Open-File Report 88-548

Table 4. Electron microprobe (EM), energy-dispersive X-ray fluorescence (XRF), and instrumental neutron-activation (INA) analyses of some tephra layers from Walker Lake cores, and tephra layers of similar chemical composition from other sites. Samples labelled WL are from cores in Walker Lake (depths indicated in parentheses); samples labelled KRL are from Crooked Meadow (in stratigraphic order, with A7-A at top, and A-A, at the bottom). All analyses are of volcanic glass separated from the tephra. n.d. - not determined. Analysts: C. E. Meyer, U.S.G.S., Menlo Park (EM), J. L. Slate, U.S.G.S., Menlo Park (XRF), and J. Budahn, D. Knight, and D. McKown, U.S.G.S., Lakewood, CO (INA).

Element or Oxide	Samples																	
									Tulomne Meadows					Crooked Meadow				
	WLC 84-8-2A (28.5-33 cm)	WLC 84-8-3A (59.5-64 cm)	WLC 84-8-3A (64-66 cm)	WLC 84-8-8 (8.10m)	WLC 84-4-2 (3.29m)	WLC 84-4-2 (3.31m)	WLC 84-2-3 (8.10m)	Yosemite Valley YOS-1	KRL82782 -A	KRL82782 -C	KRL82182 (A7-A)	KRL82182 (A-6)	KRL82182 (A-5)	KRL82182 (A-4)	KRL82182 (A-3)	KRL82182 (A-2)	KRL82182 (A-1)	KRL82182 (A-A)
	Electron-microprobe analysis																	
SiO_2	77.00	77.00	76.97	77.31	76.75	76.69	77.09	76.59	76.99	n.d.	78.15	77.96	77.98	76.89	76.97	77.81	76.80	77.20
Al_2O_3	12.77	12.70	12.80	12.71	12.79	12.91	12.80	12.93	12.75	n.d.	11.95	12.11	12.08	12.82	12.82	12.25	12.75	12.72
Fe_2O_3	1.12	1.10	1.08	0.96	1.13	1.14	1.08	1.12	1.09	n.d.	1.08	1.12	1.06	1.02	1.02	1.02	1.10	0.90
MgO	0.03	0.03	0.03	0.02	0.03	0.04	0.04	0.03	0.01	n.d.	0.02	0.02	0.02	0.02	0.03	0.01	0.03	0.04
MgO	0.05	0.06	0.05	0.05	0.04	0.04	0.05	0.05	0.06	n.d.	0.05	0.06	0.06	0.05	0.03	0.04	0.04	0.06
CaO	0.54	0.56	0.55	0.53	0.55	0.55	0.55	0.54	0.53	n.d.	0.55	0.54	0.54	0.52	0.55	0.52	0.55	0.50
TiO_2	0.06	0.04	0.05	0.05	0.05	0.06	0.04	0.07	0.08	n.d.	0.08	0.07	0.06	0.04	0.04	0.07	0.07	0.05
Na_2O	3.76	3.89	3.86	3.88	4.02	3.92	3.72	4.03	3.90	n.d.	3.63	3.70	3.71	4.08	4.09	3.83	3.87	3.74
K_2O	4.66	4.61	4.60	4.49	4.64	4.67	4.64	4.64	4.59	n d.	4.50	4.42	4.49	4.55	4.44	4.45	4.77	4.79
Total (orig.)[1]	98.73	99.40	99.24	97.19	99.05	97.96	99.40	96.79	97.85	n.d.	99.71	99.50	98.75	97.87	96.74	98.12	97.94	97.07
	Energy-dispersive X-ray fluorescence Analysis																	
K_2O, %	4.78	4.77	4.80	4.69	4.77	4.78	4.72	4.78	4.66	4.73	4.79	4.71	4.75	4.45	4.84	4.61	4.78	4.81
CaO, %	0.63	0.62	0.62	0.59	0.59	0.66	0.62	0.65	0.62	0.63	0.63	0.61	0.60	0.57	0.60	0.58	0.69	0.62
TiO %	0.051	0.049	0.054	0.050	0.049	0.049	0.056	0.057	0.055	0.055	0.055	0.052	0.051	0.042	0.057	0.041	0.075	0.059
MnO, %	0.051	0.051	0.052	0.051	0.051	0.052	0.052	0.052	0.053	0.053	0.051	0.050	0.050	0.048	0.050	0.048	0.050	0.047
