

Supplement 1

Location name	Sample name	a axis (cm)	b axis (cm)	c axis (cm)	Color	Shape
Ikokuma Kazamaura-mura (IKM)	IKM-1	5.5	3.5	2.7	White	subangular
	IKM-2	6.0	4.3	2.8	Gray	angular
	IKM-3	3.5	2.8	1.3	White	subrounded
	IKM-4	2.8	1.8	1.0	White	subrounded
Nimaibashi Mutsu-shi (NMB)	NMB-1	4.2	2.6	0.8	White	subangular
	NMB-2	5.8	2.3	2.0	White	angular
	NMB-3	3.5	2.5	2.0	White	angular
	NMB-4	4.5	2.3	1.7	White	subrounded
	NMB-5	6.0	3.0	1.6	White	subrounded
	NMB-6	3.5	2.6	2.2	White	subangular
	NMB-7	4.7	3.0	1.8	Orange	subangular
	NMB-8	5.5	2.0	1.5	Gray	angular
Noushi Higashidori-mura (NUS)	NUS-1	7.3	5.0	2.3	White	subangular
	NUS-2	4.7	2.8	1.7	White	subangular
	NUS-3	5.0	4.5	3.0	Gray	subangular
	NUS-4	6.0	4.8	4.3	Gray	angular
Iwaya Higashidori-mura (IWY)	IWY-1	3.5	2.8	1.8	White	subrounded
	IWY-2	3.3	2.3	2.0	Orange	subangular
	IWY-3	5.0	3.7	2.2	Gray	subrounded
West side of Shiryazaki	SYZw-1	10.5	9.3	3.8	Orange	subangular
Higashidori-mura (SYZw)	SYZw-2	6.6	5.4	2.5	Orange	angular
East side of Shiryazaki	SYZe-1	7.5	4.4	4.8	Gray	angular
Higashidori-mura (SYZe)	SYZe-2	4.3	3.2	3.8	Gray	angular
	SYZe-3	4.3	1.9	2.2	White	subangular
	SYZe-4	3.5	2.0	1.8	White	subangular
	Hamaokunai Mutsu-shi (HON)	HON-1	3.7	2.8	1.7	Gray
HON-2		2.7	1.7	1.3	Gray	subrounded
HON-3		3.2	2.5	1.3	White	subrounded
HON-4		4.8	3.0	2.0	White	subangular
Anden coast Oga-shi (AND)	AND-1	4.3	3.5	3.0	Orange	angular
	AND-2	3.7	3.0	1.7	White	subangular
	AND-3	3.2	2.2	1.0	White	subangular
	AND-4	3.8	3.2	1.2	Gray	angular
Koyadori Yamada-machi (KYD)	KYD-1	8.0	5.2	3.5	White	subangular
	KYD-2	5.5	3.5	2.0	White	subangular
	KYD-3	4.0	3.8	3.2	White	subangular
Gyobu-misaki asahi-shi (GBM)	GBM-1	8.5	6.5	3.5	White	angular
	GBM-2	6.0	4.2	2.5	White	angular
	GBM-3	4.5	1.5	4.0	White	subrounded
	GBM-4	7.5	6.5	3.5	White	subangular
Jogashima Miura-shi (JGS)	JGS-1	6.0	4.5	1.3	Orange	subangular
	JGS-2	3.3	2.4	1.3	White	subangular
	JGS-3	2.8	2.2	1.7	Gray	subrounded
	JGS-4	4.5	3.5	2.6	Gray	angular
	JGS-5	4.7	4.5	3.8	Gray	angular
	JGS-6	4.5	2.0	3.0	Orange	angular
Sakawa coast Odawara-shi (SKW)	SKW-1	6.0	4.5	2.5	Gray	subrounded
	SKW-2	5.0	3.0	2.5	Gray	subangular
	SKW-3	4.0	3.5	2.0	Gray	subrounded
Kobohama Oshima-machi (KBH)	KBH-1	4.6	3.2	1.5	White	angular
	KBH-2	6.0	3.0	2.3	Orange	angular
	KBH-3	4.0	3.0	2.7	White	angular
	KBH-4	4.2	3.0	1.8	White	subrounded
	KBH-5	4.5	3.5	1.8	Black	subrounded
Furusato beach Kihoku-cho (FRS)	FRS-1	5.5	4.0	1.5	White	subangular
	FRS-2	4.0	3.5	2.5	Gray	angular
	FRS-3	2.8	2.0	1.5	Gray	subrounded
Shihara coast Shirahama-cho (SHR)	SHR-1	4.5	3.0	1.5	White	subangular
	SHR-2	4.5	3.0	1.5	White	subrounded
	SHR-3	5.5	4.2	2.0	Gray	subrounded

