AUG 31	PAS	1047			7-7 1/4			
AUG 31	QUE	104743	34.1N 59.0E					
AUG 31	PRA	1047			6.5B			
AUG 31	PRA	1047			6.8S			
AUG 31	ROM	1047			7-7 1/4			
AUG 31	UPP	1047			7.5			
AUG								
AUG 31	ISC	113433	34.00N 59.19E	26	5.4(16)	110	2.3 149.5	1.16
AUG 31	USCGS	113432.9	33.9N 59.2E	24	5.5(11)	37		0.9
AUG 31	MOS	113432	33.7N 59.3E					
AUG 31	IGS	113433.2	33.98N 59.12E	24				

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AUG								
AUG 31	ISC	132257	34.11N 59.49E	13	4.7(5)	52	2.2-123.9	1.07
AUG 31	USCGS	132259.9	34.1N 59.4E	33	4.8(3)	17		0.9
AUG 31	MOS	132302	34.5N 59.5E					
AUG 31	IGS	132300.3	34.12N 59.41E	33				
AUG								
AUG 31	ISC	140616.6	34.08N 59.44E	17	4.9(10)	81	2.2-130.2	1.39
AUG 31	MOS	140622	34.6N 59.4E					
AUG 31	USCGS	140616.1	34.1N 59.4E	18	5.0(5)	20		1.1
AUG 31	BCIS	140615	34.0N 59.6E					
AUG 31	IGS	140617.0	34.05N 59.33E	18				
SEP								
SEP 01	ISC	053945	39.14N 46.2E	24	5.0	126	1.1-138.6	
SEP 01	USCGS	053946.7	39.1N 46.0E	38	5.1	40		1.0
SEP 01	BCIS	053947	39.2N 46.2E	45				
SEP 01	MOS	053942	38.7N 46.0E					
SEP								
SEP 01	ISC	072730.6	34.09N 58.24E	14	5.9	262	2.5-150.3	
SEP 01	USCGS	072730.2	34.0N 58.2E	15	5.9()B	81		1.0
SEP 01	USCGS	072730.2	34.0N 58.2E	15	6.3()S	81		1.0
SEP 01	BCIS	072728	34.1N 58.3E					
SEP 01	GOL	0727			6 1/4-6 1/2			
SEP 01	BRK	0727			7.0			
SEP 01	PAS	0727			6.2			
SEP 01	MOS	072727	34.1N 58.3E		6.5()B			
SEP 01	MOS	072727			6.3(21)S			
SEP								
SEP 01	ISC	082318	34.2N 58.2E	51		13	2.4- 98.9	
SEP 01	IGS	082310.9	33.77N 58.23E	16				
SEP 01	USCGS	082310.4	33.7N 58.2E	16		8		1.3
SEP 01	MOS	0823			6.3 LV			
SEP 01	MOS	0823			6.4 LH			
SEP 01	MOS	0823			5.6 B			
SEP								
SEP 01	ISC	110358	34.20N 59.91E	2	4.9	39	2.1- 78.9	
SEP 01	USCGS	110402.1	34.0N 59.6E		N 4.8	10		1.5
SEP 01	MOS	110352	33.6N 59.9E					
SEP 01	IGS	110402	34.26N 59.77E	33				
SEP								
SEP 01	ISC	191637	34.16N 58.24E	20	4.8	78	2.4-129.0	
SEP 01	USCGS	191637.3	34.2N 58.3E	23	5.0	23		1.0
SEP 01	IGS	191637.3	34.14N 58.13E	23				
SEP								
SEP 01	ISC	211641.8	34.17N 58.18E	37		29	2.4- 79.2	
SEP 01	USCGS	211644.7	34.4N 58.0E	44	4.8	8		0.9
SEP 01	MOS	211644	34.5N 58.2E					
SEP 01	IGS	211643.9	34.25N 58.05E	44				
SEP								
SEP 03	ISC	095350	34.02N 59.26E	30		98	6.7-134.0	
SEP 03	USCGS	095347.0	33.8N 59.2E	16	5.0	30		1.1
SEP 03	MOS	095343	33.2N 59.5E					
SEP 03	IGS	095338.1	33.99N 59.14E	16				
SEP								
SEP 04	USCGS	055408.3	35.1N 58.5E		N 4.7	11		1.4
SEP 04	ISC	055407	34.6N 58.3E	33		28	2.0-129.0	
SEP 04	IGS	055403.8	34.21N 58.5E	33				
SEP 04	MOS	055428	37.0N 56.4E					
SEP								
SEP 04	ISC	080845.2	34.20N 59.47E	24	5.0	66	2.1-130.2	
SEP 04	USCGS	080844.3	33.9N 59.2E	24	5.0	24		1.2
SEP 04	IGS	080845.0	34.10N 59.37E	24				
SEP 04	MOS	080849	34.6N 59.4E					

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SEP								
SEP 04	ISC	111935.7	34.00N 59.3LE	25	5.0	90	2.3-130.1	
SEP 04	USCGS	111935.6	33.9N 59.1E	25	5.1	30		0.9
SEP 04	BCIS	111928	33.6N 59.7E					
SEP 04	MOS	111929	33.6N 59.2E					
SEP 04	IGS	111936.4	34.05N 59.23E	25				
SEP								
SEP 04	ISC	232445	34.06N 58.32E	1	5.4	173	2.5-150.1	
SEP 04	USCGS	232447.2	34.0N 58.2E	15	5.2()S	65		0.9
SEP 04	USCGS	232447.2	34.0N 58.2E	15	5.4()B	65		0.9
SEP 04	IGS	232447.3	34.04N 58.19E	15				
SEP 04	MOS	232450	34.2N 58.4E					
SEP 04	BCIS	232450	34.1N 58.6E					
SEP								
SEP 06	ISC	022736	34.06N 59.52E	16	4.7	69	2.3- 84.7	
SEP 06	USCGS	022737.1	34.0N 59.3E	27	4.8()S	24		1.1
SEP 06	USCGS	022737.1	34.0N 59.3E	27	4.9()B	24		1.1
SEP 06	BCIS	022746	34.3N 58.9E					
SEP 06	MOS	022737	34.0N 59.4E					
SEP 06	IGS	022737.2	34.07N 59.36E	27				
SEP								
SEP 10	ISC	203158	34.08N 59.49E	10	4.7	68	2.2- 81.9	
SEP 10	USCGS	203158.6	34.0N 59.4E	18	4.7	16		1.0
SEP 10	BCIS	203203	34 1/2N 58 1/2E					
SEP 10	IGS	203159	34.06N 59.33E	18				
SEP 10	MOS	203203	34.4N 59.5E					
SEP								
SEP 11	ISC	191713.7	34.03N 59.54E	33	5.2	162	2.3-133.9	
SEP 11	USCGS	191712.9	33.9N 59.4E		5.2()B	29		1.7
SEP 11	USCGS	191712.9	33.9N 59.4E		5.4()S	29		1.7
SEP 11	BCIS	191705	33.5N 59.6E					
SEP 11	MOS	191707	33.9N 59.6E					
SEP 11	IGS	191713.8	34.08N 59.46E	33				
SEP								
SEP 14	ISC	134826	28.30N 53.17E	3	5.8	220	1.5-132.0	
SEP 14	USCGS	134831.2	28.4N 53.1E		5.8()B	104		1.5
SEP 14	USCGS	134831.2	28.4N 53.1E		5.6()S	104		1.5
SEP 14	BCIS	134833	28.6N 53.0E		N			
SEP 14	MOS	134830	28.3N 53.1E		6.1()B			
SEP 14	MOS	134830			6.0(11)S			
SEP								
SEP 14	BUL	1354	28.4N 53.1E		5.3	6	42.9- 53.8	
SEP								
SEP 14	ISC	192024.2	28.38N 53.19E	56	5.0	103	1.4-125.2	
SEP 14	USCGS	192022.7	28.4N 53.2E	44	5.1	38		0.8
SEP 14	BCIS	192015	28.1N 53.2E					
SEP 14	PRU	1920			5.8			
SEP 14	COL	1920			6.2 B			
SEP 14	COL	1920			6.0 LH			
SEP 14	MOS	192018	27.9N 53.2E					
SEP								
SEP 15	ISC	061500.6	28.39N 53.25E	50	4.6	21	1.4- 85.6	
SEP 15	USCGS	061458.7	28.3N 53.2E	31	4.5	11		1.1
SEP								
SEP 15	ISC	094214	34.03N 59.59E	14	4.8	68	2.3- 97.8	
SEP 15	USCGS	094214.6	34.0N 59.4E	20	4.9	22		1.5
SEP 15	IGS	094215.1	34.03N 59.45E	20				
SEP 15	MOS	094216	34.0N 59.6E					
SEP								
SEP 16	ISC	071007	39.3N 46.3E	44		20	1.2- 27.2	
SEP								
SEP 17	ISC	191509	34.1N 58.37E	38	4.4	21	2.5- 90.0	
SEP 17	USCGS	191508.6	34.0N 58.3E	34		10		1.2
SEP 17	MOS	191507	34.0N 58.5E					
SEP 17	IGS	191507.6	33.99N 58.41E	24				

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SEP								
SEP 19	ISC	051514.2	34.21N 58.05E	42		20	2.4-124.0	
SEP 19	USCGS	051515.7	34.4N 58.0E	48	4.6	11		1.1
SEP 19	IGS	051516.1	34.17N 58.12E	68				
SEP								
SEP 19	ISC	221236	28.34N 53.19E	18	5.1	125	1.4-128.1	
SEP 19	USCGS	221238.2	28.4N 53.2E	34	5.1	34		0.8
SEP 19	MOS	221237	28.2N 53.2E					
SEP								
SEP 19	ISC	233556.3	28.31N 53.23E	37	4.7	39	1.5-125.2	
SEP 19	USCGS	233556.0	28.3N 53.1E		N 4.8	14		1.4
SEP 19	MOS	233555	28.2N 53.2E					
OCT								
OCT 01	ISC	181603	39.19N 46.21E	10		24	1.1- 42.8	
OCT 01	USCGS	181607.9	38.9N 46.0E	56	3.5	7		1.3
OCT 01	MOS	181604	39.1N 46.2E					
OCT								
OCT 09	ISC	180605	29.5N 53.8E	46		11	1.1- 74.4	
OCT 09	USCGS	180603.9	29.9N 53.8E	26		6		1.2
OCT								
OCT 13	ISC	013453	34.10N 58.87E	29		23	2.3-129.7	
OCT 13	USCGS	013453.7	34.0N 58.7E	47		7		1.1
OCT 13	MOS	013457	34.5N 59.0E					
OCT								
OCT 16	ISC	152733.1	32.6N 48.93E	68		37	2.3-122.5	
OCT 16	USCGS	152729.4	32.6N 48.8E		N 4.1	9		1.1
OCT 16	BCIS	152724	31 3/4N 49 1/2E					
NOV								
NOV 06	ISC	170607.1	31.84N 50.76E	51		37	2.7- 82.5	
NOV 06	USCGS	170605.3	31.7N 50.7E	42	4.6	10		1.3
NOV 06	MOS	170608	31.9N 50.6E	50				
NOV								
NOV 15	ISC	062539	37.6N 58.5E	22	5.1	127	0.1-131.6	
NOV 15	BCIS	062536	37.5N 58.2E					
NOV 15	UPP	0625			5 1/2			
NOV 15	CLL	0625			5.7			
NOV 15	MOS	062529	38.0N 58.3E	20	5.5(4)B			
NOV 15	MOS	062529			5.5(25)S			
NOV								
NOV 18	ISC	142303	27.4N 53.22E	89		23	2.3-116.9	
NOV 18	MOS	142251	26.5N 53.2E					
NOV								
NOV 28	ISC	180246.7	34.23N 59.65E	33	4.8	35	2.1- 69.8	
NOV 28	MOS	180246	34.2N 59.7E					
DEC								
DEC 12	ISC	185447	35.80N 53.49E	27	4.9	43	1.7- 68.1	
DEC 12	USCGS	185447.2	35.8N 53.5E		N 4.6	12		1.0
DEC 12	MOS	185447	35.8N 53.4E					
DEC								
DEC 15	ISC	062529.3	38.0N 58.32E	20		21	0.1- 48.3	
DEC 15	MOS	062529	38.0N 58.3E	20				
1969								
JAN								
JAN 03	USCGS	031638.1	37.1N 57.9E	11	5.6()B	47		1.2
JAN 03	USCGS	031638.1	37.1N 57.9E	11	5.2()S	47		1.2
JAN 03	BCIS	031642	37.1N 57.7E					
JAN								
JAN 10	USCGS	231637.2	32.5N 48.7E	62	4.6	20		0.8
JAN								
JAN 26	USCGS	022555.8	36.8N 54.5E	48	4.8	27		1.1

