

Data Repository item 2003093

TABLE DR1. ADDITIONAL ANALYSES OF LAVA FLOWS FROM THE TYPE SECTION OF THE JOSEPHINE OPHIOLITE (LOC. 6)

Sample	Upper Pillow Lavas						Lower Pillow Lavas									
	R3d	D91	R5b	R5/6	R6b	D92b	Y5-15	PC5b3	Y6	LJC-14	LJC-15	R10b	D93b	D71	R11c	D70
Depth, m	75	110	128	155	189	208	217	227	240	263	279	322	340	361	364	384
Unit (Fig. 3)	D	D	C	C	C	C	B	B	B	B	B	A	A	A	A	A
SiO ₂	50.54	51.30	51.30	50.16	49.50	53.80	53.72	47.56	54.05	50.07	53.69	48.30	51.70	49.50	53.30	55.35
TiO ₂	2.40	2.20	1.58	1.67	1.25	1.09	0.94	1.54	0.77	0.98	0.87	1.09	1.13	1.24	1.00	1.07
Al ₂ O ₃	14.41	14.20	14.50	17.85	17.10	18.30	16.46	14.95	15.98	17.43	16.41	14.45	18.50	17.70	16.60	16.20
FeO ¹	11.40	13.08	10.78	11.38	10.65	7.10	7.59	9.48	7.54	8.30	7.08	9.72	8.55	10.15	8.10	8.57
MnO	0.18	0.20	0.20	0.17	0.18	0.13	0.18	0.20	0.13	0.16	0.12	0.17	0.13	0.15	0.13	0.12
MgO	3.84	5.40	5.50	5.10	7.10	5.10	7.76	6.00	7.57	8.19	4.11	5.02	7.30	6.80	5.20	5.63
CaO	7.98	7.98	6.98	4.14	7.42	4.47	4.49	11.07	6.32	5.94	8.34	9.83	2.93	6.13	8.01	5.08
Na ₂ O	4.36	1.85	3.58	4.95	2.63	3.61	5.67	3.10	4.23	4.99	6.11	3.15	4.55	4.32	2.49	4.78
K ₂ O	0.18	0.21	0.84	0.94	0.12	4.08	0.65	2.35	1.23	0.21	0.14	0.73	0.77	1.33	0.38	0.53
P ₂ O ₅	0.21	0.23	0.18	0.22	0.15	0.08	0.14	0.16	0.11	0.14	0.13	0.15	0.17	0.19	0.18	0.15
LOI	2.57	3.33	4.25	3.52	4.16	3.06	N.D.	N.D.	N.D.	3.78	3.11	6.32	4.67	3.57	3.90	2.59
Total	98.24	99.98	99.69	100.09	100.26	100.82	97.60	96.40	97.93	100.18	100.11	99.45	100.68	101.08	99.29	100.07
Ba	109	N.D.	N.D.	495	202	N.D.	140	525	136	23	<10	32	53	56	N.D.	23
Rb	<5	7	13	11	<5	6	7	28	15	<5	<5	18	16	<5	7	8
Sr	124	152	179	166	127	139	103	216	208	100	137	187	171	225	231	196
Y	49	38	37	41	30	22	21	36	17	21	18	25	32	31	26	25
Zr	126	128	111	120	94	87	67	107	59	69	64	74	93	94	80	78
Nb	N.D.	N.D.	N.D.	5	N.D.	N.D.	3	5	2	3	3	N.D.	N.D.	N.D.	N.D.	2
Ni	10	25	24	15	41	30	42	33	74	41	20	23	14	27	31	20
Cr	13	22	34	22	62	42	94	162	95	80	50	14	12	23	13	20
V	503	500	343	391	307	272	197	294	233	272	279	284	367	335	259	251
Sc	40	N.D.	N.D.	24	36	N.D.	29	42	30	33	32	31	33	40	N.D.	27
Th	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.34	N.D.	N.D.	N.D.	N.D.	0.40	0.50	N.D.	N.D.
Hf	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2.22	N.D.	N.D.	N.D.	N.D.	2.20	2.37	N.D.	N.D.
Ta	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.25	N.D.	N.D.	N.D.	N.D.	0.18	0.17	N.D.	N.D.
La	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	5.18	N.D.	N.D.	N.D.	N.D.	4.92	5.88	N.D.	N.D.
Ce	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	13.82	N.D.	N.D.	N.D.	N.D.	10.48	15.79	N.D.	N.D.
Pr	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2.18	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Nd	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	11.39	N.D.	N.D.	N.D.	N.D.	10.70	N.D.	N.D.	N.D.
Sm	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	3.99	N.D.	N.D.	N.D.	N.D.	2.94	3.66	N.D.	N.D.
Eu	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.05	N.D.	N.D.	N.D.	N.D.	1.08	1.21	N.D.	N.D.
Gd	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	5.11	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tb	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.01	N.D.	N.D.	N.D.	N.D.	0.62	0.91	N.D.	N.D.
Dy	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	6.38	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ho	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	1.32	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Er	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	3.74	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tm	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.51	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Yb	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	3.09	N.D.	N.D.	N.D.	N.D.	2.13	3.28	N.D.	N.D.
Lu	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	0.46	N.D.	N.D.	N.D.	N.D.	0.34	0.46	N.D.	N.D.
Ti/Zr	114	103	85	83	80	75	84	86	78	85	81	88	73	79	75	82
Ti/V	29	26	28	26	24	24	29	31	20	22	19	23	18	22	23	26

