

**Table 1.** Representative compositions of serpentinites

		Himalaya	Himalaya	Himalaya	Cuba	Cuba	Alps	Alps
element*	method**	CH 98A	CH 98B	CH 187	CU 51	CU 54	S99629-1	S-99632-1
SiO <sub>2</sub>	XRF	35.05	40.15	39.39	40.78	42.21	39.81	38.38
TiO <sub>2</sub>	XRF	0.03	0.01	0.02	0.01	0.04	0.03	0.03
Al <sub>2</sub> O <sub>3</sub>	XRF	0.54	0.37	1.09	0.78	1.74	2.86	1.29
Fe <sub>2</sub> O <sub>3</sub> (t)	XRF	6.83	7.54	8.99	7.76	8.21	8.94	11.2
MnO	XRF	0.13	0.1	0.11	0.10	0.11	0.11	0.07
MgO	XRF	40.0	41.8	38.0	35.4	35.3	35.8	36.6
CaO	XRF	0.64	0.29	0.33	0.19	0.055	0.10	0.03
Na <sub>2</sub> O	XRF	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
K <sub>2</sub> O	XRF	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
P <sub>2</sub> O <sub>5</sub>	XRF	0.005	0.006	<0.002	0.007	0.004	0.005	0.006
Cr	XRF	2720	2600	2780	2680	2110	2520	2620
Co	XRF	97	110	113	105	75	102	128
Ni	XRF	2260	2830	2390	2190	1580	2030	2740
Zn	XRF	51	54	32	37	47	38	50
Sr	ID, ICP-MS	22.8	13.1	6.9	1.35	4.11	2.51	1.67
Ce	ICP-MS	0.38	0.41	0.09	0.1	1.06	0.19	0.40
Nd	ID, ICP-MS	0.058	0.076	0.041	0.045	0.553	0.24	0.26
Sm	ID, ICP-MS	0.0185	0.0213	0.0185	0.042	0.424	0.14	0.064
Zr	ICP-MS	0.2	0.4	0.2	< 0.2	0.3	0.7	0.9
Sc	ICP-MS	5.3	3.8	7.9	10.8	7.7	13.8	5.7
Mo	ICP-MS	0.19	0.1	0.16	< 0.05	0.16	< 0.05	0.06
Cd	ICP-MS	0.07	0.10	0.08	0.1	0.04	0.09	0.11
Cu	ICP-MS	5.05	6.34	5.21	16.3	12.3	1.83	11.5
V	ICP-MS	15	12	35	36	53	68	20
Y	ICP-MS	0.4	0.5	0.7	0.1	1.2	2.7	0.6
S	combustion	0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Pb	ICP-MS	13.7	2.64	33.7	1.48	1.91	0.86	0.76
As	Hydride-AA	275	54.1	145	2.1	2.7	2.8	1.2
Sb	Hydride-AA	21	9.8	14	0.06	0.5	0.5	0.5
LOI		16.4	9.2	11.6	14.5	11.9	12.0	12
TOTAL		100.1	100.0	100.0	100.1	100.0	100.1	100.0

\* Oxides and LOI (loss of ignition) are expressed in wt.% and others are in ppm. Total Fe was expressed as Fe<sub>2</sub>O<sub>3</sub> (t)

\*\*Analytical Method, XRF = X-ray fluorescence spectrometer, ID = isotopic dilution. ICP-MS= inductively coupled plasma mass spectrometer. Hydride-AA; atomic absorption spectrometer attached to a hydride generator.

**Table 2.** Compositions of 1991 eruption products at Mount Pinatubo, Philippines, 2000 eruption products at Miyake-jima volcano, Japan, and Quaternary volcanic rocks in the Hishikari area, southern Kyushu, Japan.