	SHR-4	3.0	2.5	1.5	Pink	subrounded
	SHR-5	2.8	2.0	1.5	Brown	subrounded
Toyohama Kanonji-shi (TYH)	TYH-1	2.2	2.2	1.5	White	angular
	TYH-2	2.6	2.0	1.5	White	subangular
	TYH-3	2.2	1.5	1.2	White	subangular
	TYH-4	2.3	1.6	0.9	White	angular
	TYH-5	2.0	1.5	0.8	White	angular
	TYH-6	2.2	1.8	1.2	Gray	subangular
	TYH-7	4.5	3.0	1.8	Gray	angular
Ozaki Muroto-shi (OZK)	OZK-1	6.0	4.0	2.5	White	subrounded
	OZK-2	5.5	4.0	2.3	White	subrounded
Kainokawa Tosashimizu-shi (KNK)	KNK-1	4.0	3.5	3.0	Gray	subrounded
	KNK-2	6.0	4.5	3.0	Gray	subangular
Futami Ikata-cho (FTM)	FTM-1	5.5	3.0	1.5	White	subrounded
	FTM-2	4.8	3.5	1.5	Gray	subrounded
	FTM-3	5.0	1.8	1.2	White	subangular
Hitotsuba coast Miyazaki-shi (HTB)	HTB-1	7.8	4.5	2.5	Orange	subrounded
	HTB-2	5.8	4.5	1.7	White	subangular
	HTB-3	6.8	5.5	3.0	White	angular
	HTB-4	6.0	4.4	2.8	White	subrounded
	HTB-5	5.0	4.0	1.8	White	subrounded
Fukiagehama Minamisatsuma-shi (FAH)	FAH-1	6.0	3.6	1.2	White	subangular
	FAH-2	6.8	3.3	3.0	Gray	subangular
	FAH-3	6.0	3.0	2.3	White	subangular
	FAH-4	4.3	3.5	1.8	White	subrounded
	FAH-5	5.7	3.6	1.2	Gray	angular
	FAH-6	6.8	6.5	3.6	White	angular
	FAH-7	3.5	3.2	1.7	White	angular
	FAH-8	5.0	3.3	2.0	White	subrounded
Miyagahama Ibusuki-shi (MGH)	MGH-1	3.0	2.2	1.5	White	subangular
	MGH-2	2.5	2.4	0.9	White	subrounded
	MGH-3	3.2	2.1	1.2	White	subangular
	MGH-4	2.4	2.2	1.0	Orange	angular
	MGH-5	2.7	1.8	0.8	Brown	subangular
	MGH-6	3.8	3.5	2.0	White	subangular
Tarahama Ibusuki-shi (TRH)	TRH-1	3.8	3.0	2.5	Gray	subangular
	TRH-2	4.5	2.0	1.6	White	angular
	TRH-3	7.8	5.2	2.5	White	subrounded
Tebiro coast Tatsugo-chi (TBR)	TBR-1	5.5	4.8	2.6	White	subrounded
	TBR-2	4.5	2.8	1.5	White	angular
	TBR-3	4.0	3.5	2.2	Black	subrounded
	TBR-4	3.5	3.0	2.6	Gray	angular

