

Table S2. Sr-, Nd-, Pb-, Hf-isotope compositions of Emperor Seamounts and Mesozoic MORBs

Seamount	Sample name	Age (Ma)	Rb	Sr	$^{87}\text{Sr}/^{86}\text{Sr}$ measured	$^{87}\text{Sr}/^{86}\text{Sr}$ initial
Meiji	19-192A-5R-3, 98-100	83	14.83	179.49	0.703332	0.703054
Meiji	19-192A-6R-2, 7-14	83	26.49	213.31	0.703079*	0.702661
Meiji	19-192A-6R-3, 23-25	83	27.00	182.90	0.703254	0.702757
Detroit	145-883F-1R-3, 37-41	80	16.34	294.24	0.702884*	0.702701
Detroit	145-883F-2R-3, 129-133	80	54.64	209.91	0.702864*	0.702008
Detroit	145-884E-4R-4, 23-27	81	15.94	114.59	0.702768*	0.702305
Detroit	145-884E-6R-3, 30-33	81	1.54	126.22	0.702652*	0.702611
Detroit	145-884E-10R-4, 6-10	81	1.49	149.89	0.702774	0.702741
Detroit	197-1203A-17R-4, 57-63	76	9.63	239.07	0.703141	0.703016
Detroit	197-1203A-17R-4, 57-63§	76	9.63	239.07	0.703144	0.703019
Detroit	197-1203A-18R-3, 114-116	76	9.12	226.62	0.703172	0.703047
Detroit	197-1203A-37R-2, 89-90	76	1.26	155.03	0.703055	0.703030
Detroit	197-1203A-49R-3, 50-54	76	0.27	189.87	0.703047	0.703043
Detroit	197-1203A-53R-6, 123-128	76	0.41	233.42	0.703112	0.703107
Detroit	197-1203A-58R-4, 31-34	76	2.87	208.65	0.703079	0.703036
Detroit	197-1203A-62R-3, 114-118	76	0.75	209.31	0.703203	0.703192
Detroit	197-1203A-65R-4, 21-25	76	9.26	229.42	0.703215	0.703090
Detroit	197-1204A-9R-2, 77-80	76	23.28	174.42	0.703028	0.702614
Detroit	197-1204B-2R-2, 76-80	76	9.70	281.00	0.702882	0.702775
Suiko	55-433C-23R-3, 59	68	1.56	163.83	0.703312	0.703287
Suiko	55-433C-31R-1	68	5.00	324.63	0.703297	0.703256
Suiko	55-433C-31R-4, 46	68	6.38	141.68	0.703606	0.703486
Nintoku	197-1205A-8R-1, 5-7	62.5	19.37	467.66	0.703217	0.703123
Nintoku	197-1205A-18R-5, 63-65	62.5	12.09	428.69	0.703220	0.703156
Nintoku	197-1205A-35R-2, 29-31	62.5	0.52	263.0	0.703168	0.703163
Nintoku	197-1205A-45R-1, 98-100	62.5	13.93	299.25	0.703327	0.703221
Ojin	55-430A-5R-3, 56-58	57.5	24.05	589.75	0.703526	0.703442
Ojin	55-430A-5R-4, 88	57.5	30.24	634.86	0.703582	0.703484
Koko	197-1206A-3R-2, 103-106	51	2.05	266.96	0.703331	0.703316
Koko	197-1206A-9R-2, 145-147	51	1.19	158.01	0.703496	0.703481
Koko	197-1206A-14R-1, 100-104	51	1.47	162.11	0.703473	0.703455
Koko	197-1206A-15R-1, 10-13	51	3.01	318.85	0.703577	0.703558
Koko	197-1206A-16R-2, 59-61	51	6.33	303.85	0.703537	0.703495
Koko	197-1206A-16R-2, 59-61§	51	6.33	303.85	0.703545	0.703503
Koko	197-1206A-30R-2, 1-4	51	6.80	398.20	0.703604	0.703570
Koko	197-1206A-30R-2, 1-4§	51	6.80	398.20	0.703543	0.703509
Koko	197-1206A-38R-1, 68-71	51	1.80	197.88	0.703500	0.703482
Koko	197-1206A-41R-1, 4-7	51	2.85	312.59	0.703449	0.703431
MORB	16-153-29R-4, 92-96	75	1.11	72.86	0.702488	0.702441
MORB	88-581C-3R-3, 95-98	116	0.68	74.16	0.702947	0.702903
MORB	88-581C-3R-4, 132-135	116	3.97	117.62	0.702638	0.702477
MORB	91-595A-10R-1, 103-107	150	3.94	109.54	0.702521	0.702299
MORB	91-595B-7R-2, 80-82	150	13.64	116.76	0.702790	0.702070

