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# Journal of Asian Earth Sciences

journal homepage: www.elsevier.com/locate/jseaes



# Major and trace elements of a peat core from Yunnan, Southwest China: Implications for paleoclimatic proxies

Gangjian Wei<sup>a,\*</sup>, Luhua Xie<sup>b</sup>, Yongge Sun<sup>c</sup>, Yuehan Lu<sup>c</sup>, Ying Liu<sup>a</sup>

<sup>a</sup> State Key Laboratory of Isotope Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China
<sup>b</sup> Key Laboratory of Marginal Sea Geology, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China
<sup>c</sup> State Key Laboratory of Organic Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China

#### ARTICLE INFO

Article history: Received 16 June 2011 Received in revised form 25 April 2012 Accepted 22 June 2012 Available online 20 July 2012

Keywords: Peats Major and trace elements Chemical weathering East Asian summer monsoon

### ABSTRACT

This study examines the accumulation of major and trace elements in peat deposits in central Yunnan Province, southwestern China. The ashes of an approximately 2 m long core spanning 32.7-11.4 ka are analyzed to assess the elemental contributions of organic materials and to identify elemental paleoclimatic proxies in peats. Peat ash, which is mainly composed of silicate materials, makes up 20-80% of each of the samples. The analysis shows that organic materials are a significant source of many of the elements in the ashes. Among these elements, P and V are the most typical, with their concentrations in the ashes closely correlating to the total organic carbon (TOC) content of the peats. Al, Na, Sc, Cr, Co, Ni, Cu, Ge, Pb, and Th are also associated with biogenic materials, particularly in the lower section (below 122 cm) of the core, where the organic material content is high. Ca, Sr, Mg, and Mn appear to have been part of carbonate deposits, such as authigenic FeCO3 and MnCO3 in the anoxic peats, whereas, K, Ti, Zn, Ga, Rb, Y, rare earth elements (REEs), Zr, Hf, Nb, Ta, Ba, and U are mainly associated with silicate materials. Local weathering products, rather than dust from northern China, are the main sources for the silicate materials in these peats. Some elemental ratios such as K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O can reliably indicate changes in local chemical weathering intensity, and their variation patterns match the changes in the East Asian summer monsoon (EASM) very well. The less intensive chemical weathering indicated by lower K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratios generally corresponds to weaker EASM strength during  $\sim$ 30 to  $\sim$ 10 ka, which is consistent with the fact that weaker summer monsoons may arouse drier climates, and do not favor intense chemical weathering. This suggests that select elemental ratios in peats/organic rich sediments may be informative proxies for monsoon climate changes.

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# 1. Introduction

Peats are valuable archives of climate and environment changes, and proxies in peats have been used to reconstruct paleoclimatic and paleoenvironmental records for more than a century (Bindler, 2006). Most of these proxies are associated with biogenic materials, such as pollen, peat-forming fossils, elements and isotopes of organic matter, and some newly developed molecular biomarkers (Bindler, 2006). Inorganic materials in peats, however, can also provide plentiful information about climate and environment changes. In ombrotrophic peat bogs, inorganic materials are believed to be mainly atmospheric deposits, and their elemental and isotopic compositions probably indicate changes in atmospheric inputs. Numerous studies in the past decades have de-

\* Corresponding author. Address: 511 Kehua Rd., Guangzhou Institute of Geochemistry, CAS, Guangzhou 510640, China. Tel.: +86 20 85290093; fax: +86 20 85290130.

scribed the changes in atmospheric imported heavy metals, such as lead and mercury, during industrial eras or during pre-industrial periods in Europe and North America (Farmer et al., 2006; Kamenov et al., 2009; Kempter et al., 1997; Kylander et al., 2005, 2007; Le Roux et al., 2004; Martinez-Cortizas et al., 1999, 2002; Roos-Barraclough et al., 2002; Shotyk et al., 1998, 2001, 2005; Weiss et al., 1997, 1999). These studies of natural and anthropogenic inputs from the atmosphere are important in the evaluation of the impact of human activities on the environment. The geochemistry of inorganic materials in minerotrophic peat bogs are also believed to be informative proxies for climate and environment changes, even though inorganic materials carried by water flow can conceal materials imported from the atmosphere. Not only human activities (Monna et al., 2004a,b), but also natural climate changes (Kylander et al., 2007; Muller et al., 2006, 2008) can be reflected in the elemental and isotopic compositions of the inorganic materials in minerotrophic peat bogs.

Peat can generally be considered as a special type of sediment comprising a large amount of biogenic materials transformed from

E-mail address: gjwei@gig.ac.cn (G. Wei).

<sup>1367-9120/\$ -</sup> see front matter @ 2012 Elsevier Ltd. All rights reserved. http://dx.doi.org/10.1016/j.jseaes.2012.06.021

Table 1		
LOI and TOC contents of the pea	s and the major element	contents of the ashes (unit: %).