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DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH MAGNITUDE KM	NO. OF OBS	DELTA RANGE DEGREES	SD
FEB							
FEB 05	USCGS	202352.1	38.1N 45.3E	N 4.5	9		1.6
FEB 05	MOS	202356	38.6N 45.4E				
FEB							
FEB 07	USCGS	010306.5	32.6N 48.1E	51 4.7	14		0.6
FEB 07	MOS	010305	32.5N 48.1E	4.8			
FEB							
FEB 08	USCGS	232334.9	29.9N 51.0E	52 5.1	32		0.9
FEB 08	MOS	232333	29.9N 50.8E	5			
MAR							
MAR 04	USCGS	173549.3	30.1N 57.8E	59 4.3	10		1.3
MAR							
MAR 12	USCGS	174334.1	28.3N 53.1E	16 4.5	17		0.7
APR							
APR 09	USCGS	010448.8	37.0N 54.0E	45	6		0.5
APR							
APR 12	USCGS	230731.9	40.5N 43.0E	N	9		1.2
APR							
APR 14	USCGS	131321.8	27.8N 54.7E	44 5.0	34		0.9
APR							
APR 29	USCGS	043740.7	29.6N 51.5E	36 5.6	80		0.8
MAY							
MAY 12	USCGS	122245.3	35.5N 52.5E	29	5		0.2
MAY							
MAY 12	USCGS	190909.0	27.8N 56.5E	50 4.9	30		1.1
MAY							
MAY 14	USCGS	004434.1	39.3N 45.0E	36 4.5	6		1.8
MAY 14	BCIS	004435	38.9N 44.5E				
MAY 14	MOS	004431	38.6N 44.4E	4.5			
MAY							
MAY 27	BCIS	010331	38.6N 43.4E				
JUN							
JUN 01	USCGS	123630.2	26.7N 60.6E	50 4.7	12		1.0
JUN 01	BCIS	123631	26.9N 60.6E	50			
JUN							
JUN 04	USCGS	162134.7	25.6N 61.1E	N 4.7	12		1.0
JUN							
JUN 21	USCGS	163508.3	27.4N 57.5E	65 5.3	79		0.8
JUN 21	BCIS	163504	27.2N 57.9E	50			
JUN							
JUN 28	USCGS	223216.2	32.3N 56.1E	N 4.7	22		1.3
JUN 28	BCIS	223216	32.4N 56.2E				
JUL							
JUL 01	USCGS	060055.3	28.2N 55.4E	95 4.8	19		0.7
JUL							
JUL 20	USCGS	223729.6	28.2N 57.3E	57 4.9	17		1.3
JUL 20	BCIS	223734	28.4N 57.6E	100			
JUL 20	PRE	2237		4.9 B			
AUG							
AUG 01	USCGS	232235.3	34.3N 45.4E	66 4.9	5		0.2
AUG							
AUG 23	USCGS	191617.7	33.9N 58.9E	32 5.1	28		1.1
SEP							
SEP 01	USCGS	231610.4	30.9N 49.8E	28 4.9	21		1.1
SEP 01	BCIS	231613	30.9N 49.7E				
SEP							
SEP 02	USCGS	133003.5	30.2N 57.7E	20 5.3	14		0.5
SEP 02	BCIS	133008	30.3N 57.8E				
SEP							
SEP 03	USCGS	233903.0	54.3N 58.3E	N 4.8	11		1.0
SEP 03	BCIS	233902	34.2N 58.3E				
SEP							
SEP 25	USCGS	152529.3	36.7N 55.1E	32 5.1	10		1.2

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OCT							
OCT 07	USCGS	143928.6	36.6N 43.6E	44 4.1	10		1.1
OCT							
OCT 20	USCGS	162724.8	32.1N 49.7E	52 4.7	8		1.1
OCT							
OCT 31	USCGS	085326.3	33.2N 47.9E	51 5.0	36		0.8
NOV							
NOV 03	USCGS	215316.1	26.7N 53.7E	08 5.0			
NOV							
NOV 04	USCGS	201747.7	40.3N 50.3E	29 5.0	22		1.3
NOV							
NOV 04	USCGS	210556.9	40.2N 50.2E	N	13		1.2
NOV							
NOV 05	USCGS	190218.1	26.5N 53.6E	N	13		0.9
NOV							
NOV 06	USCGS	043600.7	26.3N 53.7E	N 5.0	18		1.0
NOV							
NOV 07	USCGS	131844.4	26.7N 53.3E	N 4.6	11		1.1
NOV							
NOV 07	USCGS	151604.4	26.6N 53.7E	N 5.0	12		0.8
NOV							
NOV 07	USCGS	163029.5	26.6N 53.3E	N 5.0	17		1.1
NOV							
NOV 07	USCGS	183359.9	27.9N 60.1E	35 6.1	92		1.0
NOV 07	GOL	1834		7			
NOV							
NOV 08	USCGS	003848.3	26.7N 53.7E	N	6		0.9
NOV							
NOV 11	USCGS	003035.3	33.4N 55.0E	N 5.0	30		1.2
NOV 11	BCIS	003035	33.4N 55.0E				
NOV							
NOV 15	USCGS	235852.1	26.8N 53.5E	42 4.9	42		0.8
NOV							
NOV 23	USCGS	114045.1	38.3N 55.5E	38 4.9	39		1.1
NOV 23	BCIS	114045	38.4N 55.3E				
NOV							
NOV 24	USCGS	154423.2	38.4N 55.2E	49 4.8	16		1.1
NOV 24	BCIS	154423	38.5N 55.3E				
NOV							
NOV 25	USCGS	091607.3	38.3N 55.5E	N 4.8	14		1.1
NOV							
NOV 28	USCGS	012928.1	36.7N 45.2E	16 4.7	15		1.4
NOV 28	BCIS	012332	36.8N 45.2E				
DEC							
DEC 01	USCGS	130434.1	26.5N 53.5E	33 4.7	16		1.3
DEC							
DEC 02	USCGS	224615.5	33.9N 58.6E	N 5.1	13		1.2
1970							
JAN							
JAN 03	USCGS	132003.7	32.6N 48.7E	33 4.4	8		0.7
JAN							
JAN 03	USCGS	163548.4	32.6N 48.8E	32 5.0	37		1.1
JAN 03	MOS	163545	32.3N 48.7E	26 5.0(13)			
JAN							
JAN 07	USCGS	182336.2	40.2N 50.1E	40 4.6	8		1.0
JAN							
JAN 09	USCGS	092305.4	38.5N 55.4E	23 4.8	10		0.8
JAN 09	MOS	092304	38.4N 55.5E				
JAN							
JAN 19	USCGS	171926.4	36.9N 48.8E	27 4.4	14		1.2
JAN							
JAN 19	USCGS	203159.5	25.3N 61.3E	N 4.4	8		1.7

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JAN								
JAN	20	USCGS 110013.1	30.7N 51.4E	25	4.9	21		1.1
JAN								
JAN	27	USCGS 140552.3	36.8N 54.9E	35	5.1	11		1.5
JAN								
JAN	30	USCGS 233542.6	39.8N 54.2E	N		6		1.5
FEB								
FEB	17	USCGS 025954.9	38.6N 43.2E	35	4.9	34		1.1
FEB								
FEB	17	USCGS 161647.7	38.6N 43.1E	9	4.7	18		0.8
FEB								
FEB	22	USCGS 104518.8	32.5N 48.6E	N		6		1.1
FEB								
FEB	23	USCGS 112226.2	27.8N 54.5E	20	5.5	99		0.9
FEB	23	MOS 112227	27.7N 54.6E		5.7(32)			
FEB								
FEB	25	USCGS 150751.0	37.4N 55.7E	36	5.0	14		1.1
FEB	25	MOS 150746	37.2N 55.7E					
FEB								
FEB	28	USCGS 195848.1	27.8N 56.3E	35	5.5	77		0.9
MAR								
MAR	01	USCGS 201244.8	34.0N 58.9E	39	5.2	39		0.8
MAR								
MAR	06	USCGS 194007.3	28.2N 57.5E	69	4.7	19		0.8
MAR	06	MOS 193959	27.7N 57.5E					
MAR								
MAR	10	USCGS 220624.4	28.4N 57.5E	67	4.7	10		0.4
MAR								
MAR	14	USCGS 015144.4	38.6N 44.7E	23	5.3	58		0.9
MAR	14	MOS 015146	38.5N 44.8E		5.2(24)			
MAR								
MAR	15	USCGS 151038.9	32.2N 49.4E	65		9		0.7
MAR								
MAR	17	USCGS 231942.3	33.9N 59.7E	19	5.0	41		1.2
MAR	17	MOS 231949	34.8N 59.7E		5.4(6)			
MAR								
MAR	21	USCGS 132314.4	27.8N 54.6E	42	4.6	14		0.4
MAR	21	MOS 132313	27.7N 54.5E		4.5			
APR								
APR	01	USCGS 235405.6	28.0N 56.7E	62	5.1	38		0.7
APR	01	MOS 235359	27.4N 56.7E					
APR								
APR	03	USCGS 205354.5	37.1N 54.6E	43	5.2	58		0.9
APR								
APR	04	USCGS 105808.8	37.0N 59.4E	8	4.8	35		0.9
APR								
APR	04	MOS 175648	27.1N 55.3E					
APR								
APR	16	USCGS 012652.1	38.7N 48.6E	78	4.9	15		1.2
APR	16	MOS 012648	38.7N 48.7E					
MAY								
MAY	11	USCGS 031219.7	28.5N 52.3E	22	5.1	46		0.6
MAY	11	MOS 031217	28.3N 52.4E		15 4.4(14)			
MAY								
MAY	12	MOS 235910	27.3N 57.3E					
MAY								
MAY	18	USCGS 065525.7	27.6N 52.9E	40	4.7	14		1.1
JUN								
JUN	07	USCGS 174833.8	33.0N 49.4E	50	4.7	25		1.2
JUN	07	MOS 174828	32.6N 49.3E					
JUN								
JUN	16	USCGS 172502.1	29.6N 51.3E	38	4.3	16		1.2
JUN	16	MOS 172500	29.5N 51.2E					