Sr- & Nd-isotope ratios for Meiji & Detroit marked with an asterisk are from Keller et al. (2000); their Nd-isotope data have been normalized to La Jolla of 0.51186 to maintain internal data consistency. Samples marked with § are residues from a 6-stage leaching experiment. Isotope ratios listed as 'measured' are corrected for run-time fractionation and reported relative to accepted standard values for each isotope system. Ratios listed as 'initial', have been age corrected to the age reported for that sample; age data are from O'Connor et al. (2013) based on linear distance vs. age model. See Text S1 for analytical details

**Table S2. Sr-, Nd-, Pb-, Hf-isotope compo
and Mesozoic MORBs**

Seamount	Sample name	Sm	Nd	¹⁴³ Nd/ ¹⁴⁴ Nd	εNd
				measured	
Meiji	19-192A-5R-3, 98-100	4.16	13.87	0.513049	8.14
Meiji	19-192A-6R-2, 7-14	4.59	16.40	0.513056*	8.40
Meiji	19-192A-6R-3, 23-25	4.21	14.56	0.513027	7.78
Detroit	145-883F-1R-3, 37-41	5.22	18.26	0.513065*	8.54
Detroit	145-883F-2R-3, 129-133	4.31	15.11	0.513084*	8.91
Detroit	145-884E-4R-4, 23-27	2.80	7.21	0.513183	10.20
Detroit	145-884E-6R-3, 30-33	3.31	9.49	0.513168*	10.16
Detroit	145-884E-10R-4, 6-10	2.19	6.25	0.513136*	9.52
Detroit	197-1203A-17R-4, 57-63	4.09	14.36	0.513112	9.45
Detroit	197-1203A-17R-4, 57-63s	4.09	14.36	0.513075	8.72
Detroit	197-1203A-18R-3, 114-116	3.95	13.06	0.513069	8.50
Detroit	197-1203A-37R-2, 89-90	2.45	7.84	0.513112	9.28
Detroit	197-1203A-49R-3, 50-54	4.03	13.72	0.513099	9.14
Detroit	197-1203A-53R-6, 123-128	6.96	26.06	0.513053	8.40
Detroit	197-1203A-58R-4, 31-34	3.38	11.36	0.513101	9.16
Detroit	197-1203A-62R-3, 114-118	6.48	23.16	0.513031	7.90
Detroit	197-1203A-65R-4, 21-25	6.77	25.17	0.513038	8.10
Detroit	197-1204A-9R-2, 77-80	4.23	13.93	0.513091	8.93
Detroit	197-1204B-2R-2, 76-80	4.50	14.49	0.513082	8.71
Suiko	55-433C-23R-3, 59	3.31	10.40	0.513050	8.04
Suiko	55-433C-31R-1	5.86	21.14	0.513052	8.29
Suiko	55-433C-31R-4, 46	2.95	9.78	0.513026	7.66
Nintoku	197-1205A-8R-1, 5-7	6.22	28.08	0.513028	8.07
Nintoku	197-1205A-18R-5, 63-65	4.99	20.04	0.513017	7.72
Nintoku	197-1205A-35R-2, 29-31	2.62	9.40	0.513082	8.85
Nintoku	197-1205A-45R-1, 98-100	6.11	23.11	0.513034	7.98
Ojin	55-430A-5R-3, 56-58	14.14	55.20	0.513012	7.56
Ojin	55-430A-5R-4, 88	15.32	59.90	0.513022	7.76
Koko	197-1206A-3R-2, 103-106	5.31	20.04	0.513046	8.16
Koko	197-1206A-9R-2, 145-147	3.39	12.06	0.513040	7.98
Koko	197-1206A-14R-1, 100-104	3.43	12.14	0.513035	7.87
Koko	197-1206A-15R-1, 10-13	5.00	18.78	0.513004	7.33
Koko	197-1206A-16R-2, 59-61	5.41	20.69	0.513024	7.74
Koko	197-1206A-16R-2, 59-61s	5.41	20.69	0.513029	7.84
Koko	197-1206A-30R-2, 1-4	6.05	21.16	0.513011	7.39
Koko	197-1206A-30R-2, 1-4s	6.05	21.16	0.513025	7.67
Koko	197-1206A-38R-1, 68-71	3.77	13.69	0.513020	7.61
Koko	197-1206A-41R-1, 4-7	5.95	22.24	0.513035	7.93
MORB	16-153-29R-4, 92-96	2.38	5.96	0.513245	11.51
MORB	88-581C-3R-3, 95-98	1.37	3.43	0.513188	10.40
MORB	88-581C-3R-4, 132-135	3.98	11.63	0.513253	11.89
MORB	91-595A-10R-1, 103-107	3.40	9.70	0.513174	10.13
MORB	91-595B-7R-2, 80-82	3.95	11.64	0.513147	9.73