Sample ID	Depth (cm)	Age (ka)	LOI	TOC	$Al_2O_3$	CaO	FeO(T) <sup>a</sup>	K <sub>2</sub> O	MgO	MnO	Na <sub>2</sub> O	$P_2O_5$	TiO <sub>2</sub>
BX-21	42	11.42	21.84	6.92	27.22	2.02	4.95	3.07	1.19	0.03	0.18	0.06	0.90
BX-22	44	11.84	20.63	6.64	26.95	1.87	4.90	3.09	1.19	0.03	0.16	0.06	0.96
BX-23	46	12.26	30.14	11.38	28.49	3.67	6.67	2.62	1.39	0.05	0.19	0.12	0.88
BX-24	48	12.68	28.33	8.94	28.82	2.87	5.96	2.80	1.31	0.03	0.15	0.10	0.90
BX-20 BX-26	50 52	13.10	30.95	11.33	28.04	3.03	6.09	2.76	1.35	0.04	0.18	0.11	0.89
BX-20 BX-27	54	13.93	38.24	16.84	20.34	4.02	6.69	2.30	1.45	0.04	0.27	0.10	0.90
BX-28	56	14.35	38.61	15.60	23.52	3.97	7.14	2.34	1.34	0.06	0.25	0.24	0.93
BX-29	58	14.77	40.29	16.79	24.33	4.33	7.69	2.49	1.45	0.06	0.26	0.30	0.97
BX-30	60	15.19	44.60	20.17	25.67	4.67	7.06	2.48	1.46	0.05	0.24	0.27	0.89
BX-31	62	15.61	47.40	21.79	26.93	4.85	7.38	2.61	1.51	0.05	0.20	0.31	0.89
BX-32	64	16.03	45.14	19.96	27.65	4.09	6.29	2.78	1.46	0.04	0.18	0.25	0.93
BX-33	66	16.45	46.39	23.28	27.29	4.05	5.48	2.65	1.53	0.03	0.22	0.30	0.94
BX-34 BX-35	70	17.29	45.50	22.10	20.10	3.61	5.55	2.01	1.37	0.03	0.22	0.29	0.97
BX-36	72	17.71	50.21	24.63	24.69	3.88	5.34	2.18	1.34	0.03	0.32	0.43	0.96
BX-37	74	18.13	50.93	24.35	24.19	3.81	5.40	2.07	1.30	0.03	0.29	0.45	0.93
BX-38	76	18.38	52.76	25.46	24.98	3.96	5.31	2.03	1.36	0.03	0.29	0.50	0.93
BX-39	78	18.85	51.66	25.55	25.19	3.81	5.08	2.09	1.38	0.03	0.32	0.46	0.93
BX-40	80	19.31	50.03	24.56	24.80	3.21	4.94	2.11	1.30	0.03	0.29	0.41	0.93
BX-41 PX 42	82	19.78	47.98	23.39	24.20	2.85	4.69	2.11	1.24	0.03	0.28	0.39	0.90
BX-42 BX-43	86	20.24	49.85 51.70	25.70	25.52	3.07	4.89	2.20	1.33	0.03	0.27	0.30	0.92
BX-44	88	21.18	43.31	20.96	26.74	2.63	5.08	2.56	1.30	0.03	0.23	0.31	0.89
BX-45	90	21.64	43.95	18.93	27.05	2.55	4.89	2.70	1.30	0.03	0.23	0.29	0.89
BX-46	92	22.11	41.13	18.64	25.72	2.28	4.82	2.68	1.21	0.03	0.22	0.29	0.89
BX-47	94	22.57	41.44	19.88	26.65	2.35	4.81	2.86	1.25	0.03	0.23	0.27	0.93
BX-48	96	23.04	38.18	18.83	26.95	2.28	4.48	3.11	1.30	0.02	0.21	0.22	0.91
BX-49 BX-50	98	23.42	32.07	10.51	26.01	1.85	4.33	3.39	1.23	0.02	0.18	0.17	0.95
BX-50 BX-51	102	24.19	39.55	19.77	26.29	2.01	4.17	3.24	1.25	0.02	0.15	0.16	0.85
BX-52	104	24.57	44.44	22.17	26.80	2.53	4.43	3.12	1.37	0.03	0.19	0.19	0.87
BX-53	106	24.95	51.27	25.21	26.15	2.36	4.62	3.12	1.32	0.03	0.19	0.20	0.87
BX-54	108	25.34	50.92	25.91	27.28	2.44	4.50	3.26	1.41	0.03	0.19	0.21	0.83
BX-55	110	25.72	47.99	24.56	26.30	2.02	4.25	3.49	1.29	0.03	0.18	0.18	0.83
BX-56	112	26.10	42.36	21.58	26.81	1./3 1.71	4.20	3.//	1.28	0.02	0.17	0.16	0.87
