

Appendix 7

Table 7.10: Average chemical analyses of four least-altered biotite diorites from Cerro Corona used to calculate the average oxygen and hydrogen percentage.

	Al ₂ O ₃	CaO	Fe ₂ O ₃	Cr ₂ O ₃	K ₂ O	MgO	MnO	Na ₂ O	P ₂ O ₅	SiO ₂	TiO ₂	LOI	
BD least altered (n=4)	15.64	3.04	5.50	0.02	2.23	1.87	0.06	3.51	0.28	62.45	0.53	3.96	
Standard deviation	1.12	0.48	0.34	0.00	0.48	0.16	0.02	0.62	0.10	1.50	0.02	0.44	
Molecular wt. (g/mol)	101.96	56.08	159.69	151.99	94.20	40.30	70.94	61.98	141.94	60.08	79.87	18.02	
Oxygen													
O in molecule (wt. %)	47.07	28.53	30.06	31.58	16.99	39.70	22.55	25.81	56.36	53.26	40.07	88.81	
wt. % oxygen	7.36	0.87	1.65	0.01	0.38	0.74	0.01	0.91	0.15	33.26	0.21	3.52	49.07
Standard error	0.53	0.14	0.10	0.00	0.08	0.06	0.01	0.16	0.06	0.80	0.01	0.39	2.6
													49.0±2.6
Hydrogen													
H in molecule (wt. %)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.19	
wt. % hydrogen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.44
Standard error	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
													0.44±0.05

The percentage oxygen or hydrogen is calculated as the product of the weight percent oxide and the percentage of oxygen or hydrogen within each oxide. All the LOI is assumed to be H₂O. The errors for oxygen are calculated as the standard deviation divided by the square root of the number of samples (four). These errors are assumed, thus the error is the maximum error.

Table 7.11: Location of sample location, clay mineral proportions (K=kaolinite, I = illite, S = smectite and C=Chlorite) and isotope values (‰).

Sample location			Mineral proportions				Oxygen isotopes								Hydrogen isotopes	
							Non-treated		70 °C		200 °C		>1000 °C			
No.	Drill core	Depth (m)	K	I	S	C	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	δD	Error
JL1.111	CCD-101	227	97	3	0	0	-	-	5.3	0.1	-	-	9.8	0.1	-	-
JL1.113	CCD-101	329	-	-	-	-	-	-	-	-	3.9	0.4	-	-	-100	1.4
JL1.116	GFD-124	3	0	100	0	0	8.7	0.1	-	-	-	-	-	-	-	-
JL1.117	GFD-124	14	6	94	0	0	6.1	0.3	-	-	6.8	0.3	-	-	-92	1.4
JL1.153	CCD-182	124	47	7	46	0	3.9	0.2	-	-	3.6	0.2	-	-	-95	-
JL1.154	CCD-182	137	-	-	-	-	-	-	-	-	5.5	0.3	8.8	0.1	-104	1.4
JL1.161	GFD-189	28	13	2	85	0	4.0	0.4	-	-	-	-	-	-	-90	1.9
JL1.164	GFD-189	36	0	34	21	45	2.8	0.2	-	-	-	-	-	-	-	-
JL1.165	GFD-189	41	68	0	32	0	-	-	-	-	5.8	0.3	-	-	-100	1.4
JL1.166	GFD-189	53	0	8	56	36	-	-	-	-	1.2	0.1	-	-	-103	1.4
JL1.169	GFD-189	61	0	53	38	9	3.8	0.2	-	-	2.9	0.3	7.6	0.1	-68	1.4
JL1.170	GFD-189	71	0	100	0	0	7.3	0.4	-	-	-	-	-	-	-	-
JL1.171	GFD-189	92	0	1	99	0	7.7	0.2	8.7	0.1	4.4	0.3	11.8	0.1	-103	1.4
JL1.173	GFD-189	111	-	-	-	-	-	-	-	-	5.5	0.4	8.6	0.1	-93	1.4
JL1.175	GFD-189	162	0	0	100	0	7.8	0.1	6.5	0.1	8.9	0.1	-	-	-96	1.4
JL1.191	CCD-037	257	38	62	0	0	4.8	0.1	-	-	5.5	0.4	-	-	-88	1.4
JL1.195	CCD-037	290	0	46	30	24	3.2	0.2	3.4	0.4	5.0	0.4	-	-	-104	1.4
JL1.196	CCD-037	296	0	79	0	21	-	-	-	-	3.6	0.0	5.7	0.1	-110	1.4
JL1.197	CCD-037	311	59	41	0	0	2.4	0.5	-	-	-	-	-	-	-	-
JL1.20	GFD-155	317	0	100	0	0	-	-	-	-	3.9	0.3	-	-	-106	1.4
JL1.200	GFD-153	34	0	100	0	0	8.3	0.1	-	-	-	-	-	-	-92	1.9
JL1.209	CCD-243	218	0	0	91	9	5.1	0.1	4.2	0.2	5.1	0.3	-	-	-109	1.4
JL1.22	GFD-155	373	0	0	3	97	-	-	-	-	4.7	0.3	-	-	-103	1.4
JL1.25	GFD-155	471	0	99	1	0	8.0	0.1	-	-	6.7	0.0	8.8	0.2	-91	1.9
JL1.29	GFD-178	53	31	5	64	0	6.0	0.5	-	-	7.7	0.3	-	-	-98	1.4
JL1.35	GFD-178	124	0	19	63	18	-	-	-	-	4.7	0.3	-	-	-95	1.4
JL1.41	GFD-178	252	38	4	58	0	2.2	0.1	-	-	4.4	0.3	-	-	-93	1.4