Supplement 2

Tephra	Sampling site	Sampler or provider of tephra (reference)	Sample No. or reference
Spfl	Uenae, Hokkaido	TMU Japan Standard Tephra Sample for Tephra Researchers	Spfa(1)
Spfa-1	Kamisarabetsu, Hokkaido	TMU Japan Standard Tephra Sample for Tephra Researchers	Spfa(4)
Toya	Menamachi, Hokkaido	TMU Japan Standard Tephra Sample for Tephra Researchers	Toya(33)
On-Pm1	Takaku, Tochigi Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	On-Pm1(3)
To-Of	Aomori Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	To-Of(1)
To-H	Uzurakubo, Aomori Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	To-H(4)
To-Cu	Sekinehama, Aomori Pre.	R. Hiramine	Ishimura and Hiramine (2020)
To-a	Towadasetaishi, Akita Pre.	R. Hiramine	
Hk-TP (upper)	Ooi, Kanagawa Pre.	T. Suzuki	
Hk-TP (middle)	Ooi, Kanagawa Pre.	T. Suzuki	
Hk-TP (lower)	Ooi, Kanagawa Pre.	T. Suzuki	
Aso-4	Fujino, Kanagawa Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	Aso-4(7)
Ata	Noga, Ohita pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	Ata(2)
AT	Chigaki, Toyama Pre.	H. Machida	
Sz-Ts	Kurokami, Kagoshima Pre.	R. Hiramine	
K-Tz	Takamibashi, Kagoshima Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	K-Tz(9)
K-Ah	Ishigori, Miyazaki Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	K-Ah(19)
1986 FOB	Tsuyazaki, Fukuoka pre., Hanami beach, Fukuoka Pre.	T. Ishii, T. Soda	
1924 SVI	Ibaruma beach, Okinawa	Ryukyu University Museum	RUMF-GR-00071, RUMF-GR-00070
B-Tm	Hachimori, Akita Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	B-Tm(14)
U-OkI	Torihama, Fukui Pre.	TMU Japan Standard Tephra Sample for Tephra Researchers	U-OkI(1)
U-2	Jeodong, Ullungdo, Korea	Sagamihara city museum	No. MW0048

Supplement 3

Sample (wt %)	IKM-1		IKM-2		IKM-3		IKM-4		NMB-1		NMB-2		NMB-3		NMB-4		NMB-5		NMB-6		NMB-7	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	76.90	0.2	78.26	0.3	77.73	0.2	77.24	0.1	77.44	0.3	77.48	0.2	76.56	0.2	76.36	0.4	77.34	0.6	77.39	0.7	78.06	0.3
TiO ₂	0.36	0.1	0.11	0.0	0.14	0.0	0.13	0.0	0.13	0.0	0.19	0.0	0.12	0.0	0.35	0.0	0.29	0.0	0.34	0.1	0.12	0.0
Al ₂ O ₃	12.59	0.2	12.48	0.2	12.20	0.1	12.39	0.1	12.29	0.1	12.29	0.1	13.35	0.1	12.88	0.2	12.36	0.3	12.19	0.5	12.51	0.1
FeO*	1.81	0.1	0.77	0.3	1.21	0.1	2.56	0.1	1.37	0.2	1.22	0.2	1.92	0.1	1.71	0.1	1.64	0.2	1.71	0.2	0.88	0.3
MnO	0.09	0.0	0.08	0.0	0.05	0.0	0.10	0.0	0.04	0.0	0.06	0.0	0.15	0.0	0.10	0.0	0.11	0.0	0.10	0.0	0.07	0.0
MgO	0.39	0.1	0.17	0.0	0.12	0.0	0.11	0.0	0.09	0.0	0.19	0.0	0.23	0.0	0.40	0.1	0.34	0.0	0.37	0.1	0.15	0.0
CaO	2.10	0.1	1.49	0.1	1.14	0.1	2.00	0.0	1.08	0.1	1.22	0.0	1.79	0.1	2.18	0.1	1.95	0.2	1.89	0.2	1.47	0.1
Na ₂ O	4.29	0.1	3.90	0.1	3.60	0.1	4.26	0.1	3.78	0.1	3.98	0.2	4.61	0.1	4.64	0.2	4.55	0.1	4.59	0.1	3.84	0.1
K ₂ O	1.47	0.0	2.73	0.1	3.82	0.1	1.21	0.1	3.80	0.1	3.37	0.1	1.27	0.1	1.37	0.0	1.42	0.1	1.41	0.1	2.91	0.2
Total**	98.79	1.1	95.81	1.9	96.39	1.1	98.46	1.3	96.59	0.7	95.75	0.7	98.55	1.9	95.82	2.1	96.96	0.8	97.82	0.9	96.63	0.6
n	7		9		8		9		9		11		7		9		6		5		5	