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JUN								
JUN 27	USCGS	075753.3	35.2N 50.7E	14	4.9	28		1.0
JUN								
JUN 30	USCGS	153532.0	31.1N 53.7E	N	4.0	8		1.8
JUL								
JUL 11	USCGS	224115.6	37.6N 49.0E	65	5.1	42		0.9
JUL 11	MOS	224113	37.6N 49.2E	40	4.8(19)			
JUL								
JUL 12	USCGS	011609.1	30.4N 51.7E	6		9		1.4
JUL								
JUL 21	USCGS	103914.2	29.3N 52.2E	20	4.5	14		1.1
JUL								
JUL 30	USCGS	005219.5	37.8N 55.9E	19	5.7()B	114		1.2
JUL 30	USCGS	005219.5	37.8N 55.9E	19	6.6()S	114		1.2
JUL 30	MOS	005220	37.8N 56.0E		6.7(31)			
JUL								
JUL 30	USCGS	020202.0	37.6N 55.8E	N	4.8	22		1.4
JUL 30	MOS	020209	38.9N 56.4E					
JUL								
JUL 30	USCGS	023511.5	37.5N 55.8E	N	4.9	20		1.5
JUL 30	MOS	023515	38.1N 56.1E					
JUL								
JUL 30	USCGS	132609.3	37.5N 55.8E	N		9		1.4
JUL 30	MOS	132606	37.5N 55.9E		4.5			
AUG								
AUG 01	USCGS	114039.4	37.5N 55.6E	33	4.9	33		0.7
AUG 01	MOS	114041	38.1N 56.2E					
AUG								
AUG 08	MOS	101930	38.7N 57.9E					
AUG								
AUG 20	USCGS	152952.2	29.3N 51.6E	33	4.4	20		1.4
AUG 20	MOS	152947	29.1N 51.5E					
AUG								
AUG 23	MOS	172051	37.5N 55.9E					
AUG								
AUG 24	MOS	130932	37.7N 55.7E					
AUG								
AUG 30	USCGS	161731.0	37.4N 56.0E	N	5.1	23		1.2
AUG 30	MOS	161732	37.7N 56.3E		4.7(6)			
AUG								
AUG 30	MOS	123132	30.8N 57.2E		4.5			
SEP								
SEP 03	USCGS	223809.4	40.0N 53.6E	36	4.4	13		0.8
SEP								
SEP 08	USCGS	124507.0	28.6N 58.9E	21	4.8	15		1.0
SEP 08	MOS	124510	28.5N 58.9E					
OCT								
OCT 03	USCGS	024740.6	34.1N 47.3E	24	4.5	13		1.4
OCT 03	MOS	024740	33.5N 47.6E		4.5			
OCT								
OCT 03	USCGS	065702.0	36.1N 51.4E	68	4.1	7		0.6
OCT								
OCT 07	USCGS	022036.7	27.8N 56.5E	43	5.0	32		0.7
OCT								
OCT 18	USCGS	061039.1	27.3N 55.0E	40	4.8	32		1.1
OCT								
OCT 20	USCGS	103419.3	27.6N 56.7E	44	4.9	30		0.8
OCT 20	MOS	103410	26.5N 56.5E					
OCT								
OCT 25	USCGS	112218.2	36.8N 45.1E	19	5.5()B	68		1.0
OCT 25	USCGS	112218.2	36.8N 45.1E	19	4.8()S	68		1.0
OCT 25	MOS	112218	36.6N 45.0E		5.2(10)			
OCT								
OCT 27	USCGS	201104.8	26.5N 55.3E	16	4.4	17		1.3

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NOV								
NOV 06	MOS	081625	37.8N 55.8E					
NOV								
NOV 09	USCGS	174142.2	29.5N 56.9E	106	5.5	76		1.0
NOV 09	MOS	174133	28.9N 56.8E	50	4.7			
NOV								
NOV 12	USCGS	131006.3	38.3N 57.2E	63	4.6	17		1.1
NOV 12	MOS	130959	38.1N 57.2E		4.8(10)			
NOV								
NOV 15	MOS	142844	37.4N 56.0E	20	4.5			
NOV								
NOV 21	USCGS	083559.1	40.0N 48.3E	68	5.1	81		1.1
NOV								
NOV 21	MOS	115710	38.0N 55.7E					
NOV								
NOV 29	USCGS	173745.9	39.6N 54.6E	53	4.7	23		1.1
DEC								
DEC 12	USCGS	111613.4	37.2N 55.4E	46	4.5	10		1.2
DEC								
DEC 23	MOS	173125	38.8N 48.5E	20				
DEC								
DEC 26	USCGS	195203.7	27.8N 57.9E	74	4.8	25		0.7
1971								
JAN								
JAN 20	USCGS	213203.0	35.1N 46.9E	57	5.1	65		1.0
JAN								
JAN 28	USCGS	060927.2	28.5N 57.4E	34	4.6	21		0.9
JAN								
JAN 28	USCGS	155106.6	35.0N 47.0E	43	4.6	13		1.6
FEB								
FEB 11	USCGS	014129.0	38.3N 46.9E	48	4.1	9		1.4
FEB								
FEB 14	USCGS	162736.1	36.6N 55.6E	39	5.2()B	101		0.9
FEB 14	USCGS	162736.1	36.6N 55.6E	39	5.3()S	101		0.9
MAR								
MAR 16	USCGS	052811.6	36.6N 54.9E	56		13		1.6
MAR								
MAR 16	USCGS	115835.2	32.1N 49.4E	40	4.1	9		1.1
MAR								
MAR 26	USCGS	211838.9	35.3N 46.4E	N	4.3	13		1.2
MAR								
MAR 31	USCGS	215010.3	34.6N 50.3E	31	4.4	15		1.0
APR								
APR 03	USCGS	101925.3	33.2N 46.5E	51	4.1	9		1.1
APR								
APR 06	USCGS	064952.9	29.8N 51.9E	10	5.2()B	78		0.9
APR 06	USCGS	064952.9	29.8N 51.9E	10	5.1()S	78		0.9
APR								
APR 12	USCGS	190325.9	28.3N 55.6E	44	6.0()B	94		1.0
APR 12	USCGS	190325.9	28.3N 55.6E	44	5.9()S	94		1.0
APR								
APR 13	USCGS	204300.3	28.2N 55.6E	44	4.8	27		0.7
APR								
APR 30	USCGS	090616.5	34.6N 50.3E	42	4.7	37		1.0
MAY								
MAY 07	USCGS	231845.3	28.3N 55.5E	44	4.5	22		0.6
MAY								
MAY 15	USCGS	045305.3	38.1N 49.1E	N	4.6	20		1.1
MAY								
MAY 22	USCGS	140207.5	35.6N 58.3E	36	4.8	12		0.8
MAY								
MAY 25	USCGS	043236.9	27.7N 55.4E	23	5.1	37		1.0
MAY								
MAY 25	USCGS	065248.9	27.3N 53.4E	11	4.8	27		0.7

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
MAY								
MAY	26 USCGS	024146.0	35.5N 58.2E	26	5.4()S	82		0.9
MAY	26 USCGS	024146.0	35.5N 58.2E	26	5.4()B	82		0.9
MAY								
MAY	31 USCGS	110555.9	28.9N 54.6E	60	4.4	9		1.1
JUN								
JUN	02 USCGS	034753.6	34.6N 47.0E	25	4.3	17		1.1
JUN								
JUN	02 USCGS	100509.3	29.4N 51.6E	35	4.8	24		0.9
JUN								
JUN	28 USCGS	213311.6	26.9N 54.9E	N 4.1		8		1.8
JUL								
JUL	01 USCGS	121327.6	36.4N 43.4E	16	5.1	43		0.8
JUL								
JUL	18 USCGS	000226.2	34.0N 45.2E	N 4.7		9		1.2
JUL								
JUL	24 USCGS	004921.5	30.4N 59.9E	56	5.0	31		0.9
AUG								
AUG	07 USCGS	075911.2	30.1N 50.7E	63	4.4	7		1.5
AUG								
AUG	09 USCGS	025436.7	36.2N 52.7E	27	5.2()B	68		0.8
AUG	09 USCGS	025436.7	36.2N 52.7E	27	5.3()S	68		0.8
AUG								
AUG	22 USCGS	175414.6	30.1N 50.7E	N 5.1		29		1.0
AUG								
AUG	25 USCGS	003044.5	28.2N 52.3E	N 4.1		7		1.4
AUG								
AUG	26 USCGS	065508.7	30.0N 50.7E	45	4.8	20		1.4
AUG								
AUG	27 USCGS	052015.1	30.2N 50.7E	54	5.0	44		1.2
AUG								
AUG	28 USCGS	163444.4	37.6N 55.8E	N 4.8		19		1.0
SEP								
SEP	02 USCGS	122422.8	30.5N 50.3E	N 4.8		28		0.8
SEP								
SEP	02 USCGS	182447.3	30.1N 50.8E	45	5.1	68		0.9
SEP								
SEP	02 USCGS	222139.0	30.1N 50.8E	39	5.0	18		1.1
SEP								
SEP	04 USCGS	134219.5	30.1N 50.9E	30	4.6	12		0.9
SEP								
SEP	08 USCGS	125334.0	29.2N 60.0E	12	5.4	57		0.8
SEP								
SEP	21 USCGS	010418.4	38.3N 43.9E	19	4.2	9		1.1
OCT								
OCT	05 USCGS	183117.7	27.2N 55.8E	39	5.1	28		0.8
OCT								
OCT	05 USCGS	224504.3	31.6N 50.7E	66	4.1	9		0.9
SEP								
SEP	02 USCGS	122422.8	30.5N 50.3E	N 4.8		28		0.8
OCT								
OCT	15 USCGS	141931.6	37.3N 54.6E	39	4.7	23		1.2
OCT								
OCT	23 USCGS	114920.6	29.6N 51.3E	4.5		25		1.1
NOV								
NOV	03 USCGS	094250.4	28.3N 57.0E	N 4.7		20		0.9
NOV								
NOV	04 USCGS	041013.0	28.1N 57.4E	51		7		0.8
NOV								
NOV	08 USCGS	030636.4	27.1N 54.5E	36	5.6()B	67		0.8
NOV	08 USCGS	030636.4	27.1N 54.5E	36	5.9()S	67		0.8
NOV								
NOV	08 USCGS	032426.6	26.9N 54.5E	N 4.9		19		0.7
NOV								
NOV	09 USCGS	001658.2	27.0N 54.5E	N 4.8		21		1.0

