

**Table S3.** Contents of major (wt.%) and trace (ppm) elements for meta-volcanic rocks from the Xileng Formation

Sample	XL02	XL05	XL03	XL06	XL13	XL14	XL15	XL16	XL17	XL18	XL19	XL20	XL21	XL22	XL23	XL24	XL25
Location	Chuzhou, early-stage		Chuzhou, late-stage				Feidong, late-stage			Lujiang, late-stage			Susong, late-stage				
SiO <sub>2</sub>	66.78	68.95	74.68	75.23	74.65	71.39	77.67	78.50	72.40	67.41	74.16	74.23	67.32	74.67	76.57	73.42	70.91
TiO <sub>2</sub>	0.24	0.33	0.27	0.18	0.21	0.38	0.28	0.21	0.31	0.30	0.25	0.40	0.63	0.40	0.31	0.35	0.42
Al <sub>2</sub> O <sub>3</sub>	15.90	15.37	13.90	13.02	14.00	14.89	12.70	12.64	15.04	19.02	14.49	13.81	15.80	13.36	12.86	13.88	15.54
Fe <sub>2</sub> O <sub>3</sub> <sup>T</sup>	2.24	2.38	1.55	2.42	1.13	1.96	1.33	1.40	2.52	2.47	1.90	2.93	3.23	2.42	1.68	2.11	3.46
MnO	0.05	0.02	0.03	0.03	0.03	0.13	0.02	0.02	0.04	0.11	0.06	0.07	0.13	0.09	0.05	0.06	0.02
MgO	0.69	0.90	0.26	0.03	0.49	0.76	0.41	0.39	0.44	0.47	0.37	0.93	0.73	0.42	0.32	0.65	0.62
CaO	2.43	1.61	0.41	0.04	0.04	0.84	0.08	0.03	0.04	0.01	1.30	0.14	2.18	0.37	0.06	1.18	0.07
K <sub>2</sub> O	3.74	3.92	1.38	1.71	5.70	3.18	2.73	2.76	2.87	6.35	1.55	3.62	2.27	1.28	1.04	2.32	2.99
Na <sub>2</sub> O	4.43	4.04	6.17	6.16	2.65	4.23	3.60	2.09	4.68	0.54	4.20	3.02	5.37	5.08	5.25	4.41	3.40
P <sub>2</sub> O <sub>5</sub>	0.11	0.11	0.02	0.02	0.01	0.01	0.04	0.01	0.01	0.02	0.01	0.08	0.14	0.02	0.01	0.08	0.02
BaO	0.22	0.18	0.05	0.06	0.15	0.09	0.09	0.12	0.10	0.12	0.10	0.11	0.09	0.04	0.03	0.06	0.06
LOI	2.70	1.74	0.95	0.21	1.03	1.38	1.01	1.32	1.47	2.59	1.55	1.64	1.28	1.30	0.92	1.12	2.21
Total	99.58	99.62	99.68	99.11	100.09	99.25	99.96	99.49	99.92	99.41	99.97	100.99	99.22	99.46	99.1	99.66	99.72
Li	17.6	13.7	5.10	1.40	14.9	31.8	6.10	3.70	7.50	9.80	7.50	17.0	18.3	19.4	5.7	23.3	14.9
Be	1.66	2.42	1.93	1.38	2.08	2.03	1.90	1.55	2.45	3.54	2.18	2.25	1.76	1.46	1.77	1.61	2.49
Sc	2.97	4.17	7.02	7.00	2.57	3.61	5.35	3.23	8.45	4.20	4.42	7.09	11.89	8.31	5.76	6.14	10.1
V	24.7	35.2	3.90	6.00	8.40	12.7	23.0	14.9	15.2	19.2	10.1	45.1	36.8	16.9	12.7	21.4	32.1
Cr	11.5	50.9	2.10	2.90	2.30	3.70	12.6	4.00	3.00	7.50	8.90	41.9	6.00	6.10	2.30	3.30	9.30
Ni	5.33	20.2	1.68	2.40	1.54	1.46	7.06	2.26	1.73	4.62	4.56	19.6	3.39	3.53	1.45	2.99	4.7
Cu	6.14	16.1	1.85	1.74	1.34	3.36	1.84	1.31	5.28	1.92	3.65	8.73	6.10	4.18	1.73	3.80	14.6
Zn	27.3	29.6	20.4	20.1	33.1	66.3	32.2	28.3	74.9	61.9	64.6	57.5	102	61.6	59.2	50.6	76.4
Ga	19.5	19.8	15.5	15.9	16.5	15.9	15.8	13.2	22.3	22.9	16.4	19.4	22.2	14.8	15.4	15.1	16.5
Rb	54.4	60.5	22.7	28.2	125	46.2	82.4	70.6	70.5	186	24.8	87.4	42.3	27.7	13.7	50.1	81.4
Sr	507	503	63.0	27.0	24.0	78.0	37.0	33.0	18.0	14.0	241	69.0	517	94.0	26.0	177	50.0
Y	9.10	7.50	39.0	30.9	11.0	21.6	24.2	14.9	38.3	18.0	24.3	26.5	31.8	23.4	36.2	23.2	32.0
Zr	250	229	343	342	274	383	355	350	501	334	330	369	350	365	372	366	320
Nb	7.81	6.76	12.5	10.3	10.6	2.01	7.41	8.37	8.68	15.3	11.6	11.7	8.71	8.26	7.23	8.67	7.97
Cs	2.73	1.36	1.93	0.93	3.05	5.29	2.09	4.73	5.35	6.30	2.09	5.04	2.18	3.20	1.81	3.42	3.95
Ba	1957	1628	480	515	1366	712	814	1084	854	948	886	1011	871	408	286	577	565
La	28.9	31.2	37.0	31.3	17.7	25.6	28.9	17.4	19.3	28.5	35.3	42.5	27.5	21.4	35.5	31.3	23.1
Ce	50.8	53.4	70.5	47.9	31.5	50.1	52.9	38.1	42.7	75.0	70.8	82.6	57.0	47.0	51.6	56.1	46.9