Sr- & Nd-isotope ratios for Meiji & Detroit marked with a normalized to La Jolla of 0.51186 to maintain internal data leaching experiment. Isotope ratios listed as 'measured' accepted standard values for each isotope system. Ratio sample; age data are from O'Connor et al. (2013) based

**Table S2. Sr-, Nd-, Pb-, Hf-isotope compo
and Mesozoic MORBs**

Seamount	Sample name	Pb	U	Th	²⁰⁶ Pb/ ²⁰⁴ Pb measured	²⁰⁷ Pb/ ²⁰⁴ Pb measured	²⁰⁸ Pb/ ²⁰⁴ Pb measured
Meiji	19-192A-5R-3, 98-100	1.12	0.40	0.60	18.521	15.455	37.961
Meiji	19-192A-6R-2, 7-14						
Meiji	19-192A-6R-3, 23-25						
Detroit	145-883F-1R-3, 37-41						
Detroit	145-883F-2R-3, 129-133						
Detroit	145-884E-4R-4, 23-27						
Detroit	145-884E-6R-3, 30-33						
Detroit	145-884E-10R-4, 6-10						
Detroit	197-1203A-17R-4, 57-63	0.72	0.75	0.51	18.933	15.488	38.031
Detroit	197-1203A-17R-4, 57-63s	0.72	0.75	0.51	18.875	15.495	38.022
Detroit	197-1203A-18R-3, 114-116	0.57	0.57	0.50	18.649	15.480	37.952
Detroit	197-1203A-37R-2, 89-90	0.96	0.06	0.19	18.137	15.435	37.668
Detroit	197-1203A-49R-3, 50-54	0.58	0.14	0.43	18.290	15.420	37.773
Detroit	197-1203A-53R-6, 123-128	0.84	0.30	0.82	18.528	15.467	38.059
Detroit	197-1203A-58R-4, 31-34	0.68	0.11	0.34	18.194	15.442	37.713
Detroit	197-1203A-62R-3, 114-118	0.66	0.41	0.83	18.594	15.460	38.039
Detroit	197-1203A-65R-4, 21-25	0.89	0.33	0.85	18.581	15.459	38.099
Detroit	197-1204A-9R-2, 77-80	0.54	0.16	0.51	18.171	15.435	37.787
Detroit	197-1204B-2R-2, 76-80	0.49	1.06	0.56	18.317	15.441	37.859
Suiko	55-433C-23R-3, 59	0.51	0.16	0.39	18.597	15.502	38.094
Suiko	55-433C-31R-1						
Suiko	55-433C-31R-4, 46	1.85	0.53	0.49	18.781	15.602	38.235