INDEXES OF EARTHQUAKES IN IRAN: 1971

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
NOV								
NOV 29	USCGS	211237.3	29.5N 52.8E	18	4.9	29		0.8
DEC								
DEC 09	USCGS	014230.7	27.2N 56.4E	15	5.3()B	76		1.1
DEC 09	USCGS	014230.7	27.2N 56.4E	15	5.8()S	76		1.1
DEC								
DEC 09	USCGS	023612.2	27.4N 56.4E		N 4.9	9		1.2
DEC								
DEC 09	USCGS	025359.7	27.3N 56.4E	35	4.5	12		0.7
DEC								
DEC 15	USCGS	152457.4	30.2N 50.6E	42	4.9	65		0.9
DEC								
DEC 20	USCGS	232738.5	28.4N 57.2E		N 4.9	24		1.2
DEC								
DEC 29	USCGS	211237.3	29.5N 52.8E	18	4.9	29		0.8
1972								
JAN								
JAN 05	USCGS	010508.7	32.9N 49.2E	46	4.4	9		0.8
JAN								
JAN 06	USCGS	094133.2	30.3N 50.5E	41	5.2	31		0.8
JAN								
JAN 14	USCGS	221003.7	32.8N 46.9E		N 5.1 ()B	37		0.8
JAN 14	USCGS	221003.7	32.8N 46.9E		N 5.3 ()S	37		0.8
JAN								
JAN 18	USCGS	211201.7	37.5N 48.7E		N 4.9	30		1.4
FEB								
FEB 05	USCGS	215243.5	33.9N 47.1E	54	4.7	13		1.0
FEB								
FEB 08	USCGS	195455.4	29.7N 51.0E	49	4.3()B	22		1.1
FEB								
FEB 09	USCGS	142151.2	29.4N 50.8E	43	4.3	5		0.1
FEB								
FEB 10	USCGS	064915.9	29.7N 50.9E	21	4.5	18		0.9
FEB								
FEB 10	USCGS	090409.2	29.6N 50.9E		N 3.9	7		0.9
FEB								
FEB 10	USCGS	164016.2	29.5N 50.9E	49	4.1()B	6		1.1
FEB								
FEB 28	USCGS	164457.9	29.5N 50.7E	55	4.4	10		1.3
FEB								
FEB 28	USCGS	184454.2	29.5N 50.7E	25	4.7()B	13		1.2
FEB 28	USCGS	184454.2	29.8N 50.7E	25	5.1()S	13		1.2
MAR								
MAR 08	USCGS	214910.6	27.6N 56.7E	45	4.9	19		0.8
APR								
APR 03	USCGS	080606.9	28.5N 52.6E	45	4.7()B	14		0.7
APR								
APR 03	USCGS	090716.0	28.1N 57.2E	52	5.0()B	50		0.9
APR								
APR 10	USCGS	020653.2	28.4N 52.8E		N 6.1()B	148		1.0
APR 10	USCGS	020653.2	28.4N 52.8E		N 6.9()S	148		1.0
APR 10	BRK	0206			7.1			
APR 10	PAS	0206			7			
APR								
APR 10	USCGS	023431.5	28.4N 52.9E		N 4.9()B	30		0.9
APR								
APR 10	USCGS	033757.1	28.4N 52.6E		N 3.9()B	10		1.0
APR								
APR 10	USCGS	043615.5	28.3N 53.0E		N 4.6()B	16		0.8
APR								
APR 10	USCGS	083351.8	28.3N 53.1E		N 4.6()B	26		0.8
APR								
APR 10	USCGS	090356.5	28.2N 52.9E		N 4.1()B	8		1.5

INDEXES OF EARTHQUAKES IN IRAN: 1972

DATE MONTH, DAY	REFER	O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	MAGNITUDE	NO. OF OBS	DELTA RANGE DEGREES	SD
APR								
APR 10	USCGS	094645.8	28.5N 52.5E	N 4.1()B	13		0.9	
APR 10	USCGS	104658.8	28.0N 53.2E	N 3.9()B	10		1.7	
APR 10	USCGS	143534.3	28.3N 53.1E	N 4.6()B	29		0.8	
APR 10	USCGS	202707.5	28.4N 52.9E	N 4.7()B	30		1.0	
APR 12	USCGS	055138.9	28.3N 53.1E	N 4.3()B	20		1.2	
APR 12	USCGS	183740.8	28.3N 53.1E	N 5.1()B	61		0.9	
APR 12	USCGS	223148.4	28.4N 53.0E	N 4.3()B	19		1.2	
APR 12	USCGS	230749.9	28.4N 53.0E	N 5.0()B	80		1.0	
APR 13	USCGS	183710.3	28.3N 53.0E	N 4.5()B	18		1.3	
APR 16	USCGS	234431.6	28.3N 52.7E	N 4.3()B	14		0.9	
APR 17	USCGS	151243.5	31.9N 59.3E	44 4.5()B	13		1.4	
APR 17	USCGS	211122.4	28.3N 52.9E	53 4.5()B	17		1.3	
APR 21	USCGS	143309.4	28.5N 52.4E	N 4.1()B	12		0.6	
APR 23	USCGS	020006.9	28.7N 53.2E	67 4.6()B	12		1.1	
APR 23	USCGS	222815.2	28.2N 53.2E	45 4.2()B	13		0.9	
APR 24	USCGS	144109.3	28.5N 53.0E	N 4.6()B	25		1.2	
APR 29	USCGS	160421.1	28.3N 53.0E	N 4.9()B	32		1.1	
MAY 04	USCGS	045924.4	28.3N 52.4E	52	11		1.4	
MAY 16	USCGS	105952.6	28.4N 52.6E	37 5.0()B	22		0.7	
MAY 20	USCGS	064426.1	28.3N 52.8E	N 4.9()B	19		0.7	
MAY 25	USCGS	090426.2	28.3N 53.1E	46	11		1.4	
JUN 06	USCGS	175443.3	26.9N 53.4E	54 4.9()B	43		1.0	
JUN 08	USCGS	093921.4	34.1N 46.2E	18 4.9()B	29		0.9	
JUN 10	USCGS	193141.8	32.9N 46.3E	N 4.0()B	11		0.6	
JUN 14	USCGS	004954.4	40.1N 51.9E	47 4.7()B	28		1.1	
JUN 30	USCGS	174933.4	27.2N 56.8E	N 4.6()B	31		1.1	
JUL 02	USCGS	140506.0	30.0N 50.8E	31 4.6()B	12		0.8	
JUL 03	USCGS	021000.4	30.1N 50.8E	38 5.0()B	33		1.1	
JUL 03	USCGS	213822.2	30.0N 51.0E	43 5.1()B	32		1.1	
AUG 02	USCGS	231213.4	27.9N 56.8E	N	8		0.8	
AUG 06	USCGS	011250.4	25.1N 61.2E	5.5()B	50		1.1	
AUG 08	USCGS	004455.2	36.3N 52.6E	47 4.7()B	24		0.9	

TABLE (2.2)
SUMMARY OF TABLE (2.1)
NUMBER OF EARTHQUAKES

MAG.	4.5-4.9	5.0-5.4	5.5-5.9	6.0-6.4	6.5-6.9	7.0-7.4	OTHERS	TOTAL	REMARKS
YEAR									
1902	0	0	0	0	1	0	1	2	
1903	0	0	0	0	0	0	5	5	
1904	0	1	0	0	0	0	0	1	
1905	0	0	0	0	0	0	1	1	
1906	0	0	0	0	0	0	0	0	
1907	0	1	0	0	0	0	2	3	
1908	0	0	0	1	0	0	0	1	
1909	1	0	1	0	0	1	2	5	
1910	1	1	0	0	0	0	0	2	
1911	0	0	0	0	1	0	0	1	
1912	0	1	0	0	0	0	0	1	
1913	0	1	2	1	0	0	0	4	
1914	0	0	0	0	0	0	1	1	
1915	0	3	0	0	0	0	0	3	
1916	1	2	0	0	0	0	1	4	
1917	1	2	5	0	0	0	0	8	
1918	0	0	1	0	0	0	0	1	
1919	0	2	0	0	0	0	0	2	
1920	0	0	2	1	0	0	0	3	
1921	0	0	1	0	0	0	0	1	
1922	0	0	1	0	0	0	0	1	
1923	1	1	4	1	1	0	0	8	
1924	7	6	4	0	1	0	1	19	
1925	4	4	2	0	0	0	0	10	
1926	3	3	1	0	0	0	1	8	
1927	11	1	3	3	0	0	1	19	
1928	12	4	1	0	0	0	0	17	
1929	17	4	4	1	1	1	1	29	
1930	16	13	3	3	0	1	11	47	
1931	13	9	0	0	1	0	5	28	
1932	6	6	2	0	0	0	0	14	
1933	3	2	1	2	0	0	2	10	
1934	9	3	3	1	0	1	1	18	
1935	12	6	3	1	1	0	3	26	
1936	6	5	1	1	0	0	0	13	
1937	6	0	1	0	0	0	1	8	
1938	4	2	2	0	0	0	0	8	
1939	5	5	2	0	0	0	1	13	
1940	9	1	1	0	1	0	2	14	
1941	4	1	1	2	0	0	0	8	
1942	1	3	0	0	0	0	0	4	
1943	1	0	0	1	0	0	1	3	
1944	2	1	2	0	0	0	1	6	
1945	5	4	1	0	0	0	3(1)	13	(1) 8 1/4
1946	4	4	5	0	0	1	3	17	
1947	8	6	1	1	1	1	10	28	
1948	7	3	6	2	0	1	4	23	
1949	7	7	3	1	2	0	5	25	
1950	5	7	5	1	0	0	16	34	
1951	5	5	3	0	0	0	20	33	
1952	6	5	4	0	0	0	13	28	
1953	7	1	1	1	0	0	33	43	
1954	4	3	3	0	0	0	42	52	
1955	1	2	3	0	0	0	73	79	
1956	3	7	7	0	1	0	80	98	
1957	6	0	3	0	0	2	39	50	
1958	7	9	8	0	1	0	21	46	
1959	6	7	3	0	0	0	16	32	
1960	6	10	2	1	1	0	25	45	
1961	21	11	4	1	1	0	78	116	
1962	13	6	8	0	0	1	186	214	
1963	17	11	4	1	0	0	192	225	
1964	24	21	6	2	0	0	29	82	
1965	16	7	0	1	0	0	19	43	
1966	17	7	0	1	0	0	107	132	
1967	26	18	2	0	0	0	16	62	
1968	33	24	5	0	1	1	16	80	
1969	22	15	2	0	1	0	9	49	
1970	27	13	4	0	1	0	21	66	
1971	26	14	2	1	0	0	14	57	
1972	23	10	0	0	1	0	19	53	
TOTAL	508	331	149	33	19	11	1144	2195	

TABLE (5.)