Fe_2O_3, %	1.16	1.16	1.17	1.06	1.17	1.18	1.15	1.19	1.16	1.13	1.14	1.15	1.13	1.01	1.07	1.02	1.16	0.91
Rb, ppm	182	188	195	191	192	190	191	186	197	195	201	194	191	199	199	204	188	196
Sr, ppm	12	7	10	12	10	10	10	14	6	3	4	12	11	11	6	10	4	14
Y, ppm	23	25	26	23	22	25	23	25	22	24	26	26	23	26	25	26	24	22
Zr, ppm	108	112	117	107	110	109	110	112	106	105	114	111	103	99	107	105	124	101
Nb, ppm	18	21	21	21	21	22	19	20	21	20	21	21	18	19	21	23	19	18
	Neutron Activation Analysis																	
Sc, ppm	1.74	1.76	1.73	1.44	1.73	1.78	1.80	1.84	1.83	1.78	1.94	1.87	1.78	1.07	1.37	1.76	1.77	1.84
Mn, ppm	315	322	314	319	326	326	330	343	332	324	316	336	317	310	303	305	315	316
Fe, %	0.71	0.75	0.72	0.70	0.73	0.74	0.73	0.75	0.78	0.76	0.78	0.78	0.73	0.52	0.67	0.87	0.74	0.61
Zn, ppm	43	44	39	55	48	45	41	n.d.	47	47	48	48	41	32	41	55	46	45
Rb, ppm	164	167	163	177	164	170	177	170	173	178	183	179	178	125	178	239	164	161
Cs, ppm	5.1	5.3	5.1	5.7	5.2	5.3	5.6	5.3	5.4	5.5	5.7	5.5	5.5	4.1	5.8	7.5	5.2	5.5
Ba, ppm	58	51	40	48	35	59	56	<35	42	33	47	46	43	23	30	51	32	92
La, ppm	22	22	21	17	21	21	20	22	22	21	24	22	21	12	16	21	23	21
Ce, ppm	46	48	45	37	45	46	44	51	47	44	52	49	44	27	35	46	49	45
Nd, ppm	21	18	20	17	18	19	19	22	21	20	22	21	20	13	18	21	19	18
Sm, ppm	4.56	4.68	4.40	4.5	4.48	4.50	4.67	4.58	4.94	4.94	5.17	4.97	4.83	3.33	4.52	4.61	4.71	4.22
Eu, ppm	0.13	0.14	0.14	0.12	0.13	0.13	0.15	0.15	0.14	0.14	0.14	0.15	0.14	0.08	0.11	0.13	0.18	0.16
Tb, ppm	0.64	0.66	0.64	0.68	0.64	0.66	0.64	0.67	0.67	0.69	0.72	0.71	0.66	0.49	0.65	0.89	0.64	0.56
Dy, pp,	4.28	4.50	4.40	4.53	4.38	4.38	4.38	4.4	4.8	4.8	4.81	4.79	4.45	3.29	4.44	n.d.	4.44	3.97
Yb, ppm	2.73	2.78	2.76	2.96	2.68	2.73	2.69	2.73	2.84	2.83	2.83	2.84	2.73	2.12	2.73	3.52	2.60	2.56
Lu, ppm	0.39	0.40	0.38	0.42	0.38	0.39	0.38	0.42	0.41	0.39	0.42	0.41	0.42	0.31	0.40	0.52	0.38	0.37
Hf, ppm	4.14	4.38	4.35	4.52	4.14	4.23	4.23	4.16	4.34	4.24	4.56	4.32	4.15	3.15	4.18	5.46	4.37	3.87
Ta, ppm	2.00	2.08	2.01	2.26	1.97	2.00	2.12	2.06	2.11	2.11	2.20	2.16	2.11	1.55	2.18	2.93	1.96	2.01
Th, ppm	18.6	19.0	18.7	19.4	18.8	19.1	19.7	19.1	19.5	19.2	20.3	19.8	19.4	13.5	19.1	25.2	17.9	17.9
U, ppm	5.79	5.96	6.00	6.42	6.21	6.28	6.78	5.84	6.46	6.44	6.91	6.73	6.72	4.80	6.91	7.75	6.04	6.25
	Interpolated Age [2], Ka B.P.																	
	1.25	1.25	1.25	4.65	unk.	unk.	unk.	unk.	unk.	unk.	0.90	1.18	2.0-2.8	3.52	3.82	4.15	7.14	10.10

[1]Original total before oxide percentages were recalculated to 100 percent. Most of the deficit observed between the original totals and 100 percent is due to the presence of water of hydration and other fluids that are present in the glass.
[2]Age estimated by interpolation between horizons dated by radiocarbon analysis (see fig. 6).

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.