BX-57 BX-58	114	26.46	44.52	20.84	26.91	1.71	4.14	3.82	1.51	0.02	0.18	0.10	0.80
BX-59	118	27.25	41.38	19.53	25.88	1.36	3.95	3.79	1.25	0.02	0.17	0.12	0.83
BX-60	120	27.63	51.16	25.55	27.29	2.11	4.64	3.51	1.43	0.03	0.20	0.21	0.84
BX-61	122	27.68	57.18	29.67	26.06	3.13	5.69	2.90	1.48	0.04	0.21	0.32	0.80
BX-62	124	27.74	56.29	29.14	26.62	3.62	6.13	2.87	1.61	0.05	0.22	0.35	0.80
BX-63	126	27.79	63.76	33.39	26.69	3.69	6.68	2.68	1.56	0.05	0.23	0.39	0.79
BX-64 PX 65	128	27.84	73.81	35.19	27.41	4.27	6.65	2.50	1.70	0.05	0.25	0.40	0.80
BX-66	132	27.95	59.47	39.83	27.01	3.85	676	2.44	1.50	0.05	0.25	0.41	0.79
BX-67	134	28.00	70.52	40.40	27.86	3.68	6.95	2.60	1.68	0.05	0.27	0.44	0.82
BX-68	136	28.06	80.43	44.46	27.46	3.87	7.34	2.46	1.69	0.05	0.27	0.49	0.84
BX-69	138	28.11	66.21	35.35	26.98	2.87	6.29	2.87	1.45	0.04	0.23	0.32	0.88
BX-70	140	28.16	61.14	31.90	26.44	2.78	5.98	2.83	1.40	0.04	0.20	0.30	0.88
BX-/1 PX 72	142	28.22	57.21	29.88	26.68	2.85	5.95	2.89	1.40	0.04	0.21	0.29	0.87
BX-72 BX-73	146	28.27	52.94	26.81	26.27	3.05	6.02	2.70	1.58	0.04	0.22	0.30	0.87
BX-74	148	28.38	49.86	24.41	23.92	3.25	6.39	2.43	1.31	0.05	0.19	0.25	0.89
BX-75	150	28.43	50.61	25.63	23.20	3.47	6.31	2.38	1.34	0.05	0.19	0.26	0.91
BX-76	152	28.48	49.66	26.00	24.13	3.49	6.47	2.61	1.41	0.05	0.18	0.25	0.92
BX-77	154	28.54	51.52	25.69	24.09	2.71	5.83	2.60	1.27	0.04	0.17	0.22	0.95
BX-78	156	28.59	50.14	25.57	22.46	2.25	5.23	2.66	1.22	0.04	0.16	0.20	0.96
BX-79 BX-80	158	28.64	50.32 48.07	25.61	25.34	2.01	4.99	3.10	1.29	0.03	0.16	0.19	1.00
BX-80 BX-81	162	28.70	42.99	21.50	25.00	1.34	4 39	3 20	1.20	0.03	0.10	0.15	1.00
BX-82	164	28.96	40.95	19.53	25.08	1.10	3.87	3.36	1.17	0.02	0.15	0.13	1.03
BX-83	166	29.17	55.59	29.93	25.65	1.49	4.54	3.22	1.25	0.02	0.17	0.17	1.01
BX-84	168	29.37	46.97	23.59	25.33	1.30	4.24	3.26	1.20	0.02	0.15	0.14	1.02
BX-85	170	29.58	49.31	25.70	25.65	1.34	4.22	3.36	1.25	0.02	0.15	0.14	1.02
BX-86	172	29.79	43.41	21.80	24.90	1.10	4.08	3.30	1.21	0.02	0.15	0.11	1.03
BX-8/	1/4	30.00 30.20	46.35	23.44	25.45	1.16	4.23	3.39	1.25	0.02	0.16	0.12	1.05
BX-89	178	30.20	42.86	21.09 21.17	25.40	1.00	4,20	3.52	1.24	0.02	0.14	0.11	1.02
BX-90	180	30.62	41.79	20.86	25.52	1.09	4.03	3.40	1.24	0.02	0.14	0.10	1.02
BX-91	182	30.83	40.17	19.69	24.76	1.02	4.00	3.21	1.19	0.02	0.14	0.10	1.01
BX-92	184	31.03	39.26	18.45	25.11	1.04	4.04	3.23	1.20	0.02	0.14	0.10	1.01
BX-93	186	31.24	39.97	19.63	22.42	1.03	4.10	3.10	1.09	0.02	0.14	0.10	0.99
BX-94	188	31.45	51.39	26.49	26.46	1.47	4.70	3.17	1.32	0.03	0.16	0.15	0.94