RE-LOCATED EPICENTRES FOR THE PERIOD 1913-1949

DATE MONTH, DAY	REFER O.TIME GMT H.M.SEC	EPICENTRE LAT. LONG. DEGREES	FOCAL DEPTH KM	NO. OF OBS	DELTA RANGE DEGREES	SD	YEAR
JAN 27	\$ 193827.1	36.81N 42.07E	33	30	5.3- 45.5	3.81	1913
MAR 24	\$ 103425.3	27.60N 53.91E	33	16	13.2- 44.7	2.04	1913
JUL 15	\$ 175833.0	30.60N 48.63E	33	12	15.1- 44.2	1.90	1917
JUL 15	\$ 175830.6	30.37N 48.86E	33	13	14.9- 43.8	1.95	1917
MAR 24	\$ 231511.2	35.45N 58.27E	33	18	16.4- 45.8	2.68	1918
MAY 25	\$ 222131.7	34.63N 61.49E	33	20	13.6- 56.8	2.24	1923
SEP 14	\$ 081044.8	28.97N 59.33E	33	6	15.9- 43.3	0.63	1923
SEP 17	\$ 070916.8	37.08N 57.68E	33	23	11.0- 60.2	3.26	1923
SEP 22	\$ 204745.4	29.61N 57.08E	33	47	15.6- 67.7	3.23	1923
SEP 23	\$ 031914.0	29.68N 56.31E	33	4	18.5- 34.8	0.30	1923
JAN 18	\$ 145635.1	29.40N 56.72E	33	6	18.3- 35.2	2.44	1924
FEB 19	\$ 065954.1	38.79N 48.58E	33	27	16.8- 67.4	2.03	1924
SEP 06	\$ 045103.1	39.71N 42.93E	33	12	8.1- 26.4	2.27	1924
SEP 13	\$ 143415.8	40.05N 41.79E	33	57	6.2- 90.8	4.53	1924
NOV 08	\$ 090545.8	39.03N 44.50E	33	18	4.4- 37.5	3.60	1924
NOV 08	\$ 090538.9	38.54N 45.41E	33	19	3.9- 38.4	3.92	1924
MAY 02	\$ 025733.4	35.21N 60.05E	33	5	9.5- 31.3	1.50	1925
JUL 11	\$ 215217.2	26.46N 57.26E	33	4	15.2- 38.1	0.62	1925
JUL 30	\$ 184316.6	28.54N 51.82E	33	7	11.9- 45.2	3.76	1925
SEP 24	\$ 043839.1	25.51N 55.38E	33	20	17.4- 51.0	2.36	1925
DEC 18	\$ 055339.1	28.79N 51.35E	149	12	11.6- 41.0	1.95	1925
APR 23	\$ 013137.1	26.98N 56.43E	33	9	14.4- 42.4	2.41	1926
MAY 19	\$ 211358.4	26.30N 58.90E	33	9	15.9- 53.4	1.46	1926
OCT 22	\$ 195938.2	40.93N 43.78E	33	34	4.7- 41.9	2.29	1926
MAY 09	\$ 103151.4	27.66N 56.66E	33	50	13.9- 55.8	2.17	1927
JUL 07	\$ 200627.8	27.01N 62.15E	33	48	13.8- 56.0	2.01	1927
JUL 22	\$ 035514.4	34.50N 53.80E	33	60	6.6- 88.3	2.45	1927
JUL 22	\$ 083738.5	33.59N 54.63E	33	11	7.8- 40.0	3.51	1927
JUL 22	\$ 203320.6	32.79N 53.43E	33	6	8.1- 31.0	2.19	1927
JUL 23	\$ 201801.6	34.42N 54.64E	33	54	7.0- 57.8	3.07	1927
JUL 23	\$ 224037.0	34.42N 53.76E	33	44	6.7- 56.0	2.36	1927
JUL 27	\$ 204157.2	35.37N 54.30E	33	6	9.8- 29.0	0.99	1927
JUL 29	\$ 113320.9	35.49N 54.43E	33	6	9.8- 28.9	1.08	1927
NOV 12	\$ 144550.0	32.24N 46.98E	33	27	8.5- 45.6	2.92	1927
NOV 16	\$ 012700.3	26.52N 54.10E	33	4	14.3- 30.6	1.21	1927
MAR 08	\$ 181411.2	31.45N 60.16E	33	8	12.3- 34.6	1.03	1928
MAR 24	\$ 105329.1	38.14N 48.47E	33	11	2.5- 31.3	1.93	1928
MAR 28	\$ 115757.3	40.85N 47.17E	33	6	2.1- 23.1	5.23	1928
APR 14	\$ 131648.6	35.71N 54.74E	33	6	6.0- 23.1	2.05	1928
APR 15	\$ 100927.6	27.55N 52.07E	33	5	12.9- 35.5	2.25	1928
AUG 21	\$ 190212.7	36.52N 59.43E	33	13	8.4- 40.9	1.78	1928
NOV 06	\$ 134238.5	40.02N 53.38E	33	10	2.7- 24.5	2.09	1928
JAN 21	\$ 154835.7	31.34N 56.90E	33	5	10.7- 25.6	1.08	1929
MAR 26	\$ 140005.5	26.01N 63.84E	33	14	13.9- 49.1	2.28	1929
MAY 01	\$ 153736.2	37.92N 57.60E	33	103	6.5- 98.2	2.39	1929
MAY 01	\$ 224257.9	38.22N 57.57E	33	8	6.3- 27.7	0.78	1929
MAY 03	\$ 162005.2	38.04N 57.83E	33	11	6.6- 27.9	2.99	1929
MAY 04	\$ 063119.0	38.64N 58.02E	33	7	6.5- 27.5	3.25	1929
MAY 13	\$ 063237.9	38.99N 57.51E	33	4	7.4- 27.0	3.16	1929
MAY 13	\$ 132717.5	37.62N 56.96E	33	25	6.2- 38.6	3.52	1929
JUL 13	\$ 073640.6	37.43N 58.13E	33	32	7.1- 44.0	3.39	1929
JUL 15	\$ 074414.1	32.18N 49.72E	33	79	8.2- 93.7	3.02	1929
JUL 25	\$ 001727.4	37.93N 57.57E	33	15	6.4- 35.3	2.02	1929
SEP 03	\$ 120736.4	26.68N 62.03E	33	56	12.6- 63.1	2.77	1929
OCT 27	\$ 164258.3	32.35N 48.35E	33	10	8.1- 25.9	3.37	1929
OCT 29	\$ 055341.9	27.42N 55.01E	33	25	13.6- 44.5	2.20	1929
OCT 29	\$ 085751.3	25.26N 50.84E	33	8	15.1- 32.3	4.35	1929
OCT 29	\$ 103234.8	26.55N 55.53E	33	8	14.6- 31.8	0.59	1929
OCT 29	\$ 114831.1	27.43N 55.01E	33	9	13.6- 24.2	1.78	1929
NOV 05	\$ 100611.6	36.92N 45.99E	33	5	4.6- 25.0	0.76	1929
NOV 20	\$ 195709.1	27.68N 55.36E	33	9	13.4- 24.3	2.56	1929
FEB 15	\$ 190704.7	28.70N 51.83E	33	15	11.8- 45.1	4.32	1930
APR 03	\$ 063258.8	32.85N 47.00E	33	7	7.9- 29.1	0.73	1930
APR 15	\$ 095625.7	28.03N 53.93E	33	11	12.8- 44.3	3.13	1930
APR 16	\$ 212542.4	38.07N 43.76E	33	5	7.7- 21.8	2.11	1930
MAY 06	\$ 070326.2	37.98N 44.88E	33	21	4.6- 43.1	3.55	1930
MAY 06	\$ 223427.2	38.22N 44.66E	33	116	4.6- 93.0	2.50	1930
MAY 06	\$ 223425.1	37.84N 44.73E	33	219	4.8- 103.6	7.73	1930
MAY 07	\$ 092937.6	37.48N 44.69E	33	5	5.0- 24.1	2.88	1930
MAY 08	\$ 052932.6	38.25N 45.37E	33	7	4.1- 42.6	4.68	1930
MAY 08	\$ 142352.1	40.09N 44.39E	33	6	4.2- 21.6	6.47	1930

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MAY 08	\$	150528.1	38.13N 45.13E	33	12	4.3- 29.2	5.52	1930
MAY 08	\$	153528.6	38.41N 45.07E	33	79	8.7- 86.5	2.75	1930
MAY 08	\$	233622.5	37.56N 44.78E	33	9	4.9- 24.1	4.11	1930
MAY 10	\$	214333.9	38.24N 44.92E	33	16	4.4- 25.8	2.89	1930
MAY 11	\$	223548.1	27.60N 55.25E	33	69	13.5- 62.3	2.27	1930
MAY 12	\$	002112.4	27.39N 54.94E	33	55	13.6- 62.4	2.59	1930
MAY 13	\$	201409.2	27.37N 55.23E	33	11	13.7- 44.1	2.70	1930
MAY 23	\$	094823.9	38.09N 45.18E	33	20	4.3- 42.8	3.46	1930
MAY 29	\$	171459.8	38.06N 44.71E	33	27	4.6- 43.1	3.85	1930
JUN 04	\$	072808.6	38.17N 45.13E	33	42	4.3- 46.9	2.93	1930
JUL 08	\$	171547.3	29.33N 52.89E	33	6	11.3- 44.0	2.26	1930
JUL 09	\$	043557.6	37.73N 44.55E	33	7	4.9- 23.9	3.72	1930
AUG 03	\$	220559.8	38.43N 44.64E	33	20	4.5- 27.7	3.24	1930
AUG 17	\$	122930.2	27.97N 55.22E	33	41	15.2- 50.4	2.84	1930
AUG 21	\$	065529.4	38.40N 45.02E	33	4	8.7- 25.2	0.07	1930
AUG 23	\$	105317.4	27.88N 55.02E	33	73	17.4- 70.2	2.46	1930
SEP 02	\$	185851.2	29.77N 51.58E	33	41	10.7- 65.2	2.63	1930
SEP 05	\$	162034.6	27.44N 55.11E	33	19	13.6- 45.5	2.43	1930
OCT 02	\$	153309.7	35.86N 52.08E	33	14	4.8- 40.1	3.61	1930
OCT 07	\$	205303.0	35.58N 51.90E	33	13	5.0- 40.3	3.01	1930
OCT 18	\$	010222.3	30.07N 51.21E	33	4	10.3- 20.2	0.95	1930
OCT 25	\$	233427.1	38.79N 45.54E	33	15	3.7- 42.2	2.87	1930
DEC 05	\$	055706.6	35.10N 47.95E	33	6	5.5- 27.2	1.33	1930
APR 27	\$	165046.4	39.34N 45.95E	33	108	3.2- 86.3	2.40	1931
APR 27	\$	180521.4	40.90N 47.17E	33	6	2.1- 21.6	1.21	1931
MAY 05	\$	064220.6	26.43N 54.22E	33	16	14.4- 45.4	2.50	1931
MAY 05	\$	114001.9	25.66N 54.74E	33	6	15.2- 43.2	1.59	1931
MAY 05	\$	141043.1	25.96N 54.59E	33	10	17.2- 42.9	1.81	1931
MAY 07	\$	004543.0	26.54N 54.44E	33	14	14.3- 44.9	2.46	1931
MAY 08	\$	090601.2	40.51N 46.16E	33	6	2.9- 21.7	3.13	1931
MAY 12	\$	102515.2	38.79N 45.72E	33	17	3.6- 42.1	3.32	1931
JUL 04	\$	210050.7	37.73N 44.61E	33	9	4.9- 23.8	2.13	1931
JUL 05	\$	175707.6	38.60N 48.85E	33	9	2.0- 25.3	2.65	1931
JUL 28	\$	173629.3	29.58N 52.16E	33	9	14.5- 33.6	3.30	1931
AUG 08	\$	085418.3	35.94N 57.89E	33	12	10.4- 38.9	4.66	1931
NOV 16	\$	082501.7	27.25N 54.91E	33	11	16.0- 36.6	3.14	1931
DEC 24	\$	230010.4	38.65N 44.55E	33	12	8.5- 40.6	1.92	1931
JAN 22	\$	004906.1	32.56N 47.21E	33	14	8.1- 26.7	3.03	1932
FEB 04	\$	211814.1	26.44N 62.50E	33	22	12.1- 50.0	2.12	1932
MAR 15	\$	074436.4	40.38N 45.14E	33	14	1.4- 25.3	2.42	1932
MAR 15	\$	101805.3	33.72N 48.04E	33	14	6.8- 26.6	1.06	1932
MAY 07	\$	145413.7	36.24N 44.97E	33	8	5.5- 25.4	2.77	1932
MAY 20	\$	191617.0	36.25N 53.36E	33	19	4.9- 39.0	4.21	1932
MAY 24	\$	232929.6	38.44N 48.31E	33	10	2.3- 24.2	2.90	1932
MAY 24	\$	233204.1	39.77N 48.60E	33	5	17.5- 28.7	2.38	1932
SEP 08	\$	072536.4	30.83N 58.57E	33	12	11.9- 28.9	1.77	1932
SEP 12	\$	233727.4	38.35N 50.05E	33	9	2.0- 24.8	2.19	1932
FEB 21	\$	190303.8	27.55N 57.31E	33	17	14.2- 43.7	1.89	1933
APR 16	\$	065442.8	38.52N 48.77E	33	6	2.1- 38.1	2.66	1933
OCT 05	\$	132949.6	34.76N 57.45E	33	62	11.4- 67.1	2.57	1933
NOV 06	\$	070715.9	38.99N 43.77E	33	7	2.8- 22.0	4.57	1933
NOV 28	\$	110924.1	32.10N 56.02E	33	62	9.6- 61.4	3.54	1933
DEC 12	\$	052140.2	31.82N 56.16E	33	9	9.9- 25.2	2.10	1933
DEC 14	\$	185146.4	32.19N 55.86E	33	20	9.5- 59.3	2.48	1933
JAN 01	\$	215551.5	31.82N 56.46E	33	8	12.8- 25.1	1.09	1934
JAN 02	\$	205542.2	29.92N 57.55E	33	33	12.2- 60.0	3.39	1934
FEB 04	\$	132717.8	30.25N 51.53E	33	49	10.2- 63.4	3.46	1934
FEB 16	\$	075950.5	25.87N 55.45E	33	8	15.2- 23.1	3.01	1934
FEB 22	\$	080716.3	37.79N 44.95E	33	45	2.4- 54.1	3.16	1934
FEB 26	\$	144714.7	27.12N 57.86E	33	10	14.8- 26.0	2.52	1934
MAR 13	\$	233339.9	31.14N 51.67E	33	12	9.3- 35.8	4.10	1934
MAR 10	\$	020336.7	29.72N 52.68E	33	12	13.3- 24.3	5.24	1934
MAR 18	\$	221927.8	26.35N 52.76E	33	9	16.4- 23.9	1.76	1934
MAR 18	\$	224431.1	26.11N 53.59E	33	13	14.6- 31.1	4.44	1934
MAR 19	\$	032827.9	27.31N 52.71E	33	15	13.2- 35.9	2.62	1934
JUN 08	\$	020155.6	39.53N 48.27E	33	9	2.2- 24.1	2.49	1934
JUN 13	\$	221022.6	27.71N 62.64E	33	128	12.5-103.9	2.39	1934
AUG 31	\$	003932.4	26.19N 56.47E	33	7	18.1- 25.9	3.56	1934
OCT 29	\$	161549.0	40.81N 49.01E	33	40	0.8- 66.7	3.35	1934
NOV 02	\$	220617.2	40.79N 49.13E	33	10	3.6- 22.3	2.23	1934
MAR 05	\$	102640.5	36.15N 53.16E	33	35	7.9- 56.0	3.04	1935
APR 11	\$	231448.4	36.47N 53.56E	33	102	4.8- 98.0	2.32	1935
APR 11	\$	235919.5	36.48N 53.21E	33	11	4.7- 23.9	1.40	1935
APR 12	\$	001126.1	36.84N 53.22E	33	29	7.6- 44.8	3.78	1935
APR 12	\$	003342.2	35.98N 53.09E	33	20	8.0- 34.0	3.53	1935

