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C.I.P.W.

Table 2 -- Chemical analyses and norms of volcanic rocks of the Ironwood area, Michigan.

[Rapid Rock Analysis by L. Artis, S. Botts, Chloe, P. Elmore, J. Glenn, J. Kelsey, L. Shapiro, H. Smith]

75-145

Formation	SIEMANS CREEK			KALLANDER CREEK (Lower Keweenawan)										PORTAGE LAKE VOLCANICS (Middle Keweenawan)	UNNAMED FORMATION (Middle Keweenawan)				Flow from CLIFF HARBOR CONGLOMERATE
Rock Type	Basalt	Andesite	Basalt	Rhyodacite	Rhyodacite	Rhyodacite	Basalt	Trachyandesite	Trachyandesite	Trachy-basalt	Andesite	Trachy-andesite	Trachyandesite	Trachyandesite	Basalt	Basalt	Quartz Basalt	Rhyobasalt	Trachyandesite
No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
SiO_2	50.2	50.8	50.0	68.3	65.5	62.5	52.4	52.2	52.2	51.2	51.6	48.9	48.7	48.7	46.8	45.2	49.2	48.1	50.6
Al_2O_3	15.1	13.5	15.8	12.8	12.3	13.3	16.2	16.0	13.[illegible]	14.2	14.1	14.8	14.8	12.7	17.4	16.3	15.9	15.5	15.4
Fe_2O_3	3.0	4.0	3.3	6.1	6.9	5.9	4.1	5.7	9.[illegible]	6.1	4.7	8.1	6.6	5.9	3.3	5.1	6.6	8.4	6.6
FeO	7.0	9.3	7.3	.5	1.4	3.2	5.9	5.5	5.0	6.7	8.3	4.5	5.1	8.1	7.7	6.9	5.7	5.2	4.4
MgO	6.8	4.6	6.4	.4	1.4	1.5	6.0	3.4	2.7	4.4	3.8	4.6	5.6	6.0	6.9	7.5	5.5	7.2	7.2
CaO	10.2	8.0	8.0	.0	1.4	.9	7.4	5.2	5.3	6.2	7.5	5.4	5.7	8.7	9.4	9.1	7.7	8.6	4.2
Na_2O	2.1	2.7	3.0	3.7	2.1	2.2	2.8	4.0	3.4	2.4	3.0	3.6	3.3	2.7	2.6	2.6	2.5	2.3	3.[illegible]
K_2O	.3	.9	1.9	4.4	5.6	6.5	1.0	1.7	2.1	1.0	.9	1.4	1.7	1.1	.3	.6	1.2	.4	0.7
H_2O -	.4	.3	.2	.2	.4	.4	.6	1.2	1.2	1.1	.7	.7	.8	.6	.8	.9	.8	.8	1.1
H_2O +	3.4	1.7	2.1	.70	1.3	1.5	1.7	2.0	2.5	2.5	1.4	2.8	3.0	2.1	2.8	3.3	2.5	2.4	3.6
TiO_2	1.2	2.9	1.5	.8	1.2	1.0	1.0	2.3	.6	2.8	2.8	2.7	2.6	2.4	1.4	1.3	1.8	1.6	1.1
P_2O_5	.2	.5	.3	.4	.9	1.0	.3	.6	1.0	.6	.7	1.1	1.2	1.1	.3	.3	.3	.4	.3
MnO	.2	.2	.2	.1	.1	.2	.1	.1	.2	.2	.2	.4	.4	<.1	.3	.3	.2	.2	.2
CO_2	.05	.05	.05	<.1	<.1	<.1	<.1	.1	<.1	<.1	.2	.4	.3	<.1	<.05	.6	<.05	<.05	<.1
Sum	100	100	100	99	99	100	99	100	99	99	100	99	99	100	100	100	100	100	99

Norms, Recalculated to [illegible] on H_2O Free, loss oxidized basis

	1	2	C.I.P.W. 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Quartz	4.6	7.1		26.5	25.6	18.7	4.2	7.3	6.6	10.6	8.2	2.4	1.1	1.8			2.4	1.4	1.6
Corundum				1.5	2.6	2.6													1.5
Orthoclase	1.7	5.6	11.1	20.7	33.9	38.9	6.1	10.0	12.8	6.7	5.6	8.9	10.6	6.7	1.6	3.3	7.2	2.2	3.9
Albite	19.3	23.6	26.2	32.0	18.3	19.4	24.6	34.6	30.4	21.0	26.2	32.0	29.3	23.5	23.0	23.6	22.0	20.4	34.6
Anorthite	32.2	22.5	24.7	1.1			29.4	21.1	16.9	26.1	22.8	21.1	21.7	19.7	36.1	32.8	30.0	31.7	20.3
Wollastonite																			
Diopside	15.8	11.9	12.9				6.3	1.4	3.0	.0	9.2		0.6	14.6	10.2	10.4	6.2	5.5	
Hypersthene / Forsterite	21.4	17.8	9.7 / 5.0	7.7	12.3	13.7	23.7	16.9	20.1	23.6	16.7	23.2	25.1	22.0	15.0	7.8	24.1	30.2	31.6
Fayalite			3.5												4.2 / 3.0	8.4 / 6.1			
Magnetite	3.2	4.4	3.5	1.9	2.6	2.8	3.2	3.0	6.3	4.2	4.2	9.2	3.7	4.4	3.4	4.2	3.7	4.4	3.5
~~Hematite~~																			
Ilmenite	2.3	5.8	2.9	1.5	1.4	1.8	1.8	4.4	1.2	5.5	5.4	5.5	5.2	4.6	2.9				
Rutile Titanite					1.2											2.7	3.7	3.2	2.3
Apatite	.3	1.3	.7	1.0	2.0	1.7	.7	1.3	2.7	1.3	1.7	2.7	2.7	2.7	0.6	0.7	0.7	1.0	0.7
Calcite																			

Locations for this table on letter size sheet

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