Notes: Oxides are in weight percent, trace elements in parts per million. FeO is total Fe reported as FeO. LOI = loss on ignition. N.D. = no data. Depth is depth in meters beneath the top of the extrusive sequence.

TABLE DR2. ADDITIONAL ANALYSES OF LATE PILLOW LAVAS AND DIKES
FROM THE JOSEPHINE OPHIOLITE

Sample	Uppermost pillow lavas			Dikes in serpentinized peridotite			
	L31	Q1p	L54-00	F86	G89	KG7104b (amphibolite)	KG793j2
SiO ₂	50.28	49.80	49.89	45.20	46.49	40.96	46.84
TiO ₂	1.67	2.59	2.54	1.54	2.17	1.41	1.63
Al ₂ O ₃	15.64	14.40	13.57	15.04	13.97	20.59	17.59
FeO ^T	7.35	11.75	12.05	12.06	13.02	10.95	10.95
MnO	0.22	0.20	0.35	0.19	0.23	0.20	0.21
MgO	4.46	5.43	4.50	6.42	4.24	8.44	4.92
CaO	11.88	5.14	8.30	6.75	7.09	9.45	10.34
Na ₂ O	4.80	4.51	4.01	6.13	7.46	2.77	4.74
K ₂ O	0.52	0.62	1.42	0.49	0.27	0.24	0.68
P ₂ O ₅	0.17	0.21	0.18	0.19	0.19	0.27	0.30
LOI	0.00	5.94	3.19	4.93	3.92	3.65	0.54
Total	96.99	100.92	100.00	99.39	99.48	98.93	98.74
Ba	178	688	317	N.D.	37	379	204
Rb	13	10	19	N.D.	3	N.D.	12
Sr	373	115	82	66	78	950	428
Y	33	42	35	41	40	31	27
Zr	110	110	112	112	105	109	110
Nb	4	5	6	N.D.	N.D.	N.D.	N.D.
Ni	103	13	9	298	11	206	10
Cr	81	18	39	50	7	45	23.8
V	373	476	579	348	496	323	316
Sc	46	40	42	N.D.	36	N.D.	24
Th	0.39	0.41	N.D.	N.D.	N.D.	N.D.	1.50
Hf	2.42	2.34	N.D.	N.D.	N.D.	N.D.	3.70
Ta	0.23	0.25	N.D.	N.D.	N.D.	N.D.	0.46
La	5.72	7.15	N.D.	N.D.	N.D.	N.D.	14.20
Ce	14.13	18.14	N.D.	N.D.	N.D.	N.D.	31.70
Pr	2.09	2.65	N.D.	N.D.	N.D.	N.D.	N.D.
Nd	10.77	13.92	N.D.	N.D.	N.D.	N.D.	25.90
Sm	3.83	4.88	N.D.	N.D.	N.D.	N.D.	N.D.
Eu	1.40	1.66	N.D.	N.D.	N.D.	N.D.	N.D.
Gd	4.60	6.06	N.D.	N.D.	N.D.	N.D.	N.D.
Tb	0.93	1.14	N.D.	N.D.	N.D.	N.D.	N.D.
Dy	5.80	7.55	N.D.	N.D.	N.D.	N.D.	N.D.
Ho	1.25	1.60	N.D.	N.D.	N.D.	N.D.	N.D.
Er	3.58	4.47	N.D.	N.D.	N.D.	N.D.	N.D.
Tm	0.50	0.61	N.D.	N.D.	N.D.	N.D.	N.D.
Yb	3.04	3.76	N.D.	N.D.	N.D.	N.D.	3.00
Lu	0.47	0.57	N.D.	N.D.	N.D.	N.D.	N.D.
Ti/Zr	91	141	136	82	124	78	89
Ti/V	27	33	26	27	26	26	31