(continued on next page)

Table 1 (continued)

Sample ID	Depth (cm)	Age (ka)	LOI	TOC	$Al_2O_3$	CaO	FeO(T) <sup>a</sup>	K <sub>2</sub> O	MgO	MnO	Na <sub>2</sub> O	$P_2O_5$	TiO <sub>2</sub>
BX-95	190	31.66	48.46	24.16	26.58	1.63	5.11	3.05	1.29	0.03	0.16	0.15	0.95
BX-96	192	31.86	50.14	24.68	26.45	1.77	5.41	2.90	1.31	0.03	0.17	0.16	0.92
BX-97	194	32.07	52.75	27.27	26.87	1.93	5.61	2.96	1.38	0.03	0.17	0.18	0.92
BX-98	196	32.28	56.24	27.73	26.08	2.09	6.07	2.78	1.35	0.04	0.18	0.20	0.91
BX-100	200	32.70	60.42	32.96	25.92	1.82	7.14	2.79	1.30	0.03	0.18	0.23	0.90

<sup>a</sup> FeO(T): total Fe.



**Fig. 1.** Location of Chirui Lake. The dashed lines outline the regions influenced by the three branches of the East Asian summer monsoon: EASM, East Asian summer monsoon; ISM, Indian summer monsoon; and WNPSM, Western North Pacific summer monsoon. The terms of the summer monsoon branches and their influence in various regions are from Wang and Lin (2002). The locations of the paleoclimate records included in the discussion, such as Hulu, Dongge, Wulu and Dashibao (WL&DSB) caves, and the core SK218/1 are also shown on the map.

plants; the redox condition in peats is extremely anoxic or euxinic. Plants generally accumulate some metals from the soil, and a high concentration of these metals in the phytoliths may significantly influence the composition of the peats (Wust and Bustin, 2003). Such plant-derived metals are different from those in the inorganic materials input from the atmosphere or carried by water flow, and they may bias paleoclimatic interpretations of peats (Wust and Bustin, 2003). However, the extent to which the plant-derived metals contribute to the total metal concentrations in peats, and how they influence the paleoclimatic records is still not well known. It is apparent that such influences need to be assessed before appropriate elemental proxies for paleoclimatic change can be identified.

Here, we report the major and trace elements in the peats/sediments of an approximately 2 m peat core collected from Baoxiu Basin in the central Yunnan Province, southwestern China. The samples from this core, comprised of peats and organic rich sediments, have total organic carbon (TOC) contents ranging from 6.64% to 44.46% (Lu, 2003). The large variation in the organic material contents is helpful in the evaluation of their contribution to the major and trace element concentrations in peats. The correlation between elements and organic materials is discussed in detail below and the contribution of biogenic materials to the major and trace elements in peats is assessed. Moreover, several typical proxies for chemical weathering are compared to evaluate the influence of plant-derived elements on the paleoclimatic records. This analysis provides a better understand of the behaviors of elements in peats, enabling us to clarify the relationships between the elements, and climatic and environmental changes. The results of this work will improve reconstruction of paleoclimatic records using peats.

## 2. Materials and methods

## 2.1. Site description

Baoxiu Basin (23°46′N, 102°23′E) is located in Shiping County in the central Yunnan Province, southwestern China (Fig. 1). The altitude of this basin is 1400–1430 m, and the mountains to its south, west, and north have altitudes of 1500–2000 m. Streams originating from the surrounding mountains flow into Chirui Lake, located in the center of Baoxiu Basin, and the water flows southeast out of Chirui Lake into Yilong Lake. Chirui Lake is 0.5–1.0 km<sup>2</sup> in size, with water depths of 1–3 m. These depths vary between the rainy and dry seasons.

Baoxiu Basin is very close to the boundary of the region controlled by the East Asian summer monsoon (EASM) (Wang and Lin, 2002), as shown in Fig. 1. The climate in this region is very sensitive to changes in the EASM. It is a sub-tropical region, with an annual temperature and precipitation of about 18 °C and 960 mm, respectively. About 80% of the precipitation in this region occurs during the rainy season from May to October, when the summer monsoon prevails.

Peat is deposited around Chirui Lake, and grass was the dominant plant that formed these peats.

#### 2.2. Samples and experiments

A 200 cm long core was collected from the margin of Chirui Lake. The sample was taken from above the seasonal variation range of the water level. Disturbance was observed in the top 40 cm of the core, which may be attributed to farming around the lake prior to the 1970s. The peat core was divided into samples at 2 cm intervals in the field and packed into plastic bags.

Samples for geochemical measurement were freeze-dried, hand-milled using a mortar, and then sieved through a 250  $\mu$ m sieve. The pre-treated samples were precisely weighed into clean porcelain vials, and baked at 900 °C for 2 h to measure loss on ignition (LOI). The ash was collected for further elemental measurement, and all of the element concentrations were measured relative to the ash. Samples from the top 40 cm of soil were not included in further geochemical measurements.

Table 2	
Trace element concentrations of the ashes (unit: I	ppm).