Sample (wt %)	NMB-8		NUS-1		NUS-2		NUS-3		NUS-4		IWY-1		IWY-2		IWY-3		SYZw-1		SYZw-2		SYZe-1	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	76.70	0.2	77.95	0.2	78.10	0.3	76.07	0.7	76.02	0.6	77.66	0.4	75.99	0.6	77.68	0.2	77.98	0.3	77.29	0.1	77.71	0.2
TiO ₂	0.10	0.1	0.06	0.1	0.04	0.0	0.38	0.1	0.42	0.1	0.18	0.0	0.38	0.0	0.19	0.0	0.12	0.0	0.14	0.0	0.13	0.0
Al ₂ O ₃	13.37	0.1	12.41	0.2	12.41	0.1	13.08	0.5	12.92	0.2	12.56	0.3	12.79	0.3	12.22	0.1	12.32	0.1	12.41	0.2	12.37	0.1
FeO*	1.91	0.1	0.95	0.1	0.94	0.1	1.80	0.1	2.03	0.1	1.73	0.1	2.03	0.2	1.02	0.1	0.97	0.3	1.21	0.1	1.03	0.2
MnO	0.15	0.0	0.09	0.0	0.10	0.0	0.11	0.0	0.09	0.0	0.05	0.0	0.10	0.0	0.06	0.0	0.07	0.0	0.06	0.0	0.05	0.0
MgO	0.23	0.0	0.02	0.0	0.01	0.0	0.33	0.1	0.42	0.1	0.31	0.0	0.44	0.1	0.22	0.0	0.13	0.0	0.11	0.0	0.09	0.0
CaO	1.78	0.1	0.35	0.0	0.34	0.0	2.12	0.2	2.26	0.1	2.16	0.0	2.26	0.2	1.32	0.0	1.53	0.0	1.11	0.1	1.10	0.1
Na ₂ O	4.52	0.1	4.89	0.1	4.83	0.2	4.67	0.2	4.56	0.1	4.09	0.1	4.73	0.2	3.76	0.2	4.10	0.1	3.95	0.2	3.77	0.1
K ₂ O	1.24	0.0	3.27	0.1	3.21	0.1	1.45	0.1	1.27	0.0	1.26	0.0	1.28	0.1	3.53	0.1	2.78	0.1	3.73	0.1	3.76	0.1
Total**	97.95	1.1	95.65	0.6	94.80	1.3	98.35	2.1	96.48	1.0	95.58	2.1	96.79	0.7	96.94	1.4	96.14	1.9	97.88	1.2	96.28	0.7
n	8		8		10		5		6		4		10		8		7		4		9	