Sample location			Mineral proportions				Oxygen isotopes								Hydrogen isotopes	
							Non-treated		70 °C		200 °C		>1000 °C			
No.	Drill core	Depth (m)	K	I	S	C	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	$\delta^{18}\text{O}$	Error	δD	Error
JL1.48	GFD-190	64	87	5	9	0	5.1	0.2	-	-	-	-	-	-	-	-
JL1.50	GFD-190	147	56	3	40	0	5.1	0.1	-	-	-	-	-	-	-	-
JL1.51	GFD-190	157	0	26	57	16	3.3	0.3	2.6	0.2	3.6	0.2	-	-	-109	1.4
JL1.59	GFD-175	69	46	54	0	0	2.2	0.1	-	-	-	-	-	-	-110	1.9
JL1.67	GFD-175	340	83	5	11	0	3.6	0.1	3.7	0.4	-	-	-	-	-93	1.4
JL1.68	GFD-175	340	93	7	0	0	5.2	0.2	5.0	0.4	5.9	0.2	10.0	0.1	-103	1.4
JL1.86	CCD-106	282	76	0	23	0	1.5	0.3	5.6	0.1	3.2	0.2	-	-	-96	1.4
JL1.92	CCD-243	229	30	2	68	0	8.7	0.2	-	-	-	-	-	-	-98	1.9
JL1.95	CCD-146	74	-	-	-	-	4.1	0.5	-	-	-	-	-	-	-	-
JL2.101	GFD-314	339	-	-	-	-	-	-	-	-	3.8	0.3	-	-	-85	1.4
JL2.110	GFD-314	408	0	100	0	0	6.8	0.2	-	-	-	-	-	-	-	-
JL2.131	GFD-314	543	0	100	0	0	5.2	0.3	5.8	0.1	5.1	0.1	-	-	-103	1.4
JL2.133	GFD-314	549	0	0	0	100	-	-	-	-	2.4	0.3	-	-	-	-
JL2.139	GFD-314	587	74	26	0	0	5.2	0.1	-	-	5.1	0.3	-	-	-109	1.9
JL2.154	GFD-314	694	78	4	18	0	-	-	-	-	6.4	0.3	11.9	0.1	-89	1.4
JL2.184	GFD-314	923	43	57	0	0	4.6	0.2	-	-	-	-	-	-	-	-
JL2.216	GFD-314	1203	88	6	5	1	-	-	-	-	4.5	0.4	8.5	0.4	-82	1.4
JL2.221	GFD-314	1230	36	64	0	0	3.8	0.2	-	-	4.3	0.3	-	-	-101	-
JL2.230	GFD-314	1303	96	0	3	0	3.9	0.3	3.3	0.2	3.1	0.4	6.9	0.3	-111	1.4
JL2.236	GFD-314	1352	97	3	0	0	1.4	0.1	-	-	1.0	0.1	4.0	0.1	-105	1.4
JL2.32	GFD-315	506	0	45	55	0	-	-	-	-	4.4	0.4	-	-	-101	1.4
JL2.34	GFD-315	541	8	12	79	0	6.0	0.2	-	-	5.2	0.2	-	-	-103	1.9
JL2.39	GFD-315	654	0	97	3	0	-	-	3.5	0.5	3.7	0.3	-	-	-93	1.4
JL2.53	GFD-315	773	29	37	34	0	5.1	0.2	-	-	-	-	-	-	-71	1.4
JL2.67	GFD-315	896	3	89	8	0	-	-	-	-	3.4	0.3	-	-	-89	1.4
JL2.80	GFD-315	1064	62	38	0	0	5.2	0.2	-	-	5.6	0.22	-	-	-46	1.9
JL2.84	GFD-315	1126	94	6	0	0	4.2	0.2	-	-	3.6	0.3	-	-	978	1.4
JL2.85	GFD-314	68	76	24	0	0	-	-	5.4	0.4	-	-	-	-	-	-
JL2.96	GFD-314	294	-	-	-	-	-	-	-	-	3.9	0.4	-	-	-99	1.4
JL2.98	GFD-314	283	9	81	0	9	4.9	0.2	-	-	4.5	0.3	9.6	0.3	-89	1.4