ID	BX-21	BX-22	BX-23	BX-24	BX-25	BX-26	BX-27	BX-28	BX-29	BX-30	BX-31	BX-32	BX-33	BX-34
Depth (cm)	42	44	46	48	50	52	54	56	58	60 15 10	62	64	66 16 45	68
Age (ka)	11.42	11.84	12.26	12.68	13.10	13.51	13.93	14.35	14.77	15.19	15.61	16.03	16.45	16.87
Sc	31.3	31.3	32.9	32.2	31.8	30.2	28.7	28.6	30.2	31.8	32.3	32.2	32.1	31.3
V	198	193	233	215	211	194	202	208	216	228	249	236	224	228
Cr	144	141	167	152	150	159	141	145	156	156	151	151	165	14/
CO Ni	22.2 57.2	21.3	25.7	24.5 66.6	25.0 67.5	24.2	25.1	25.2	23.3	25.2 76.2	24.2 75.2	22.9	Z1.Z 72.0	22.4 71.2
Cu	82.0	85.8	122	105	105	97.4	81.2	80.5	91.5	105	104	103	139	148
Zn	72.1	90.6	95.3	116.2	114.0	91.0	85.7	85.5	77.2	90.8	97.1	99.3	88.7	98.9
Ga	36.2	37.1	38.0	39.0	39.8	35.4	33.1	33.4	32.3	34.9	35.2	37.5	36.4	37.0
Ge	3.49	3.65	3.73	4.07	4.25	3.86	3.46	3.42	3.43	3.90	3.98	4.19	3.66	3.68
Rb	230	240	219	241	231	211	208	202	206	230	241	246	214	213
Sr	67.9	62.3	92.1	78.2	81.0	96.1	105	102	104	114	115	99.5	96.0	83.8
Y	41.5	43.9	43.4	43.3	42.2	40.6	40.3	43.5	41.3	42.5	44.5	43.7	42.1	42.7
Zr	227	213	208	205	202	203	196	191	193	206	204	214	201	210
Nb	17.6	18.8	16.9	16.6	16.4	17.3	16.5	16.7	17.3	16.3	16.4	17.1	17.7	17.6
Ba	/12	695 58.C	702	686	6//	6/2	656	668 52.C	655	6/6	680	663	645	64 I
La	57.0 120	28.0 126	59.9 140	59.1 120	28.1 125	23.0 121	53.7 126	52.0 124	52.0 126	20.2 125	57.9 141	22.4 122	54.1 120	23.2 125
Pr	135	14 1	149	139	144	142	120	124	120	14.2	141	132	144	12.0
Nd	53.4	54.3	60.5	57.3	56.2	55.6	52.4	52.4	54.3	56.3	58.3	55.8	57.0	53.9
Sm	10.0	10.3	11.6	10.8	11.0	10.6	10.2	10.0	10.4	10.9	11.5	10.8	10.8	10.7
Eu	1.95	2.05	2.35	2.17	2.17	2.15	2.02	1.98	2.14	2.20	2.32	2.19	2.24	2.15
Gd	8.97	9.67	10.3	9.82	9.99	9.40	9.26	9.26	9.39	10.2	10.7	10.4	9.77	9.81
Tb	1.40	1.47	1.58	1.48	1.50	1.45	1.41	1.44	1.45	1.50	1.57	1.55	1.53	1.52
Dy	7.82	8.30	8.52	8.13	8.18	8.08	7.57	7.64	8.00	8.15	8.57	8.57	8.41	8.28
Но	1.48	1.58	1.67	1.56	1.56	1.57	1.46	1.47	1.57	1.57	1.64	1.62	1.70	1.62
Er	4.43	4.68	4.76	4.57	4.57	4.51	4.32	4.40	4.49	4.56	4.84	4.78	4.74	4.74
1m Vh	0.72	0.74	0.77	0.72	0.71	0.73	0.69	0.70	0.73	0.74	0.77	0.77	0.77	0.76
YD	4.60	4.58	5.00	4.69	4.57	4.72	4.44	4.53	4.67	4.72	4.97	4.95	4.96	0.02
Hf	5.65	5.58	5 70	5.46	5 39	5 54	4 98	4 92	5 32	5 30	5.49	5.76	5.53	5.61
Ta	1.21	1.26	1.38	1.18	1.20	1.44	1.19	1.19	1.38	1.22	1.19	1.55	1.39	1.28
Pb	53.6	52.8	64.2	55.6	57.4	55.4	49.7	48.1	48.8	53.1	56.8	57.5	63.3	59.7
Th	28.4	28.0	30.8	28.5	29.4	28.9	26.7	26.3	27.7	29.7	30.4	30.2	30.4	28.3
	BX-35	BX-36	BX-37	BX-38	BX-39	BX-40	BX-41	BX-42	BX-43	BX-44	BX-45	BX-46	BX-47	BX-48
	BX-35 70	BX-36 72	BX-37 74	BX-38 76	BX-39 78	BX-40 80	BX-41 82	BX-42 84	BX-43 86	BX-44 88	BX-45 90	BX-46 92	BX-47 94	BX-48 96
	BX-35 70 17.29	BX-36 72 17.71	BX-37 74 18.13	BX-38 76 18.38	BX-39 78 18.85	BX-40 80 19.31	BX-41 82 19.78	BX-42 84 20.24	BX-43 86 20.71	BX-44 88 21.18	BX-45 90 21.64	BX-46 92 22.11	BX-47 94 22.57	BX-48 96 23.04
<u></u>	BX-35 70 17.29 31.4	BX-36 72 17.71 31.5	BX-37 74 18.13 31.9	BX-38 76 18.38 32.6	BX-39 78 18.85 31 3	BX-40 80 19.31 31.0	BX-41 82 19.78 29.9	BX-42 84 20.24	BX-43 86 20.71	BX-44 88 21.18	BX-45 90 21.64 32.4	BX-46 92 22.11 31.1	BX-47 94 22.57 32.3	BX-48 96 23.04 31.6
Sc V	BX-35 70 17.29 31.4 248	BX-36 72 17.71 31.5 246	BX-37 74 18.13 31.9 257	BX-38 76 18.38 32.6 306	BX-39 78 18.85 31.3 272	BX-40 80 19.31 31.0 283	BX-41 82 19.78 29.9 258	BX-42 84 20.24 31.8 276	BX-43 86 20.71 32.3 281	BX-44 88 21.18 32.5 228	BX-45 90 21.64 32.4 209	BX-46 92 22.11 31.1 209	BX-47 94 22.57 32.3 220	BX-48 96 23.04 31.6 203
Sc V Cr	BX-35 70 17.29 31.4 248 145	BX-36 72 17.71 31.5 246 156	BX-37 74 18.13 31.9 257 145	BX-38 76 18.38 32.6 306 150	BX-39 78 18.85 31.3 272 159	BX-40 80 19.31 31.0 283 155	BX-41 82 19.78 29.9 258 143	BX-42 84 20.24 31.8 276 149	BX-43 86 20.71 32.3 281 152	BX-44 88 21.18 32.5 228 180	BX-45 90 21.64 32.4 209 156	BX-46 92 22.11 31.1 209 152	BX-47 94 22.57 32.3 220 151	BX-48 96 23.04 31.6 203 150
Sc V Cr Co	BX-35 70 17.29 31.4 248 145 23.8	BX-36 72 17.71 31.5 246 156 23.6	BX-37 74 18.13 31.9 257 145 24.5	BX-38 76 18.38 32.6 306 150 24.8	BX-39 78 18.85 31.3 272 159 24.5	BX-40 80 19.31 31.0 283 155 24.2	BX-41 82 19.78 29.9 258 143 23.2	BX-42 84 20.24 31.8 276 149 23.0	BX-43 86 20.71 32.3 281 152 23.4	BX-44 88 21.18 32.5 228 180 20.7	BX-45 90 21.64 32.4 209 156 18.6	BX-46 92 22.11 31.1 209 152 18.6	BX-47 94 22.57 32.3 220 151 18.8	BX-48 96 23.04 31.6 203 150 16.2
Sc V Cr Co Ni	BX-35 70 17.29 31.4 248 145 23.8 77.0	BX-36 72 17.71 31.5 246 156 23.6 73.8	BX-37 74 18.13 31.9 257 145 24.5 71.2	BX-38 76 18.38 32.6 306 150 24.8 68.8	BX-39 78 18.85 31.3 272 159 24.5 69.5	BX-40 80 19.31 31.0 283 155 24.2 72.8	BX-41 82 19.78 29.9 258 143 23.2 66.5	BX-42 84 20.24 31.8 276 149 23.0 66.6	BX-43 86 20.71 32.3 281 152 23.4 67.7	BX-44 88 21.18 32.5 228 180 20.7 74.2	BX-45 90 21.64 32.4 209 156 18.6 59.0	BX-46 92 22.11 31.1 209 152 18.6 -	BX-47 94 22.57 32.3 220 151 18.8 56.6	BX-48 96 23.04 31.6 203 150 16.2 50.3
Sc V Cr Co Ni Cu	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 204	BX-36 72 17.71 31.5 246 156 23.6 73.8 239	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 212	BX-38 76 18.38 32.6 306 150 24.8 68.8 163	BX-39 78 18.85 31.3 272 159 24.5 69.5 165	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 158	BX-41 82 19.78 29.9 258 143 23.2 66.5 144	BX-42 84 20.24 31.8 276 149 23.0 66.6 144	BX-43 86 20.71 32.3 281 152 23.4 67.7 139	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1	BX-46 92 22.11 31.1 209 152 18.6 - 85.2	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0