Sample (wt %)	SYZe-2		SYZe-3		SYZe-4		HON-1		HON-2		HON-3		HON-4		AND-1		AND-2		AND-3		AND-4	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	75.65	1.1	77.67	0.2	78.29	0.2	75.39	0.6	77.14	0.2	76.36	0.2	78.25	0.2	76.50	0.5	76.29	0.2	76.17	0.4	76.39	0.2
TiO ₂	0.35	0.0	0.07	0.0	0.06	0.0	0.43	0.1	0.23	0.0	0.38	0.1	0.19	0.0	0.34	0.0	0.37	0.0	0.39	0.1	0.37	0.1
Al ₂ O ₃	13.11	0.8	12.40	0.2	12.36	0.2	12.29	0.5	12.27	0.1	12.81	0.1	11.89	0.1	12.55	0.3	12.78	0.2	12.81	0.3	12.77	0.3
FeO*	1.98	0.2	0.56	0.1	0.91	0.1	3.37	0.2	2.46	0.1	1.85	0.1	1.34	0.1	1.81	0.1	1.89	0.1	1.91	0.1	1.87	0.1
MnO	0.07	0.0	0.08	0.0	0.09	0.0	0.11	0.0	0.07	0.0	0.11	0.1	0.05	0.0	0.10	0.0	0.11	0.0	0.11	0.0	0.10	0.0
MgO	0.40	0.0	0.04	0.0	0.02	0.0	0.45	0.1	0.30	0.0	0.37	0.0	0.18	0.0	0.44	0.0	0.43	0.0	0.42	0.1	0.44	0.1
CaO	2.34	0.3	0.54	0.0	0.33	0.0	2.95	0.2	2.41	0.1	2.04	0.1	1.36	0.1	2.14	0.1	2.10	0.1	2.18	0.1	2.05	0.1
Na ₂ O	4.82	0.1	3.52	0.2	4.70	0.1	4.05	0.1	3.93	0.1	4.62	0.1	4.37	0.1	4.70	0.1	4.56	0.2	4.49	0.2	4.51	0.1
K ₂ O	1.28	0.1	5.13	0.1	3.24	0.1	0.96	0.0	1.19	0.1	1.46	0.1	2.37	0.1	1.43	0.1	1.47	0.1	1.51	0.1	1.52	0.1
Total**	97.09	0.8	96.81	1.3	96.93	1.4	98.24	0.5	97.64	0.3	98.85	1.1	97.37	0.6	97.08	1.3	97.28	2.1	98.49	1.3	97.85	1.6
n	4		17		21		8		6		7		11		10		18		26		16	

Sample (wt %)	KYD-1		KYD-2		KYD-3		GBM-1		GBM-2		GBM-3		GBM-4		JGS-1		JGS-2		JGS-3		JGS-4	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	76.99	0.5	76.39	0.6	76.86	0.6	78.11	0.2	77.91	0.2	77.67	0.2	77.95	0.2	78.29	0.2	78.35	0.2	77.27	0.3	76.78	0.3
TiO ₂	0.34	0.0	0.32	0.1	0.30	0.1	0.12	0.0	0.13	0.0	0.13	0.1	0.12	0.0	0.11	0.0	0.14	0.0	0.12	0.0	0.14	0.0
Al ₂ O ₃	12.47	0.2	12.72	0.3	12.44	0.2	11.88	0.1	12.00	0.1	12.03	0.1	11.87	0.1	12.08	0.1	12.01	0.1	12.21	0.3	12.67	0.3
FeO*	1.84	0.1	1.86	0.2	1.89	0.1	1.18	0.1	1.17	0.1	1.23	0.1	1.22	0.1	0.91	0.1	1.08	0.1	2.44	0.2	2.54	0.1
MnO	0.08	0.0	0.09	0.0	0.11	0.0	0.05	0.0	0.04	0.0	0.04	0.0	0.04	0.0	0.03	0.0	0.05	0.0	0.10	0.0	0.10	0.0
MgO	0.39	0.1	0.41	0.1	0.33	0.1	0.11	0.0	0.11	0.0	0.12	0.0	0.10	0.0	0.12	0.0	0.11	0.0	0.10	0.0	0.11	0.0
CaO	2.04	0.1	2.20	0.1	1.99	0.1	1.13	0.0	1.15	0.1	1.11	0.0	1.12	0.0	1.13	0.1	1.12	0.1	1.97	0.1	2.05	0.1
Na ₂ O	4.51	0.2	4.68	0.1	4.74	0.1	3.63	0.1	3.67	0.1	3.74	0.2	3.73	0.1	3.48	0.1	3.44	0.1	4.55	0.1	4.41	0.2
K ₂ O	1.35	0.1	1.33	0.1	1.34	0.1	3.80	0.1	3.84	0.1	3.93	0.1	3.85	0.1	3.85	0.1	3.71	0.1	1.24	0.1	1.19	0.1
Total**	99.40	0.4	96.09	0.6	96.94	1.3	96.74	1.1	96.69	1.8	97.06	1.1	96.39	1.3	96.69	0.9	97.21	0.7	98.21	1.2	97.03	2.1
n	8		10		8		14		15		15		12		12		12		13		12	