Element*	method**	Pinatubo, basalt	Pinatubo, andesite	Miyake- Jima81500 basalt	Miyake- Jima062700 basalt	Hishikari OH-441 Lower Andesite	Hishikari OH-478 upper andesite	Hishikari OH000119- 05 Lower Andesite
age		1991AD	1991AD	2000AD	2000AD	1.46 Ma	0.56Ma	1 Ma
SiO <sub>2</sub>	XRF	51.2	59.7	50.8	52.9	60.5	59.8	55.8
TiO <sub>2</sub>	XRF	0.9	0.66	1.09	1.36	0.69	0.66	0.69
Al <sub>2</sub> O <sub>3</sub>	XRF	14.8	16.0	17.9	14.8	15.7	15.8	17.8
Fe <sub>2</sub> O <sub>3</sub> (t)	XRF	9.01	6.13	12.3	14.3	6.76	6.76	7.75
MnO	XRF	0.16	0.13	0.20	0.24	0.134	0.124	0.134
MgO	XRF	8.85	4.62	4.01	3.95	2.95	3.45	3.32
CaO	XRF	10.2	6.94	10.8	8.72	5.62	6.39	8.16
Na <sub>2</sub> O	XRF	3.05	3.98	2.13	2.65	2.87	2.9	2.93
K <sub>2</sub> O	XRF	1.45	1.6	0.40	0.56	2.107	1.99	1.18
P <sub>2</sub> O <sub>5</sub>	XRF	0.35	0.26	0.12	0.15	0.119	0.12	0.14
Ba	XRF	310	393	170	249	356	357	274
V	XRF	n.d.	115	401	442	182	185	228
Cr	XRF	342	150	21.0	14.5	43	45	33
Co	XRF	36.3	20.4	26.5	29	19	19.8	22.9
Ni	XRF	105	50.2	9.0	6	13	19	20
Zn	XRF	78.3	67.1	73.3	112	72	64	67
Rb	XRF	39	38	3.3	7.4	76	62.8	22.6
Sr	XRF	615	571	237	222	313	311	451
Zr	XRF	104	102	54.8	66	155	151	110
U	ICP-MS	1.54	1.57	0.2	0.2	1.4	1.9	1.0
Th	ICP-MS	5.87	5.33	0.2	0.35	5.2	7.6	4.1
Ce	ICP-MS	48.1	39.7	8.445	11.91	52	34	35
Nd	ICP-MS	25.2	19.8	9	11.55	23	18.8	12.8
Sm	ICP-MS	5.4	4.18	3.55	4.35	4.1	4.4	3.3
Sc	ICP-MS	35	19	43	43	17	22	23
Y	ICP-MS	19	14	27.1	34.8	29	22.7	16.9
Ta	ICP-MS	0.18	0.26	0.1	0.1	0.3	0.2	0.2
Nb	ICP-MS	3	4	0.47	0.57	4.3	4.2	2.7
Cs	ICP-MS	3.5	3.3	0.25	0.55	4.4	2.9	2.5
Hf	ICP-MS	2.4	2.7	1.6	2.5	3.8	4.5	2.7
Cu	ICP-MS	80	62	332	162	28.3	76.9	71.4
S	combustion	n.d.	0.25	0.02	n.d.	0.07	0.04	0.06
Pb	ICP-MS	8	5.5	2.895	3.69	11.62	12.16	6.71
As	hydride-AA	1.32	2.4	1.3	2.2	6.5	12.1	10.2
Sb	hydride-AA	0.17	0.27	0.05	0.04	0.73	0.25	0.22
LOI		0.23	0.55	n.d.	n.d.	1.7	1.3	1.1
TOTAL		100.2	100.6	99.66	99.70	99.12	99.21	99.03

\* Oxides and LOI (loss of ignition) are expressed in wt.% and others are in ppm. Total Fe was expressed as Fe<sub>2</sub>O<sub>3</sub> (t)

\*\*Analytical Method, XRF = X-ray fluorescence spectrometer, ID = isotopic dilution. ICP-MS= inductively coupled plasma mass spectrometer. Hydride-AA; atomic absorption spectrometer attached to a hydride generator.

S was determined using an elemental analyser in which SO<sub>2</sub> released from a mixture of samples and V<sub>2</sub>O<sub>5</sub> at 1500 °C was separated from the rest of gases using a gas chromatography.