N.D. = no data

TABLE DR3. LEAST METASOMATIZED SHEETED DIKES FROM THE JOSEPHINE OPHIOLITE

	Lower sheeted dike complex and dike-gabbro transition														
	A14-92	A89	CJ19	E16	E41c	F24	F42b	H5	R37	R38b	R42d	RA-A5	Z104	Z30	Z58
SiO ₂	52.12	53.20	52.40	53.40	51.60	51.45	51.71	52.80	50.52	55.47	52.20	54.03	47.94	53.20	51.70
TiO ₂	0.91	1.09	1.10	0.97	1.31	1.32	0.99	1.25	1.11	0.85	1.00	0.73	1.42	0.77	1.21
Al ₂ O ₃	16.56	16.60	17.60	16.00	16.80	16.10	16.33	15.20	16.09	16.64	16.00	15.08	17.08	16.80	16.40
FeO ¹	8.59	8.78	6.83	8.99	9.30	8.95	8.27	8.72	8.78	8.78	8.00	8.06	11.61	6.99	8.77
MnO	0.11	0.10	0.07	0.21	0.10	0.17	0.15	0.15	0.15	0.17	0.09	0.14	0.20	0.13	0.15
MgO	5.30	6.30	4.90	7.00	6.30	6.74	7.18	7.60	6.77	5.29	6.78	8.38	5.52	6.70	6.30
CaO	7.39	7.56	10.55	6.98	7.94	10.51	7.39	9.46	7.14	7.26	8.74	8.86	10.27	10.78	8.88
Na ₂ O	4.56	3.80	3.33	4.18	3.81	2.44	4.44	2.42	4.57	2.98	3.94	2.18	4.19	3.14	2.27
K ₂ O	0.12	0.20	0.01	0.04	0.29	0.01	0.33	0.43	0.43	0.61	0.15	0.12	0.10	0.28	0.17
P ₂ O ₅	0.12	0.17	0.20	0.15	0.17	0.19	0.11	0.17	0.12	0.14	0.11	0.10	0.03	0.13	0.17
LOI	3.39	2.21	3.09	2.93	2.23	2.23	2.49	2.68	3.50	1.64	2.41	1.98	2.13	1.85	2.87
Total	99.42	100.01	100.08	100.85	99.85	100.11	99.39	100.88	99.18	99.83	99.42	99.66	100.49	100.77	98.89
Ba	35	174	N.D.	N.D.	97	N.D.	10	92	77	66	41	56	N.D.	N.D.	40
Rb	5	5	5	5	N.D.	5	5	7	5	10	N.D.	5	5	6	5
Sr	166	248	76	159	219	241	161	302	173	197	231	160	409	189	229
Y	21	26	25	21	27	27	20	29	23	19	24	16	28	22	27
Zr	72	83	96	74	87	95	69	102	79	78	84	55	126	62	98
Nb	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ni	N.D.	82	73	48	40	36	63	71	59	19	57	185	18	74	45
Cr	27	104	17	25	83	65	119	194	153	44	139	337	10	120	60
V	276	278	304	289	268	269	252	266	238	254	261	233	239	219	261
Sc	31	41	N.D.	N.D.	N.D.	37	N.D.	36	N.D.	N.D.	39	N.D.	N.D.	33	37
Th	N.D.	N.D.	0.60	N.D.	N.D.	0.40	N.D.	0.40	N.D.	N.D.	0.40	N.D.	N.D.	0.20	0.30
Hf	N.D.	N.D.	2.29	N.D.	N.D.	2.23	N.D.	2.22	N.D.	N.D.	2.14	N.D.	N.D.	1.65	2.30
Ta	N.D.	N.D.	0.25	N.D.	N.D.	N.D.	N.D.	0.20	N.D.	N.D.	0.14	N.D.	N.D.	0.12	0.17
La	N.D.	N.D.	5.44	N.D.	N.D.	4.76	N.D.	5.35	N.D.	N.D.	4.05	N.D.	N.D.	2.89	4.31
Ce	N.D.	N.D.	13.12	N.D.	N.D.	12.72	N.D.	14.83	N.D.	N.D.	11.45	N.D.	N.D.	7.72	12.72
Pr	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Nd	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Sm	N.D.	N.D.	3.00	N.D.	N.D.	3.08	N.D.	3.39	N.D.	N.D.	2.78	N.D.	N.D.	2.21	2.87
Eu	N.D.	N.D.	1.37	N.D.	N.D.	1.17	N.D.	1.09	N.D.	N.D.	0.94	N.D.	N.D.	0.73	1.03
Gd	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tb	N.D.	N.D.	0.71	N.D.	N.D.	0.73	N.D.	0.75	N.D.	N.D.	0.70	N.D.	N.D.	0.49	0.71
Dy	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ho	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Er	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Tm	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Yb	N.D.	N.D.	2.73	N.D.	N.D.	2.76	N.D.	2.77	N.D.	N.D.	2.58	N.D.	N.D.	1.93	2.62
Lu	N.D.	N.D.	0.39	N.D.	N.D.	0.37	N.D.	0.39	N.D.	N.D.	0.34	N.D.	N.D.	0.29	0.35