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APR 12	\$	010642.9	36.51N 53.71E	33	35	4.9- 45.3	3.04	1935
APR 12	\$	124435.6	36.37N 53.45E	33	47	4.9- 55.7	2.67	1935
APR 12	\$	223157.2	36.44N 53.51E	33	30	4.9- 38.0	2.28	1935
APR 13	\$	022924.7	37.05N 53.13E	33	16	4.2- 33.1	3.90	1935
APR 17	\$	133636.9	37.08N 54.00E	33	5	4.6- 20.2	2.81	1935
APR 15	\$	230449.4	36.77N 53.46E	33	14	4.6- 27.4	1.84	1935
MAY 01	\$	102444.6	40.55N 43.33E	33	60	1.0- 71.4	2.72	1935
MAY 02	\$	215551.6	37.21N 44.63E	33	8	3.0- 24.4	2.30	1935
MAY 31	\$	131641.4	31.98N 47.87E	33	22	8.6- 34.5	3.45	1935
JUL 02	\$	152459.5	26.54N 55.02E	33	8	17.3- 37.3	2.88	1935
SEP 22	\$	013958.9	26.63N 62.04E	33	5	15.8- 28.9	2.52	1935
SEP 08	\$	011612.4	37.58N 54.30E	33	12	4.4- 27.0	2.28	1935
OCT 15	\$	170245.1	28.90N 51.31E	33	13	13.8- 36.3	3.99	1935
OCT 27	\$	064305.8	27.34N 54.55E	33	12	15.3- 23.9	2.48	1935
JAN 08	\$	123438.8	26.91N 52.91E	33	16	13.7- 36.3	3.10	1936
FEB 24	\$	162924.8	32.82N 48.30E	33	19	7.7- 29.5	4.36	1936
APR 17	\$	221517.8	27.74N 55.57E	33	21	13.5- 36.4	2.94	1936
APR 21	\$	021437.7	26.29N 55.28E	33	26	14.8- 48.6	1.82	1936
JUN 17	\$	084052.8	25.94N 54.66E	33	5	17.7- 24.8	2.45	1936
JUN 30	\$	193605.2	33.54N 60.41E	33	55	8.1- 56.3	2.42	1936
AUG 16	\$	213700.8	26.05N 55.43E	33	21	15.0- 45.7	2.41	1936
AUG 20	\$	020846.6	30.42N 51.54E	33	17	10.0- 32.6	2.86	1936
AUG 28	\$	001955.8	34.54N 46.92E	33	8	6.0- 24.1	0.64	1936
SEP 07	\$	085242.1	31.49N 60.75E	33	9	9.6- 25.3	1.62	1936
NOV 06	\$	202705.1	27.91N 56.71E	33	15	13.7- 24.8	2.09	1936
FEB 13	\$	021749.5	30.64N 55.99E	33	7	12.7- 26.4	4.58	1937
MAR 07	\$	191056.8	38.77N 45.40E	33	13	1.6- 23.1	4.84	1937
APR 07	\$	183103.3	34.81N 52.37E	33	32	5.9- 35.9	3.82	1937
MAY 11	\$	160213.7	28.81N 58.50E	33	9	12.9- 15.3	2.13	1937
MAY 12	\$	091049.1	30.71N 57.30E	33	11	11.9- 26.2	3.21	1937
MAY 21	\$	215616.9	27.60N 54.32E	33	11	16.0- 29.5	1.99	1937
NOV 19	\$	023613.0	31.96N 49.45E	33	8	8.4- 26.0	3.89	1937
JAN 26	\$	034007.9	33.12N 45.87E	33	28	7.1- 41.0	2.58	1938
APR 23	\$	060406.4	27.15N 53.18E	33	34	13.5- 64.1	1.49	1938
APR 23	\$	092605.2	27.22N 53.28E	33	29	13.4- 45.3	2.42	1938
JUL 19	\$	194527.5	34.92N 59.35E	33	12	7.7- 25.6	1.93	1938
DEC 19	\$	185652.9	36.23N 57.96E	33	17	7.6- 23.9	1.83	1938
JAN 25	\$	110224.7	30.41N 50.73E	33	18	10.0- 44.6	3.55	1939
APR 06	\$	040807.8	35.15N 54.56E	33	19	6.4- 58.6	2.99	1939
JUN 10	\$	083648.5	33.90N 56.97E	33	18	9.9- 48.7	2.58	1939
JUN 30	\$	000149.4	34.61N 56.47E	33	11	7.8- 35.0	1.70	1939
JUL 24	\$	172956.2	27.96N 53.97E	33	10	15.6- 30.1	2.91	1939
AUG 18	\$	225235.4	26.83N 54.49E	33	15	15.7- 41.9	3.22	1939
AUG 28	\$	213533.6	36.14N 58.58E	33	10	7.5- 29.9	3.92	1939
SEP 19	\$	032406.8	38.28N 57.28E	33	43	6.1- 46.8	2.45	1939
NOV 04	\$	101524.3	32.55N 49.08E	33	48	7.8- 82.0	2.75	1939
NOV 08	\$	172115.1	36.33N 58.12E	33	15	7.6- 48.2	2.02	1939
NOV 28	\$	142215.2	32.19N 49.55E	33	18	8.2- 35.2	2.73	1939
MAR 17	\$	090858.0	38.24N 42.85E	33	10	2.3- 23.0	2.16	1940
MAY 04	\$	170437.6	35.68N 57.81E	33	11	7.8- 24.3	2.05	1940
MAY 04	\$	182836.3	38.67N 54.98E	33	5	11.3- 18.5	0.91	1940
MAY 04	\$	210159.1	35.77N 58.45E	33	67	8.2- 63.7	2.46	1940
MAY 05	\$	060139.2	35.18N 57.80E	33	13	8.1- 31.2	2.69	1940
JUN 01	\$	151015.5	28.36N 54.06E	33	8	12.5- 23.7	3.91	1940
JUL 06	\$	072023.7	33.92N 46.13E	33	10	8.5- 84.9	2.12	1940
JUL 06	\$	174522.3	34.42N 46.72E	33	17	9.0- 34.7	3.26	1940
JUL 10	\$	131104.1	41.62N 43.63E	33	24	2.3- 26.6	3.05	1940
JUL 11	\$	012350.3	40.55N 49.01E	33	7	0.9- 19.6	4.15	1940
SEP 25	\$	193125.0	36.44N 52.04E	33	41	12.2- 64.7	2.29	1940
DEC 16	\$	095120.2	28.29N 56.80E	33	9	17.4- 22.3	4.00	1940
FEB 04	\$	190928.3	28.87N 53.87E	33	8	15.3- 39.8	3.24	1941
FEB 16	\$	163903.1	33.30N 58.87E	33	55	9.1- 91.5	2.15	1941
MAR 28	\$	211323.8	28.18N 54.16E	33	32	12.7- 44.1	2.79	1941
MAR 29	\$	003740.4	28.22N 54.09E	33	9	15.6- 40.8	2.61	1941
JUN 10	\$	203849.4	33.51N 46.95E	33	35	9.2- 64.7	2.84	1941
JUN 15	\$	123854.7	26.43N 53.29E	33	6	14.2- 21.3	3.09	1941
AUG 28	\$	001848.0	34.61N 47.14E	33	12	9.4- 40.6	2.43	1941
SEP 10	\$	215354.5	38.95N 43.36E	33	41	5.2- 80.0	2.10	1941
MAR 27	\$	183803.3	39.82N 53.81E	33	11	11.9- 32.8	2.79	1942
JUN 07	\$	104749.5	26.69N 56.03E	33	7	18.8- 42.7	2.94	1942
JUL 29	\$	202209.3	29.74N 57.50E	33	15	15.0- 44.6	2.83	1942
FEB 06	\$	023601.0	24.90N 63.30E	33	29	10.7- 59.7	1.69	1943
DEC 31	\$	093536.3	27.22N 60.61E	33	6	13.2- 27.3	1.95	1943
APR 05	\$	180602.2	37.03N 54.62E	33	8	15.6- 46.5	2.24	1944
JUL 17	\$	105352.8	36.25N 42.89E	33	25	6.2- 93.8	1.91	1944
NOV 09	\$	193942.9	37.66N 48.27E	33	8	3.9- 20.8	3.61	1944