Nintoku	197-1205A-8R-1, 5-7	1.73	0.73	2.46	18.269	15.443	37.817
Nintoku	197-1205A-18R-5, 63-65	1.10	0.51	1.65	18.272	15.452	37.833
Nintoku	197-1205A-35R-2, 29-31	0.49	0.16	0.50	18.211	15.421	37.681
Nintoku	197-1205A-45R-1, 98-100	1.18	0.50	1.59	18.304	15.456	37.834
Ojin	55-430A-5R-3, 56-58	2.82	1.10	3.01	18.523	15.476	37.990
Ojin	55-430A-5R-4, 88	8.79	1.35	3.28	18.935	15.588	38.299
Koko	197-1206A-3R-2, 103-106	1.09	0.34	1.11	18.344	15.446	37.885
Koko	197-1206A-9R-2, 145-147	0.74	0.12	0.45	18.209	15.465	37.750
Koko	197-1206A-14R-1, 100-104	0.61	0.08	0.46	18.342	15.453	37.915
Koko	197-1206A-15R-1, 10-13	0.84	0.22	0.68	18.377	15.463	37.972
Koko	197-1206A-16R-2, 59-61	0.80	0.60	0.69	18.595	15.475	38.067
Koko	197-1206A-16R-2, 59-61s	0.80	0.60	0.69	18.597	15.471	38.045
Koko	197-1206A-30R-2, 1-4	0.83	0.29	0.80	18.565	15.454	38.036
Koko	197-1206A-30R-2, 1-4s	0.83	0.29	0.80	18.568	15.472	38.076
Koko	197-1206A-38R-1, 68-71	0.61	0.17	0.55	18.441	15.468	37.989
Koko	197-1206A-41R-1, 4-7	0.94	0.39	0.93	18.598	15.462	38.052
MORB	16-153-29R-4, 92-96	0.05	0.03	0.07			
MORB	88-581C-3R-3, 95-98	0.17	0.02	0.03	19.338	15.656	38.289
MORB	88-581C-3R-4, 132-135	0.48	0.63	0.19	18.459	15.527	38.038
MORB	91-595A-10R-1, 103-107	0.81	0.20	0.12	20.248	15.628	37.880
MORB	91-595B-7R-2, 80-82	66.00	0.12	0.18	19.935	15.810	38.996

Sr- & Nd-isotope ratios for Meiji & Detroit marked with a normalized to La Jolla of 0.51186 to maintain internal de leaching experiment. Isotope ratios listed as 'measured' accepted standard values for each isotope system. Rati sample; age data are from O'Connor et al. (2013) basec