Sample (wt %)	JGS-5		JGS-6		SKW-1		SKW-2		SKW-3		KBH-1		KBH-2		KBH-3		KBH-4		KBH-5		FRS-1	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	76.27	0.3	78.18	0.2	75.66	0.3	75.55	0.2	75.59	0.2	77.86	0.2	77.77	0.2	77.76	0.3	77.69	0.2	71.79	0.7	78.14	0.1
TiO ₂	0.49	0.0	0.13	0.0	0.46	0.1	0.45	0.1	0.45	0.0	0.12	0.0	0.12	0.0	0.14	0.0	0.15	0.0	0.42	0.1	0.12	0.0
Al ₂ O ₃	12.24	0.2	11.84	0.2	12.42	0.1	12.57	0.2	12.52	0.1	12.07	0.2	12.09	0.2								

Sample (wt %)	FRS-2		FRS-3		SHR-1		SHR-2		SHR-3		SHR-4		SHR-5		TYH-1		TYH-2		TYH-3		TYH-4	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	74.34	0.1	75.67	0.2	77.47	0.3	77.66	0.2	78.02	0.2	77.62	0.2	71.69	0.3	77.68	0.1	76.07	0.2	75.67	0.2	73.43	0.4
TiO ₂	0.26	0.0	0.22	0.0	0.13	0.0	0.13	0.1	0.12	0.0	0.12	0.0	0.59	0.1	0.13	0.0	0.06	0.0	0.06	0.1	0.29	0.1
Al ₂ O ₃	13.48	0.1	12.78	0.1	12.19	0.1	12.14	0.1	11.91	0.1	12.06	0.1	13.61	0.1	12.44	0.1	13.34	0.2	13.47	0.2	13.64	0.2
FeO*	1.20	0.1	2.50	0.0	1.22	0.1	1.17	0.1	1.10	0.1	1.24	0.1	3.44	0.1	1.24	0.1	0.96	0.1	0.99	0.0	2.46	0.1
MnO	0.07	0.0	0.08	0.0	0.06	0.0	0.05	0.0	0.05	0.0	0.04	0.0	0.09	0.0	0.06	0.0	0.06	0.0	0.06	0.0	0.08	0.0
MgO	0.27	0.1	0.17	0.0	0.10	0.0	0.09	0.0	0.12	0.0	0.14	0.0	0.60	0.0	0.10	0.0	0.06	0.0	0.04	0.0	0.38	0.0
CaO	1.22	0.0	1.79	0.0	1.11	0.1	1.13	0.1	1.15	0.1	1.15	0.1	2.48	0.2	1.03	0.0	0.76	0.0	0.78	0.1	2.34	0.2
Na ₂ O	3.90	0.2	4.71	0.1	3.81	0.1	3.79	0.1	3.72	0.2	3.76	0.1	4.37	0.1	3.72	0.1	4.13	0.1	4.16	0.2	4.23	0.2
K ₂ O	5.25	0.2	2.09	0.1	3.91	0.1	3.84	0.1	3.82	0.1	3.87	0.1	3.12	0.1	3.60	0.1	4.56	0.1	4.77	0.1	3.14	0.1
Total**	99.40	0.5	99.25	0.9	96.84	1.2	97.43	0.5	97.32	1.3	97.56	0.5	99.79	0.2	97.32	1.2	96.48	1.7	95.70	1.0	99.02	0.8
n	11		4		14		13		9		15		5		4		9		9		4	