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JAN 11	\$ 020314.2	27.19N 55.06E	33	21	13.8- 50.7	3.48	1945
JAN 15	\$ 053012.4	38.57N 43.86E	33	7	5.0- 27.1	0.68	1945
JAN 15	\$ 172133.1	27.04N 54.85E	33	18	13.9- 50.5	2.75	1945
FEB 01	\$ 195338.5	36.51N 57.74E	33	11	7.3- 37.6	1.58	1945
MAR 12	\$ 013845.3	31.08N 47.11E	33	15	9.3- 42.0	3.12	1945
MAY 11	\$ 201735.3	35.34N 52.75E	33	10	5.5- 34.8	4.52	1945
JUL 21	\$ 013341.4	38.65N 43.36E	33	10	1.8- 26.8	2.16	1945
JUL 29	\$ 085700.7	39.04N 43.12E	33	7	1.8- 24.3	2.52	1945
SEP 05	\$ 013342.4	38.20N 57.18E	33	6	7.8- 22.9	0.69	1945
NOV 20	\$ 062801.0	38.92N 43.32E	33	26	1.6- 91.8	2.83	1945
NOV 27	\$ 215655.3	25.03N 63.40E	33	75	10.7-108.2	2.46	1945
FEB 10	\$ 131331.3	32.46N 59.90E	33	8	14.6- 28.0	3.57	1946
MAR 02	\$ 204702.6	34.72N 45.62E	33	8	5.5- 24.3	3.20	1946
MAR 05	\$ 044515.2	40.74N 50.25E	33	23	4.3- 91.2	5.07	1946
MAR 12	\$ 022158.6	29.72N 51.72E	33	51	10.8- 91.3	3.20	1946
MAR 17	\$ 210600.9	24.96N 63.50E	33	13	10.5- 46.4	1.24	1946
MAR 27	\$ 233035.5	25.42N 64.64E	33	37	10.0- 62.4	1.96	1946
JUL 27	\$ 162547.5	35.76N 45.97E	33	39	5.3- 43.8	1.81	1946
AUG 07	\$ 224649.3	23.93N 64.08E	33	16	9.5- 58.7	2.37	1946
AUG 17	\$ 094805.1	35.27N 46.23E	33	37	5.8- 44.0	2.92	1946
AUG 17	\$ 233740.0	35.50N 46.00E	33	45	5.5- 95.6	2.84	1946
SEP 19	\$ 001143.0	32.28N 56.43E	33	10	11.3- 36.9	1.42	1946
OCT 03	\$ 153743.1	39.44N 44.16E	33	21	0.8- 63.1	3.08	1946
NOV 04	\$ 214748.8	39.84N 54.59E	33	116	3.6-106.9	1.61	1946
JAN 02	\$ 141108.0	28.49N 51.87E	33	9	13.9- 21.4	2.85	1947
APR 19	\$ 173912.3	37.67N 43.30E	33	37	2.7- 37.7	2.92	1947
MAY 04	\$ 005017.3	27.77N 56.51E	33	13	13.7- 42.1	5.55	1947
MAY 04	\$ 223407.9	26.48N 55.33E	33	15	16.4- 26.1	3.11	1947
JUN 23	\$ 115046.5	39.70N 54.59E	33	13	3.7- 33.3	3.06	1947
JUL 13	\$ 145130.6	37.58N 57.52E	33	13	6.6- 36.4	5.06	1947
AUG 05	\$ 142414.4	25.06N 63.44E	33	92	10.6-106.5	2.01	1947
SEP 23	\$ 122816.0	33.42N 58.66E	33	76	4.5- 99.0	3.04	1947
SEP 25	\$ 182514.9	33.07N 58.97E	33	7	4.9- 23.8	1.35	1947
SEP 26	\$ 030440.7	33.52N 58.80E	70	47	4.4- 91.3	3.16	1947
SEP 27	\$ 081615.5	33.22N 58.94E	33	8	4.7- 23.6	1.60	1947
OCT 03	\$ 061350.3	25.99N 57.41E	33	63	12.0- 96.9	2.29	1947
OCT 06	\$ 151821.0	33.45N 58.85E	33	22	4.5- 51.0	2.21	1947
OCT 29	\$ 220551.3	28.82N 60.00E	33	6	9.2- 43.4	0.42	1947
NOV 13	\$ 032631.3	33.54N 58.91E	33	24	4.4- 51.0	2.53	1947
DEC 07	\$ 192306.3	39.70N 42.55E	33	18	1.6- 25.5	3.44	1947
DEC 09	\$ 163227.4	25.10N 63.23E	33	18	10.8- 52.4	3.06	1947
JAN 30	\$ 084354.8	25.14N 63.69E	33	63	10.5-106.8	2.44	1948
FEB 01	\$ 233828.5	26.92N 57.85E	33	15	11.0- 52.3	3.37	1948
FEB 11	\$ 153116.9	35.52N 46.08E	33	16	4.8- 30.1	4.09	1948
MAR 14	\$ 211816.9	33.08N 58.90E	33	30	4.9- 44.4	1.90	1948
APR 26	\$ 072418.4	35.30N 44.56E	33	15	4.9- 24.1	2.29	1948
JUN 17	\$ 140827.9	36.64N 49.24E	33	36	3.8- 84.5	2.41	1948
JUN 18	\$ 184437.4	37.36N 57.59E	33	53	0.8- 87.5	2.01	1948
JUN 30	\$ 193144.6	36.49N 49.45E	33	21	3.9- 84.9	4.78	1948
JUL 05	\$ 135317.8	29.46N 57.78E	33	72	8.5-102.4	3.15	1948
JUL 30	\$ 033012.4	31.21N 49.12E	33	45	9.2- 88.8	2.33	1948
AUG 05	\$ 223523.4	31.69N 49.02E	33	13	11.3- 26.4	2.12	1948
SEP 08	\$ 111826.6	34.02N 59.34E	33	9	8.3- 26.4	1.62	1948
OCT 05	\$ 201209.4	37.82N 58.32E	33	125	7.0-102.2	2.81	1948
OCT 05	\$ 223902.0	39.38N 71.03E	33	6	1.8- 2.8	4.25	1948
OCT 06	\$ 012447.0	37.64N 58.53E	33	49	6.9- 48.0	2.30	1948
OCT 17	\$ 061633.3	38.06N 58.70E	33	12	6.7- 36.9	3.89	1948
NOV 02	\$ 152423.8	37.20N 59.00E	33	14	6.7- 47.9	3.45	1948
JAN 02	\$ 125027.9	25.08N 64.12E	33	39	11.1- 53.0	1.98	1949
MAR 06	\$ 163646.9	30.01N 51.44E	33	30	9.7-100.9	2.26	1949
APR 24	\$ 042215.6	27.22N 56.42E	60	89	15.3- 95.5	1.93	1949
MAY 13	\$ 050306.8	25.91N 57.09E	33	7	16.0- 19.5	1.78	1949
JUN 22	\$ 015048.6	33.81N 45.61E	33	17	6.4- 37.4	2.94	1949
JUL 04	\$ 034043.8	27.62N 56.61E	33	80	10.4- 95.1	1.71	1949
JUL 04	\$ 042211.7	27.36N 56.55E	33	13	15.0- 46.5	1.71	1949
JUL 05	\$ 023004.5	27.42N 56.57E	33	47	10.6-104.1	2.31	1949
JUL 21	\$ 212611.1	27.16N 58.36E	33	15	14.3- 60.1	3.79	1949
AUG 05	\$ 071447.1	27.67N 56.35E	33	21	14.9- 59.6	2.43	1949
SEP 02	\$ 014740.1	35.71N 45.82E	33	19	4.6- 79.2	2.90	1949
OCT 13	\$ 102634.8	36.60N 44.50E	33	37	3.6-102.1	3.02	1949
NOV 05	\$ 150544.4	37.16N 55.16E	33	20	2.7- 94.3	3.17	1949
NOV 22	\$ 152120.1	28.06N 57.06E	33	42	9.9-103.5	2.26	1949
DEC 14	\$ 034349.5	35.22N 58.75E	33	11	2.7- 38.6	2.57	1949
DEC 16	\$ 232407.2	27.33N 54.40E	33	11	11.1- 65.8	3.48	1949
DEC 17	\$ 011318.2	37.53N 57.03E	33	18	1.1- 94.1	2.67	1949

TABLE (6.1)

AFTERSHOCKS OF THE EARTHQUAKE APRIL 29, 1968, MAKU
READINGS OF TABRIZ (TAB)

DATE	TIME (GMT)			S-P SEC	AMPLITUDE (MM)			MAG.	INT.	NOTES
	H.	M.	SEC		N	E	Z			
1968										
APRIL										
29	17	22	16	27.0	4.0	6.5	5.0	3.2	IV	
29	18	39	30	30.6	18.0	40.0	38.0	4.1	V+	
29	18	47	41	25.0	1.2	2.2	1.8	2.7	IV	
29	19	57	46	26.0	59.0	108.0	68.0	4.4	VI	KER+SIR
29	22	17	07	25.0	0.5	0.9	0.6	2.3	III	
29	23	05	35	29.0	3.2	3.5	3.0	3.1	IV	
30	08	11	50	26.0	0.5	0.5	0.6	2.2		
30	11	56	27	23.0	3.0	4.0	3.5	3.0	IV	
30	12	27	44	29.0	0.5	0.5	0.6	2.3		
MAY										
01	05	46	41	23.0	2.5	2.7	3.0	2.9		
01	09	06	55	10.0	8.0	22.0	12.0	3.3		
01	10	18	01	15.9	6.0	7.5	7.6	3.1		
01	23	41	40	31.2	3.2	5.3	6.3	3.3	IV	
02	10	03	09	25.0	6.5	18.0	16.4	3.7	V	
02	13	53	12	24.6	13.0	9.0	10.3	3.5	IV	KER
04	06	05	22	39.2	4.8	3.0	3.0	3.2		
04	18	36	45	31.0	1.8	2.5	2.8	3.0		
06	00	23	50	28.0	0.5	0.7	0.6	2.3		
07	11	54	27	30.0	3.0	4.0	4.0	3.1		
08	12	18	53	26.5	12.5	34.0	31.0	3.9	V	
08	21	13	55	15.0	2.7	4.0	3.5	2.8		
09	23	08	48	23.0	1.2	1.5	3.0	2.8		
10	18	49	07	25.0	1.5	2.8	2.5	3.1		
10	23	07	31	30.5	0.5	1.0	1.3	2.6		
10	23	10	56	28.0	0.6	1.5	1.2	2.6		
11	00	15	40	31.0	1.5	1.2	1.5	2.7		
11	00	34	30	27.0	0.8	1.5	1.0	2.6		
11	06	31	21	20.0	3.4	4.3	4.5	3.0		
11	11	30	52	24.0	2.8	3.5	4.0	3.0		
11	21	43	20	32.2	5.3	11.0	14.0	3.6	V	
12	03	36	25	29.5	2.8	4.0	4.2	3.1		
12	05	15	22	27.6	6.2	18.0	14.0	3.7	V	SIR
12	05	16	58	25.4	50.0	88.0	57.0	4.1		
12	06	31	35	31.4	0.5	0.5	0.5	2.3		
12	12	43	52	17.5	8.0	12.0	15.8	3.4		
13	18	23	54	32.0	1.5	2.8	2.5	3.0		
14	05	19	21	22.0	10.5	29.6	15.0	3.7		
14	23	00	39	32.6	2.3	3.0	3.2	3.0		
15	23	51	12	27.0	0.5	0.6	1.0	2.4		
16	02	21	37	32.5	8.0	13.5	11.0	3.7		
16	03	12	30	34.0	2.5	3.5	3.0	3.1		
16	05	50	11	35.0	3.0	7.0	5.0	3.3		
18	10	05	13	33.3	4.0	7.0	5.2	3.3		
18	12	10	32	25.0	0.7	1.0	0.8	2.4		
18	16	08	45	26.5	2.5	3.0	3.0	3.0		
20	19	19	58	31.5	60.0	115.0	86.0	4.5	VI-	KER+SIR
20	20	16	53	24.5	3.5	4.0	3.8	3.0		
20	23	02	35	27.0	1.3	3.0	2.6	2.9		
21	01	13	17	17.0	2.0	2.5	3.0	2.7		
21	01	22	54	17.0	1.2	2.5	3.0	2.7		
21	20	31	32	30.5	14.0	30.0	25.0	3.9	IV	
22	00	58	37	9.0	2.0	9.0	6.0	2.9		
22	05	10	12	29.5	6.2	7.0	8.0	3.4		KER
22	10	50	32	32.2	9.6	12.0	20.0	3.7		
26	05	04	21	19.0	2.3	2.5	3.2	2.8		
26	05	35	42	40.0	7.0	9.5	8.0	3.6		
26	17	33	25	26.0	1.6	2.2	2.8	2.8		
26	17	56	13	19.5	1.5	4.0	3.0	2.9		
26	18	54	02	24.0	1.3	1.5	1.0	2.6		
26	23	48	49	21.6	43.0	78.0	57.0	4.2	V	
27	01	31	27	17.0	39.0	51.0	43.0	4.0	V-	
28	01	38	29	14.5	3.5	3.6	3.0	2.7		
30	12	32	38	28.0	13.0	30.0	28.0	3.9		
31	18	20	29	27.8	1.5	3.2	3.6	3.0		
JUNE										
01	10	13	41	33.6	3.0	1.3	2.5	3.0		
08	22	24	44	30.4	6.5	3.0	4.2	3.2		
08	23	12	44	25.0	1.0	0.5	0.5	2.3		
10	17	13	13	24.6	5.0	6.0	8.0	3.3		
10	18	03	01	29.0	2.5	2.0	1.5	2.8		
13	11	50	07	30.0	3.5	1.5	2.0	2.9		
18	06	47	49	27.0	3.0	2.5	2.5	2.9		
18	10	09	55	30.3	5.0	4.5	4.0	3.3		
18	17	02	37	30.0	4.5	6.0	4.5	3.3		
19	14	26	32	30.0	9.0	7.0	11.0	3.5		
19	20	13	12	29.4	13.0	19.5	19.0	3.8		
21	01	36	56	30.0	2.0	3.0	3.0	3.0		
21	23	20	04	32.0	2.5	3.0	4.0	3.1		