**Table S2. Sr-, Nd-, Pb-, Hf-isotope compo
and Mesozoic MORBs**

Seamount	Sample name	$^{206}\text{Pb}/^{204}\text{Pb}$ initial	$^{207}\text{Pb}/^{204}\text{Pb}$ initial	$^{208}\text{Pb}/^{204}\text{Pb}$ initial	$^{208}\text{Pb}^*/^{206}\text{Pb}^*$
Meiji	19-192A-5R-3, 98-100	18.229	15.454	37.817	0.921
Meiji	19-192A-6R-2, 7-14				
Meiji	19-192A-6R-3, 23-25				
Detroit	145-883F-1R-3, 37-41				
Detroit	145-883F-2R-3, 129-133				
Detroit	145-884E-4R-4, 23-27				
Detroit	145-884E-6R-3, 30-33				
Detroit	145-884E-10R-4, 6-10				
Detroit	197-1203A-17R-4, 57-63	18.149	15.484	37.856	0.889
Detroit	197-1203A-17R-4, 57-63s	18.091	15.491	37.847	0.893
Detroit	197-1203A-18R-3, 114-116	17.900	15.477	37.736	0.907
Detroit	197-1203A-37R-2, 89-90	18.091	15.435	37.620	0.928
Detroit	197-1203A-49R-3, 50-54	18.111	15.419	37.592	0.924
Detroit	197-1203A-53R-6, 123-128	18.261	15.466	37.819	0.931
Detroit	197-1203A-58R-4, 31-34	18.074	15.441	37.591	0.927
Detroit	197-1203A-62R-3, 114-118	18.129	15.458	37.730	0.922
Detroit	197-1203A-65R-4, 21-25	18.303	15.458	37.864	0.930
Detroit	197-1204A-9R-2, 77-80	17.951	15.434	37.557	0.938
Detroit	197-1204B-2R-2, 76-80	16.707	15.434	37.580	0.930
Suiko	55-433C-23R-3, 59	18.387	15.501	37.926	0.928
Suiko	55-433C-31R-1				
Suiko	55-433C-31R-4, 46	18.588	15.601	38.176	0.925
Nintoku	197-1205A-8R-1, 5-7	18.011	15.442	37.532	0.931
Nintoku	197-1205A-18R-5, 63-65	17.989	15.451	37.532	0.932
Nintoku	197-1205A-35R-2, 29-31	18.012	15.420	37.477	0.921
Nintoku	197-1205A-45R-1, 98-100	18.045	15.455	37.563	0.929
Ojin	55-430A-5R-3, 56-58	18.303	15.475	37.792	0.924
Ojin	55-430A-5R-4, 88	18.847	15.588	38.229	0.916
Koko	197-1206A-3R-2, 103-106	18.188	15.445	37.718	0.931
Koko	197-1206A-9R-2, 145-147	18.128	15.465	37.651	0.930
Koko	197-1206A-14R-1, 100-104	18.276	15.452	37.792	0.934
Koko	197-1206A-15R-1, 10-13	18.246	15.462	37.839	0.937
Koko	197-1206A-16R-2, 59-61	18.218	15.473	37.925	0.925
Koko	197-1206A-16R-2, 59-61s	18.221	15.469	37.903	0.922
Koko	197-1206A-30R-2, 1-4	18.390	15.453	37.877	0.925
Koko	197-1206A-30R-2, 1-4s	18.393	15.471	37.917	0.929
Koko	197-1206A-38R-1, 68-71	18.302	15.467	37.841	0.932
Koko	197-1206A-41R-1, 4-7	18.390	15.461	37.889	0.923
MORB	16-153-29R-4, 92-96				
MORB	88-581C-3R-3, 95-98	19.201	15.655	38.222	0.879
MORB	88-581C-3R-4, 132-135	16.955	15.520	37.889	0.936
MORB	91-595A-10R-1, 103-107	19.873	15.626	37.806	0.768
MORB	91-595B-7R-2, 80-82	19.932	15.628	37.879	0.896

Sr- & Nd-isotope ratios for Meiji & Detroit marked with a normalized to La Jolla of 0.51186 to maintain internal de leaching experiment. Isotope ratios listed as 'measured' accepted standard values for each isotope system. Rati sample; age data are from O'Connor et al. (2013) basec