Sample (wt %)	TYH-5		TYH-6		TYH-7		OZK-1		OZK-2		KNK-1		KNK-2		FTM-1		FTM-2		FTM-3		HTB-1	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	78.14	0.2	77.56	0.3	74.70	0.3	78.17	0.2	76.79	0.3	77.89	0.2	77.75	0.1	77.84	0.1	77.75	0.2	77.73	0.1	77.69	0.4
TiO ₂	0.12	0.0	0.24	0.0	0.24	0.1	0.11	0.0	0.14	0.0	0.13	0.0	0.11	0.0	0.13	0.0	0.13	0.0	0.12	0.1	0.12	0.0
Al ₂ O ₃	11.80	0.1	12.70	0.2	10.47	0.3	11.95	0.1	12.22	0.1	12.08	0.1	12.12	0.1	12.09	0.1	12.21	0.1	12.14	0.1	12.17	0.1
FeO*	1.19	0.1	0.95	0.1	3.90	0.1	1.11	0.1	2.57	0.1	1.17	0.1	1.27	0.1	1.21	0.1	1.21	0.1	1.23	0.1	1.27	0.1
MnO	0.06	0.0	0.05	0.0	0.07	0.0	0.04	0.0	0.11	0.0	0.06	0.0	0.05	0.0	0.05	0.0	0.05	0.0	0.05	0.0	0.05	0.0
MgO	0.12	0.0	0.12	0.1	0.00	0.0	0.11	0.0	0.11	0.0	0.12	0.0	0.12	0.0	0.12	0.0	0.11	0.0	0.11	0.0	0.11	0.0
CaO	1.07	0.1	1.35	0.1	0.28	0.0	1.12	0.0	2.15	0.0	1.08	0.0	1.08	0.0	1.11	0.0	1.13	0.1	1.08	0.0	1.08	0.1
Na ₂ O	3.67	0.1	3.86	0.1	5.40	0.1	3.56	0.1	4.69	0.0	3.70	0.1	3.66	0.1	3.64	0.1	3.61	0.1	3.68	0.1	3.75	0.1
K ₂ O	3.83	0.1	3.18	0.1	4.94	0.1	3.83	0.1	1.22	0.1	3.78	0.1	3.85	0.1	3.82	0.1	3.80	0.0	3.86	0.1	3.76	0.4
Total**	95.17	1.3	98.55	1.2	98.47	1.4	97.29	0.6	97.39	1.9	98.56	0.6	98.49	0.5	98.13	0.5	98.36	0.5	97.87	0.7	96.11	0.6
n	9		4		6		13		3		14		14		14		14		15		13	

Sample (wt %)	HTB-2		HTB-3		HTB-4		HTB-5		FAH-1		FAH-2		FAH-3		FAH-4		FAH-5		FAH-6		FAH-7	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	77.39	0.1	77.54	0.1	77.49	0.2	77.40	0.3	77.88	0.1	77.60	0.7	77.87	0.3	77.89	0.3	77.75	0.2	77.67	0.2	78.35	0.2
TiO ₂	0.12	0.0	0.12	0.0	0.13	0.0	0.13	0.0	0.10	0.0	0.13	0.0	0.14	0.0	0.14	0.1	0.12	0.0	0.12	0.1	0.14	0.0
Al ₂ O ₃	12.20	0.1	12.11	0.1	12.18	0.1	12.21	0.1	12.36	0.1	12.59	0.7	12.23	0.1	12.27	0.1	12.08	0.1	12.05	0.1	12.11	0.1
FeO*	1.27	0.1	1.27	0.1	1.22	0.1	1.26	0.1	1.20	0.1	1.07	0.2	1.12	0.1	1.19	0.1	1.06	0.2	1.23	0.1	0.93	0.1
MnO	0.05	0.0	0.05	0.0	0.03	0.0	0.05	0.0	0.05	0.0	0.05	0.0	0.04	0.0	0.06	0.0	0.06	0.0	0.06	0.0	0.05	0.0
MgO	0.13	0.0	0.13	0.0	0.11	0.0	0.11	0.0	0.12	0.0	0.13	0.0	0.10	0.0	0.10	0.0	0.14	0.0	0.13	0.0	0.11	0.0
CaO	1.16	0.1	1.18	0.1	1.12	0.1	1.19	0.1	1.03	0.1	1.12	0.1	1.13	0.1	1.10	0.0	1.20	0.1	1.13	0.1	1.16	0.1
Na ₂ O	3.76	0.1	3.71	0.1	3.77	0.1	3.72	0.1	3.67	0.1	3.60	0.1	3.71	0.2	3.53	0.2	3.75	0.1	3.78	0.1	3.44	0.1
K ₂ O	3.93	0.1	3.90	0.1	3.94	0.1	3.93	0.1	3.58	0.1	3.72	0.1	3.65	0.1	3.73	0.1	3.84	0.1	3.84	0.1	3.71	0.1
Total**	96.06	0.3	96.20	0.5	95.44	0.6	95.55	0.5	97.51	1.4	97.11	0.8	95.38	2.5	96.74	1.3	97.62	0.8	97.14	0.7	97.08	0.6
n	13		13		12		13		7		6		7		9		15		14		12	