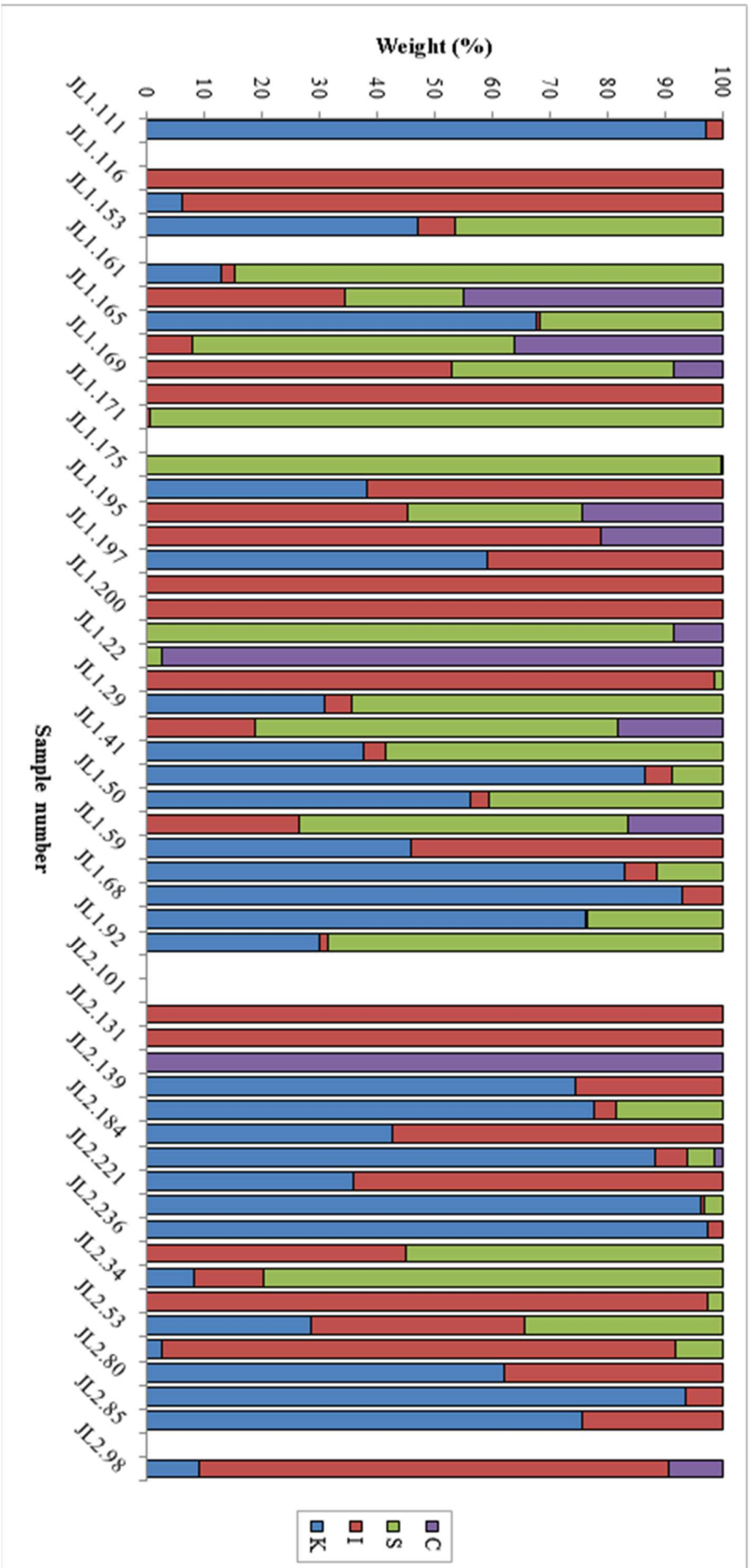


Figure 7.19: Clay mineral proportions as calculated by mineral intensity factor for samples selected for isotope analysis. C=Chlorite (purple); S=smectite (green); i=illite (red); k=kaolinite (blue)