**Table S2. Sr-, Nd-, Pb-, Hf-isotope compo
and Mesozoic MORBs**

Seamount	Sample name	Lu	Hf	$^{176}\text{Hf}/^{177}\text{Hf}$	ϵHf
				measured	
Meiji	19-192A-5R-3, 98-100	0.44	3.16	0.283130	13.33
Meiji	19-192A-6R-2, 7-14	0.47	3.65	0.283125	13.43
Meiji	19-192A-6R-3, 23-25				
Detroit	145-883F-1R-3, 37-41	0.52	3.88	0.283166	14.71
Detroit	145-883F-2R-3, 129-133	0.43	3.14	0.283160	14.48
Detroit	145-884E-4R-4, 23-27	0.47	1.76	0.283274	17.50
Detroit	145-884E-6R-3, 30-33	0.49	2.18	0.283226	16.13
Detroit	145-884E-10R-4, 6-10	0.31	1.38	0.283232	16.35
Detroit	197-1203A-17R-4, 57-63	0.38	2.98	0.283129	13.41
Detroit	197-1203A-17R-4, 57-63s				
Detroit	197-1203A-18R-3, 114-116	0.35	2.80	0.283130	13.47
Detroit	197-1203A-37R-2, 89-90	0.26	1.69	0.283161	14.35
Detroit	197-1203A-49R-3, 50-54	0.41	2.92	0.283153	14.17
Detroit	197-1203A-53R-6, 123-128	0.58	5.06	0.283122	13.26
Detroit	197-1203A-58R-4, 31-34	0.33	2.41	0.283144	13.87
Detroit	197-1203A-62R-3, 114-118	0.53	4.74	0.283107	12.75
Detroit	197-1203A-65R-4, 21-25	0.54	4.56	0.283122	13.23
Detroit	197-1204A-9R-2, 77-80	0.41	3.01	0.283158	14.37
Detroit	197-1204B-2R-2, 76-80	0.44	3.21	0.283168	14.72
Suiko	55-433C-23R-3, 59	0.24	2.29	0.283106	12.67
Suiko	55-433C-31R-1	0.35	4.45	0.283103	12.73
Suiko	55-433C-31R-4, 46	0.15	2.33	0.283102	12.79
Nintoku	197-1205A-8R-1, 5-7	0.28	4.44	0.283102	12.71
Nintoku	197-1205A-18R-5, 63-65	0.23	3.31	0.283106	12.81
Nintoku	197-1205A-35R-2, 29-31	0.20	1.68	0.283143	13.82
Nintoku	197-1205A-45R-1, 98-100	0.34	4.27	0.283090	12.18
Ojin	55-430A-5R-3, 56-58	0.45	9.88	0.283099	12.62
Ojin	55-430A-5R-4, 88	0.45	10.66	0.283097	12.56
Koko	197-1206A-3R-2, 103-106	0.34	3.88	0.283109	12.64
Koko	197-1206A-9R-2, 145-147	0.20	2.32	0.283093	12.08
Koko	197-1206A-14R-1, 100-104	0.20	2.40	0.283092	12.06
Koko	197-1206A-15R-1, 10-13	0.29	3.59	0.283079	11.62
Koko	197-1206A-16R-2, 59-61	0.30	3.75	0.283081	11.69
Koko	197-1206A-16R-2, 59-61s				
Koko	197-1206A-30R-2, 1-4	0.35	4.20	0.283105	12.52
Koko	197-1206A-30R-2, 1-4s				
Koko	197-1206A-38R-1, 68-71	0.24	2.71	0.283087	11.86
Koko	197-1206A-41R-1, 4-7	0.34	4.26	0.283094	12.15
MORB	16-153-29R-4, 92-96	0.43	1.64	0.283254	16.85
MORB	88-581C-3R-3, 95-98	0.31	0.89	0.283141	11.77
MORB	88-581C-3R-4, 132-135	0.65	2.78	0.283240	16.56
MORB	91-595A-10R-1, 103-107	0.52	2.39	0.283121	12.59
MORB	91-595B-7R-2, 80-82	0.60	2.82	0.283109	12.23

Sr- & Nd-isotope ratios for Meiji & Detroit marked with a normalized to La Jolla of 0.51186 to maintain internal data leaching experiment. Isotope ratios listed as 'measured' accepted standard values for each isotope system. Ratio sample; age data are from O'Connor et al. (2013) based