Sample	XL02	XL05	XL03	XL06	XL13	XL14	XL15	XL16	XL17	XL18	XL19	XL20	XL21	XL22	XL23	XL24	XL25
Location	Chuzhou, early-stage		Chuzhou, late-stage				Feidong, late-stage			Lujiang, late-stage			Susong, late-stage				
Pr	5.40	5.49	8.50	7.52	3.86	5.91	5.99	4.42	5.48	6.96	7.98	9.25	7.49	5.87	9.89	6.29	6.65
Nd	18.2	18.8	34.2	30.5	13.0	22.3	23.0	15.5	22.4	24.2	29.8	32.3	31.2	23.4	43.0	23.5	27.8
Sm	3.03	2.97	6.91	6.21	2.18	4.40	4.50	2.75	5.03	4.29	5.28	5.90	6.50	4.79	8.84	4.28	5.98
Eu	1.36	0.97	1.62	1.58	0.58	1.20	1.33	0.60	1.12	0.96	1.34	1.07	2.33	1.35	2.25	1.13	1.31
Gd	3.30	3.09	7.52	6.35	2.20	4.67	5.01	2.87	5.67	4.43	5.53	6.17	7.34	5.09	9.32	4.74	6.23
Tb	0.43	0.35	1.30	1.05	0.32	0.71	0.76	0.41	1.07	0.66	0.75	0.87	1.24	0.78	1.41	0.70	1.00
Dy	2.11	1.54	7.37	6.23	1.87	4.10	4.34	2.53	6.84	3.85	4.50	5.28	6.51	4.60	7.69	4.17	6.21
Ho	0.35	0.27	1.50	1.32	0.40	0.79	0.86	0.51	1.50	0.77	0.88	1.07	1.39	0.90	1.50	0.85	1.28
Er	0.92	0.77	4.50	3.91	1.37	2.40	2.55	1.66	4.91	2.39	2.91	3.14	4.02	2.72	4.39	2.72	3.85
Tm	0.15	0.10	0.67	0.58	0.24	0.36	0.4	0.26	0.78	0.35	0.42	0.46	0.67	0.40	0.63	0.41	0.57
Yb	0.84	0.61	4.35	4.05	1.78	2.59	2.71	1.79	5.75	2.56	3.06	3.13	3.75	2.78	4.24	2.86	3.82
Lu	0.15	0.10	0.70	0.66	0.30	0.43	0.44	0.27	0.87	0.44	0.50	0.48	0.69	0.46	0.64	0.49	0.60
Hf	6.52	6.14	9.64	9.12	7.68	10.2	9.44	9.64	13.3	10.1	9.21	9.90	9.49	9.56	9.86	9.53	8.89
Ta	0.58	0.55	0.83	0.67	0.77	0.08	0.49	0.62	0.59	0.93	0.75	0.75	0.64	0.53	0.47	0.60	0.60
Pb	10.4	23.1	5.30	18.4	8.50	12.6	5.90	8.00	42.6	13.3	19.6	21.3	12.9	15.5	8.80	9.20	11.0
Th	3.91	9.45	6.79	6.20	10.32	5.51	4.91	5.61	5.42	10.84	8.24	10.6	4.91	4.45	3.83	6.72	5.73
U	0.94	1.74	1.15	1.53	1.54	1.23	0.83	1.05	1.27	1.19	1.58	1.21	1.11	0.99	0.90	1.59	1.19

LOI: loss on ignition; Mg<sup>#</sup>:  $[\text{Mg}^{2+}/(\text{Mg}^{2+}+\text{Fe}^{2+})]\times 100$ .