TABLE (6.2)

AFTERSHOCKS OF THE EARTHQUAKE JUNE 9, 1968: AHAR
READINGS OF TABRIZ (TAB)

DATE	TIME (GMT)			S-P SEC	AMPLITUDE (MM)			MAG.	INT.	NOTES
	H.	M.	SEC		N	E	Z			
1968										
JUNE										
09	01	26	07	14.0	7.5	12.0	7.5	3.6		
09	01	31	55	17.3	9.0	7.0	9.0	3.7		
09	02	48	39	15.6	11.5	9.0	6.0	3.6		
09	03	27	18	19.0	4.0	4.0	8.0	3.5		
09	03	55	54	5.0	4.0	3.0	3.3	2.8		
09	03	59	54	17.2	5.5	10.5	8.0	3.6		
09	04	58	53	16.0	6.0	4.0	5.0	3.4		
09	07	15	18	16.0	10.5	10.0	16.5	3.7		
09	10	35	55	17.0	13.0	13.5	14.0	3.9		
09	11	38	40	16.0	41.0	22.0	31.0	4.2	V	MB=4.2 (CGS)
09	14	04	35	18.0	6.0	4.0	3.0	3.4		
09	16	32	47	10.0	3.0	2.0	2.0	2.9		
09	22	21	26	16.6	3.0	5.0	4.0	3.3		
09	23	30	00	9.4	5.0	7.0	5.5	3.3		
10	05	50	42	17.0	39.0	36.0	34.0	4.3		
10	10	58	49	17.7	5.0	6.0	7.0	3.5		
10	11	09	02	18.5	7.0	3.0	4.0	3.5		
10	13	18	31	16.0	4.0	3.5	4.0	3.3		
10	13	39	05	15.7	8.0	4.0	4.0	3.5		
10	14	33	42	17.0	43.0	31.0	43.0	4.3		SIR, KER
10	20	54	05	18.0	2.0	1.5	2.0	3.0		
10	21	55	52	17.5	1.0	1.5	1.0	2.8		
11	01	20	03	16.8	14.5	31.0	23.0	3.6		
11	23	35	44	18.0	2.0	3.5	4.0	3.3		
13	20	02	56	9.0	1.5	1.0	0.5	2.5		
14	03	24	39	18.0	8.0	12.0	13.0	3.8		
15	03	21	33	14.0	42.0	30.0	25.0	4.2		
16	06	25	56	17.0	13.5	13.0	20.0	3.9	IV	
23	04	40	20	14.8	23.5	30.5	36.0	4.2		
23	05	31	40	13.0	7.0	6.0	6.0	3.4		
24	04	37	16	15.7	5.0	5.0	6.0	3.4		
27	07	44	08	14.6	4.0	6.5	7.5	3.5		

TABLE (6.3)

AFTERSHOCKS OF THE EARTHQUAKE MARCH 14, 1970: KHOY
READINGS OF TABRIZ (TAB)

DATE	TIME (GMT)			S-P SEC	AMPLITUDE (MM)			MAG.	INT.	NOTES
	H.	M.	SEC		N	E	Z			
1970										
MARCH										
14	02	01	12	19.7	39.0	68.0	48.0	4.4	V	
14	02	16	55	24.0	1.8	4.0	4.0	3.3		
14	02	29	36	19.7	1.0	2.0	2.1	2.9		
14	04	21	41	22.5	1.0	1.0	1.0	2.7		
14	07	29	16	19.7	4.1	8.0	6.0	3.5		
14	07	33	35	31.5	2.0	2.0	4.0	3.3		
14	11	18	40	20.0	1.0	1.5	1.5	2.8		
14	13	02	30	28.0	1.5	1.5	1.5	3.0		
14	15	29	20	06.0	2.5	4.0	5.0	2.8		
14	15	34	37	27.5	10.0	22.0	28.0	4.2		
14	16	10	36	22.1	4.5	12.0	9.0	3.7		
14	17	00	10	26.7	2.5	4.5	5.0	3.5		
14	17	23	28	26.3	5.5	15.0	13.0	3.9		
14	17	26	38	19.1	3.0	5.0	5.0	3.3		
14	17	34	15	19.4	2.0	4.0	3.5	3.2		
14	19	19	20	21.4	10.0	21.0	21.0	4.0		
14	19	53	11	27.5	1.5	2.8	2.8	3.2		
14	22	24	58	22.5	1.3	2.2	2.5	3.1		
14	23	45	48	20.0	0.6	1.0	1.2	2.8		
15	04	30	17	20.0	1.0	3.0	2.0	3.0		
15	08	42	49	20.0	1.0	2.0	2.0	2.9		
15	15	13	24	16.0	1.5	2.0	2.0	2.9		
17	20	24	30	24.0	2.0	3.5	3.2	3.2		
19	17	25	22	22.0	2.0	4.0	4.0	3.3		
19	17	39	14	24.0	1.5	4.5	3.5	3.3		
19	17	58	06	21.0	1.0	3.0	2.5	3.1		
20	09	31	07	22.0	2.5	4.0	2.8	3.2		
24	08	44	20	25.0	1.0	3.0	2.0	3.1		
25	08	23	53	25.5	1.5	3.4	2.0	3.2		
25	17	47	31	24.0						
25	21	47	57	21.0	1.0	2.0	1.5	2.9		
25	22	36	23	23.0						
26	09	26	30	11.0	1.0	2.0	2.0	2.7		
27	06	06	55	20.0						
27	22	59	56	22.1	2.0	3.5	4.5	3.3		
28	06	29	08	19.0						
30	17	07	58	20.7						
31	19	01	34	21.5	1.5	2.5	2.5	3.1		
APRIL										
01	18	10	24	24.8	23.0	30.0	45.0	4.3		KER, SIR
03	08	36	06	14.0						
03	09	08	40	27.0						
04	02	33	05	24.2	1.5	2.5	2.5	3.1		
06	10	30	45	13.5	5.0	9.5	8.5	3.4		

TABLE (11.1)

1908 SEP. 28. 06 28 00. 38 N 44 E

REFER	PRIMAR H. M.	SECONDAR H. M.	AMP. IN.	DUR. H. M.	REMARKS
001	06 34.4	06 51.4	0.6	1 56	A
001	06 35.2	06 49.9	1.7	1 55	C
001	06 34.2	06 49.9	0.5	1 55	B
KEW	06 43.7	06 49.1	0.8	0 23	
LVR	06 41.6	06 53.7	0.6	0 33	
ED1	06 43.0	06 52.0	0.7	0 31.5	
002	06 39.6	06 48.0	1.0	0 47	
003	06 32.7	06 47.	1.5	0 41	
004	06 30.2	06 39.5	2.5		
004	06 31.4	06 37.5	1.0		A
004		06 40.0			B
005	06 29.5	06 31.5	9.5	0 39	
CAL	06 53.2	06 59.8	0.75	0 17.3	
BOM	06 49.3	06 49.5	0.4	0 14.0	
KOD	06 41.6	06 55.5	0.6	0 28.0	
PER	06 43.0	06 51.	0.7	0 30	
CGH	07 12.0		0.5	0 15	
CAL	07 48.2	07 49.7	0.5	0 08.1	

001 SHIDE 50.41N 1.17W
 003 MALTA 35.54N 14.31E
 002 HASLEMERE 51.5N 0.43W
 004 CAIRO 29.51N 31.30E
 005 BEIRUT 33.54N 35.28E
 010 BATAVIA 6.11S 106.47E
 015 MAURITIUS 20.5S 57.53E

TABLE (11.2)

1909 JAN. 23. 02 48 03. 33.3N 50.2E

REFER	PRIMAR H. M.	SECONDAR H. M.	AMP. IN.	DUR. H. M.	REMARKS
001	02 55.5	03 16.5	8.5	4 00	A AND B. PERSIA
001	02 55.5	03 13.5	7.0	4 00	C
KEW	02 57.2	03 16.9	7.0	4 48	
LVR	03 00	03 18.1	12.3	2 10	
ED1	02 56.0	03 21.	7.5	1 53	
002	03 02.6	03 13.7	10.	1 40	WEST OF PERSIA
002		03 17.2	9.0		
002		03 19	6.0		
SFS	03 02.4	03 12.1	3.5	1 48.7	BRUJIRD(PERSIA)
SFS		03 15.9	7.5		
SFS		03 19.9	3.0		
003	02 54.5	03 10	10.0		LURISTAN,PERSIA
005	02 53	02 58	31.4	2 28	
PDA	03 04.5	03 11.4	1.0	0 49.3	
004	02 51.3	02 59.5	*15.0	2 25	B+A NOT WORKING.P3.2 54.5
BOM	02 57.7	03 15.7	1.4	1 34	
CGH	03 08.7	03 27.2	4.5	1 51	
KOD	02 56.7	03 14.6	2.0	1 44	LURISTAN
IRK	02 58.3	03 12.9	3.8	3 13	
TOR	03 14.1	03 44.6	1.05	1 21	SMALL,PERSIA
PIL	03 14.1	03 48.1	0.8	1 45.3	SMALL,EXTENDED
010	03 21.1	03 45.2	0.6		P2.03 35.5,P3 03 44.0,LURISTAN,W.PERSIA
HNL	03 23.2	03 39.6	0.6	2 40.	P3 03 38.5
HNL		03 56.3	0.7		
HNL		04 04.8	0.6		
HNL		04 09.8	0.7		
HNL		04 16.4	0.7		
012	03 38.5				
PER	03 00.2	04 22.2	1.0	1 50	
PER	03 49.6			1 36.7	
DJA	03 08.2	03 11.4	0.5		PERSIA
DJA		03 21.6	0.3	1 05	
015	02 58.0	03 18.0	1.0		E-W
015	02 58.0	03 21.0	0.9		N-S
PIL	03 14.8	04 07.8	4.5	2 30.6	TRUE EARTHQUAKE
PER	03 00	03 22	8.3	*2 00	END OBSCURED BY AIR TREHORS