N.D. = no data

TABLE DR4. PLAGIOGRANITES FROM THE JOSEPHINE OPHIOLITE

Sample	A45z	A88z	E17b	KH2b	R38a	R42a	R46b	Z59b
SiO ₂	67.90	66.10	64.80	75.63	69.71	58.50	59.40	66.00
TiO ₂	0.80	0.90	1.11	0.32	0.60	1.31	1.19	1.13
Al ₂ O ₃	14.30	15.20	15.40	13.43	13.65	15.90	16.10	15.50
FeO ^I	4.38	5.46	5.43	0.63	4.40	8.37	8.18	2.65
MnO	0.05	0.04	0.06	0.01	0.04	0.08	0.05	0.04
MgO	1.90	1.80	2.50	0.38	0.96	3.10	3.20	1.60
CaO	5.30	4.90	4.45	2.34	3.83	7.71	6.52	5.18
Na ₂ O	4.76	3.61	4.60	6.02	4.71	3.76	3.24	5.25
K ₂ O	0.20	0.19	0.28	0.01	0.15	0.18	0.18	0.06
P ₂ O ₅	0.21	0.20	0.19	0.05	0.13	0.17	0.22	0.34
LOI	2.01	1.68	2.02	0.93	1.19	1.28	1.42	0.90
Total	101.81	100.08	100.84	99.75	99.37	100.73	99.70	98.65
Ba	N.D.	N.D.	81	12	68	54	N.D.	81
Rb	5	5	3	7	8	2	5	3
Sr	192	263	111	64	192	259	242	157
Y	43	47	39	15	37	31	36	50
Zr	159	186	157	98	118	128	135	259
Nb	N.D.	N.D.	4	N.D.	N.D.	4	N.D.	5
Ni	11	13	<10	10	10	10	22	<10
Cr	10	10	<10	20	10	17	10	<10
V	68	113	98	28	30	291	274	69
Sc	N.D.	N.D.	20	N.D.	N.D.	28	N.D.	15
Th	N.D.	N.D.	0.91	N.D.	N.D.	0.66	N.D.	1.18
Hf	N.D.	N.D.	3.49	N.D.	N.D.	2.94	N.D.	5.06
Ta	N.D.	N.D.	0.27	N.D.	N.D.	0.24	N.D.	0.37
La	N.D.	N.D.	6.26	N.D.	N.D.	6.61	N.D.	9.16
Ce	N.D.	N.D.	15.39	N.D.	N.D.	14.99	N.D.	23.45
Pr	N.D.	N.D.	2.27	N.D.	N.D.	2.21	N.D.	3.64
Nd	N.D.	N.D.	11.94	N.D.	N.D.	11.18	N.D.	18.54
Sm	N.D.	N.D.	4.18	N.D.	N.D.	3.81	N.D.	6.33
Eu	N.D.	N.D.	1.37	N.D.	N.D.	1.16	N.D.	1.79
Gd	N.D.	N.D.	5.20	N.D.	N.D.	4.30	N.D.	7.40
Tb	N.D.	N.D.	0.97	N.D.	N.D.	0.82	N.D.	1.34
Dy	N.D.	N.D.	6.60	N.D.	N.D.	5.38	N.D.	8.59
Ho	N.D.	N.D.	1.40	N.D.	N.D.	1.14	N.D.	1.80
Er	N.D.	N.D.	3.97	N.D.	N.D.	3.30	N.D.	5.03
Tm	N.D.	N.D.	0.61	N.D.	N.D.	0.47	N.D.	0.74
Yb	N.D.	N.D.	3.75	N.D.	N.D.	2.91	N.D.	4.75
Lu	N.D.	N.D.	0.59	N.D.	N.D.	0.46	N.D.	0.73

N.D. = no data