Sc V Cr Co Ni Cu Zn C-	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 26.4	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 26.0	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 206	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 25.5	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 25.4	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 26.0	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 25.0	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 25.8	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 26 5	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 25 0	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 25.0	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 24.8	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 25 5	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 23.2
Sc V Cr Co Ni Cu Zn Ga Ce	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3 60	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 2.53	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3 50	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3 16	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26
Sc V Cr Co Ni Cu Zn Ga Ge Rh	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2	BX-41 82 19.78 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5	BX-41 82 19.78 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 25	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 61.2	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 25	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137	BX-46 92 22.11 31.1 209 152 18.6 - - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.0	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64 0	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 622	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 50.4	BX-41 82 19.78 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.2	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.2	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 622 12.0	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11 8	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 114	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm F11	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 15.3 62.4 12.1 2.45	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 14.5 59.4 11.6 2 36	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2 36	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 15.3 62.2 12.2 2 43	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2 33	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 15.3 62.2 12.2 2.43 11.0	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57	BX-41 82 19.78 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93	BX-37 74 18.13 31.9 257 145 245,5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45	BX-41 82 19.78 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66 1.67	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81	BX-37 74 18.13 31.9 257 145 245,5 71.2 206 84.8 36,6 3,66 202 102 45,5 205 17,5 630 59,2 143 15,3 62,4 12,1 2,45 10,9 1,66 8,96 1,72	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.666 1.67 4.85	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05	BX-37 74 18.13 31.9 257 145 245,5 71.2 206 84.8 36,6 3,66 202 102 45,5 205 17,5 630 59,2 143 15,3 62,4 12,1 2,45 10,9 1,66 8,96 1,72 5,00	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72 4.83	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.866 1.71 5.07	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.666 1.67 4.85 0.78	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.00 0.79	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.655 1.67 4.90 0.79	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.666 1.67 4.85 0.78 5.19	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82 5.28	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.00 0.79 5.08	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81 5.19	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78 5.13	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77 4.98	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75 4.93	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90 0.79 5.12	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79 5.18	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79 5.02	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74 4.85	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77 5.02	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78 5.04	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71 5.05
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66 1.67 4.85 0.78 5.19 0.84 6.11	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82 5.28 0.89 5.52	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.00 0.79 5.08 0.85 2 5.42	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81 5.19 0.87 5.62	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 625 57.3 141 15.4 622 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78 5.13 0.78 5.13 0.85 5.5	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77 4.98 0.84 5.57	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75 4.93 0.83 5.5	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90 0.79 5.12 0.86 5 5.2	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79 5.18 0.86 5.5 14 0.7 5.18 0.86 5.5 14 0.7 1.5 0.7 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79 5.02 0.83 5.57	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74 4.84 0.80 5.71	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77 5.02 0.81 5.02	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78 5.04 0.78 5.04 0.85 5.17	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71 5.05 0.84 6.21
