THE RIO CUARTO CRATER FIELD RE-VISITED: REMOTE SENSING IMAGERY ANALYSIS AND NEW FIELD OBSERVATIONS.

Introduction:

The Rio Cuarto crater field consists of 10 elongate depressions occurring along a line 30-40km long. It is found in the Pampas of Argentina, north of the city of Rio Cuarto, at ~32°50’S, 64°10’W, and was first described in detail by Schultz and Lianza [1]. Previously, some of these features had been identified as deflations [2], however, based on the morphology of the depressions, and recovery of glass and fragments of chondritic meteorite, Schultz and Lianza [1] interpreted the structures as the result of the highly oblique impact of a chondritic body 150-300m in diameter. Glass was later shown to have elevated Cr, Ni, and Ir abundances [3,4], a low water content [3], and contained rare shocked quartz grains [3], suggesting that the material was in fact an impactite, and further strengthening the impact argument.

Results and Discussion:

We conducted an extensive remote sensing study of the Rio Cuarto site and the surrounding Pampas, using CORONA and EOS TerraASTER satellite imagery. Our survey reveals >100 features that bear a strong similarity to those described previously [1], with several >5km in length.

We visited >50 of these features (including several of those previously identified [1]) during fieldwork in the area. Similarities indicated by the satellite imagery (elongate scars with high length-to-width ratios and orientations ~NNE-SSW) are confirmed on the ground: rims (occasionally degraded) 3-10m above the plains, and bases 3-10m below the plains are characteristic. In addition, 3 samples of chondrite were recovered from craters D and E (both these craters also yielded abundant glass, the largest sample 17x9x6cm), and glass was found in 2 of the new structures following brief searches. The absence of glass at other sites appears to be related to variable preservation of the original surface – many features are infilled with lakes, swamp, or dunes, or are cultivated.

Conclusion:

Our findings suggest that all the depressions (those previously identified [1], and the new features we describe) have a common formation mechanism. Further work is needed to establish the formation mechanism, either exogenic or endogenic, of the Rio Cuarto structures.