Sample (wt %)	FAH-8		MGH-1		MGH-2		MGH-3		MGH-4		MGH-5		MGH-6		TRH-1		TRH-2		TRH-3		TBR-1	
	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.	ave.	std.
SiO ₂	78.23	0.1	78.00	0.1	78.00	0.2	74.83	0.2	77.55	0.2	71.86	0.3	77.32	0.2	71.47	0.2	77.48	0.1	77.58	0.2	75.99	0.2
TiO ₂	0.09	0.0	0.13	0.0	0.13	0.0	0.46	0.0	0.13	0.0	0.62	0.1	0.12	0.0	0.63	0.0	0.11	0.0	0.14	0.0	0.28	0.1
Al ₂ O ₃	12.20	0.1	11.99	0.1	12.17	0.1	12.93	0.1	12.16	0.2	13.74	0.2	12.29	0.2	13.82	0.1	12.34	0.1	12.27	0.2	12.96	0.2
FeO*	0.93	0.0	0.92	0.1	1.09	0.2	2.11	0.0	1.25	0.1	3.06	0.4	1.29	0.1	3.55	0.1	1.22	0.1	1.20	0.2	2.06	0.0
MnO	0.06	0.0	0.06	0.0	0.06	0.0	0.09	0.0	0.05	0.0	0.09	0.0	0.05	0.0	0.10	0.0	0.03	0.0	0.05	0.0	0.08	0.0
MgO	0.11	0.0	0.12	0.0	0.12	0.0	0.42	0.0	0.11	0.0	0.62	0.0	0.12	0.0	0.55	0.0	0.09	0.0	0.08	0.0	0.38	0.0
CaO	0.96	0.0	0.94	0.0	1.17	0.0	1.81	0.1	1.13	0.1	2.46	0.1	1.13	0.1	2.53	0.1	1.10	0.0	1.14	0.0	2.38	0.1
Na ₂ O	3.57	0.1	3.86	0.1	3.54	0.1	4.18	0.1	3.70	0.1	4.39	0.2	3.77	0.1	4.37	0.1	3.80	0.1	3.76	0.1	4.52	0.1
K ₂ O	3.86	0.1	3.97	0.1	3.72	0.1	3.16	0.1	3.93	0.1	3.16	0.1	3.90	0.1	2.99	0.1	3.83	0.1	3.78	0.1	1.34	0.0
Total**	96.75	0.4	97.63	0.9	97.64	0.4	96.54	0.5	95.82	0.7	98.42	0.7	96.61	0.6	99.19	0.3	96.19	0.9	96.37	0.7	97.88	1.8
n	11		7		15		14		14		13		15		6		12		9		9	

Sample (wt %)	TBR-2		TBR-3		TBR-4	
	ave.	std.	ave.	std.	ave.	std.
SiO ₂	77.80	0.2	65.66	0.1	75.23	0.2
TiO ₂	0.15	0.0	0.51	0.0	0.20	0.0
Al ₂ O ₃	12.09	0.1	15.98	0.1	12.92	0.2
FeO*	1.09	0.2	3.65	0.0	2.60	0.2
MnO	0.05	0.0	0.16	0.0	0.09	0.0
MgO	0.12	0.0	0.82	0.1	0.18	0.0
CaO	1.14	0.1	1.87	0.1	1.82	0.0
Na ₂ O	3.74	0.1	5.44	0.2	4.88	0.1
K ₂ O	3.82	0.1	5.90	0.1	2.08	0.1
Total**	96.59	0.7	99.67	0.2	98.57	0.6
n	15		8		8	

The average composition (wt %) and standard deviation are shown in the ave. column and the std. column. *: Total iron oxide as FeO.