Sc V Cr Co Ni Cu Zn Ga Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66 1.67 4.85 0.78 5.19 0.84 6.11 1.24	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82 5.28 0.89 5.28 1.42	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.00 0.79 5.08 0.85 5.48 1.26	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81 5.19 0.87 5.60 1.2°	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 625 57.3 141 15.4 622 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78 5.13 0.85 5.58 1.36	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77 4.98 0.84 5.55 1.20	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75 4.93 0.83 5.64 1.31	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90 0.79 5.12 0.86 5.85 1.27	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79 5.18 0.86 5.84 1.26	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79 5.02 0.83 5.65 1.20	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.7 0.6 34 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74 4.84 0.80 5.71 1.20	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77 5.02 0.81 5.92 1.26	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78 5.04 0.85 6.17 1.37	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71 5.05 0.84 6.31 1.62
Sc V Cr Co Ni Cu Zn Ga Rb Sr Y Zr Nba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta Ph	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66 1.67 4.85 0.78 5.19 0.84 6.11 1.34 58.6	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82 5.28 0.89 5.81 1.43 63.1	BX-37 74 18.13 31.9 257 145 24.5 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.00 0.79 5.08 0.85 5.48 1.26 58.0	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81 5.19 0.87 5.60 1.28 5.60	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78 5.13 0.78 5.13 0.85 5.58 1.36 64 2	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77 4.98 0.84 5.55 1.29 67 4	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75 4.93 0.83 5.64 1.31 65.6	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90 0.79 5.12 0.86 5.85 1.27 67,7	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79 5.18 0.86 5.84 1.26 69.7	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79 5.02 0.83 5.65 1.29 63.7	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74 4.84 0.80 5.71 1.29 62.8	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77 5.02 0.81 5.92 1.26 62 6	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78 5.04 0.85 6.17 1.37 66.6	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71 5.05 0.84 6.31 1.63 60 <i>A</i>
Sc V Cr Co Ni Cu Zn Ga Rb Sr Y Zr Nba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta Pb Th	BX-35 70 17.29 31.4 248 145 23.8 77.0 204 96.6 36.4 3.65 207 95.0 43.7 221 18.7 651 56.6 136 14.7 57.9 11.5 2.26 10.3 1.58 8.66 1.67 4.85 0.78 5.19 0.84 6.11 1.34 58.6 27.9	BX-36 72 17.71 31.5 246 156 23.6 73.8 239 79.4 36.9 3.64 201 99.8 44.8 210 18.4 654 57.2 141 15.3 61.6 11.9 2.45 10.6 1.64 8.93 1.81 5.05 0.82 5.28 0.89 5.81 1.43 63.1 29.0	BX-37 74 18.13 31.9 257 145 245 71.2 206 84.8 36.6 3.66 202 102 45.5 205 17.5 630 59.2 143 15.3 62.4 12.1 2.45 10.9 1.66 8.96 1.72 5.08 0.85 5.48 1.26 58.0 28.9	BX-38 76 18.38 32.6 306 150 24.8 68.8 163 - 35.6 3.60 191 105 46.0 205 17.2 619 61.2 149 16.3 64.9 12.8 2.56 11.7 1.71 9.10 1.73 5.11 0.81 5.19 0.87 5.60 1.28 58.5 29.9	BX-39 78 18.85 31.3 272 159 24.5 69.5 165 77.0 35.4 3.53 188 99.3 42.8 202 17.8 625 57.3 141 15.4 62.2 12.0 2.51 10.8 1.63 8.77 1.72 4.83 0.78 5.13 0.85 5.58 1.36 64.2 29.7	BX-40 80 19.31 31.0 283 155 24.2 72.8 158 81.8 36.0 3.50 198 92.2 42.5 209 17.3 615 55.8 134 14.5 59.4 11.6 2.36 10.5 1.57 8.45 1.67 4.93 0.77 4.98 0.84 5.55 1.29 67.4 29.1	BX-41 82 19.78 29.9 258 143 23.2 66.5 144 79.6 35.9 3.34 202 85.5 41.2 201 17.6 610 54.6 133 14.4 59.6 11.7 2.36 10.7 1.57 8.61 1.66 4.82 0.75 4.93 0.83 5.64 1.31 65.6 28.6	BX-42 84 20.24 31.8 276 149 23.0 66.6 144 80.9 35.8 3.28 203 89.2 42.0 213 16.8 635 55.6 137 14.7 60.0 11.8 2.36 10.7 1.61 8.65 1.67 4.90 0.79 5.12 0.86 5.85 1.27 67.7 29.5	BX-43 86 20.71 32.3 281 152 23.4 67.7 139 82.0 36.5 3.40 210 89.6 43.8 211 17.0 619 58.5 142 15.3 62.2 12.2 2.43 11.0 1.63 9.03 1.72 5.05 0.79 5.18 0.86 5.84 1.26 69.7 30.8	BX-44 88 21.18 32.5 228 180 20.7 74.2 97.2 81.7 35.9 3.26 217 82.5 43.0 202 17.1 622 58.1 142 15.1 61.0 12.0 2.40 10.8 1.63 8.86 1.71 5.07 0.79 5.02 0.83 5.65 1.29 63.7 31.2	BX-45 90 21.64 32.4 209 156 18.6 59.0 87.1 72.1 35.0 3.20 212 79.1 41.5 208 17.0 634 54.9 137 14.8 59.4 11.4 2.33 10.1 1.60 8.43 1.69 4.69 0.74 4.84 0.80 5.71 1.29 62.8 30.4	BX-46 92 22.11 31.1 209 152 18.6 - 85.2 72.3 34.8 3.16 223 76.2 43.0 212 16.7 629 56.9 141 14.8 59.3 11.3 2.26 10.4 1.60 8.63 1.66 4.90 0.77 5.02 0.81 5.92 1.26 62.6 30.0	BX-47 94 22.57 32.3 220 151 18.8 56.6 83.2 75.9 35.5 3.16 234 78.4 44.4 231 17.9 661 59.6 143 15.1 60.3 11.4 2.28 10.3 1.61 8.90 1.68 5.08 0.78 5.04 0.85 6.17 1.37 66.6 30.6	BX-48 96 23.04 31.6 203 150 16.2 50.3 74.0 67.7 33.2 3.26 233 74.4 43.7 225 17.5 662 57.3 140 14.8 57.4 10.9 2.25 9.97 1.57 8.83 1.74 4.88 0.71 5.05 0.84 6.31 1.63 60.4 29.9

(continued on next page)

Table 2 (continued)

	BX-49 98 23.42	BX-50 100 23.81	BX-51 102 24.19	BX-52 104 24.57	BX-53 106 24.95	BX-54 108 25.34	BX-55 110 25.72	BX-56 112 26.10	BX-57 114 26.48	BX-58 116 26.87	BX-59 118 27.25	BX-60 120 27.63	BX-61 122 27.68	BX-62 124 27.74
Sc	30.2	30.5	30.3	31.8	31.6	32.2	30.5	30.3	30.4	29.0	28.8	31.3	31.2	30.7
V	197	188	200	214	243	244	229	214	195	189	191	210	241	220
Cr	138	147	142	157	147	155	145	142	149	137	137	158	162	161
CO Ni	15.1	14.8	16.7	16.4	19.0 54.2	19.0 52.0	17.0 51.2	16.8	16.5	15.4	15.2	17.2	20.3	19.6
	533	43.9 64.0	48.0 67.2	- 85.6	100	84.9	70.3	47.9 56.2	583	40.8 71 9	67.5	86.0	59.9 77 3	- 75 3
Zn	73.2	63.6	72.2	67.0	75.2	69.6	72.3	69.4	63.0	71.9	71.9	80.2	97.1	69.0
Ga	34.4	33.4	35.0	34.3	34.3	34.1	33.5	33.6	34.0	33.5	32.1	33.9	33.2	32.3
Ge	3.39	3.30	3.46	3.41	3.37	3.37	3.40	3.35	3.36	3.31	3.30	3.44	3.40	3.42
Rb	250	238	252	241	245	246	254	269	263	257	254	249	253	238
Sr	67.6	/1.4	69.9 45.6	11.2	/4.2	/4.9	69.5	64.6	63.3	55./ 20.7	56.8 40.1	/3.2	101	109
I Zr	228	43.4 227	43.0 247	206	221	228	223	226	211	223	212	223	205	212
Nb	20.7	17.1	20.8	16.9	17.3	16.9	16.9	17.9	17.6	20.8	18.4	17.1	15.9	16.5
Ba	668	670	665	679	659	691	682	710	716	697	692	720	745	745
La	59.4	57.0	60.6	61.3	61.0	59.9	58.7	58.8	54.6	49.6	50.3	53.5	65.0	64.1
Ce	143	141	148	155	151	151	144	139	131	114	118	132	168	169
PI Nd	14.8	14.7 57.0	15.1	15.8 61.8	15.1 50.6	15.5	14.8 57.4	14.3 55.8	13.9 53.5	11.9	12.4	14.1 54.1	16.9 67.4	17.2 68.4
Sm	11.0	10.7	11.1	11.6	11.3	11.4	10.9	10.8	10.1	9.0	9.0	10.1	12.8	12.9
Eu	2.11	2.17	2.20	2.36	2.27	2.31	2.14	2.08	1.97	1.75	1.80	2.02	2.57	2.63
Gd	9.94	9.86	10.6	10.3	10.8	10.3	10.1	9.89	9.12	8.28	8.43	9.08	12.0	11.7
Tb	1.56	1.57	1.59	1.63	1.60	1.64	1.62	1.59	1.48	1.34	1.38	1.49	1.77	1.77
Dy	8.85	8.66	8.77	8.94	8.97	8.97	8.80	8.80	8.23	7.68	8.04	8.24	9.50	9.32
H0 Fr	1.73	1.74	5.02	1.76	1./3	1.80 5.04	1.08	1.72	1.62	1.52	1.57	1.62	1.81 5.28	1.84
Tm	0.79	0.79	0.80	0.79	0.80	0.81	0.78	0.78	0.73	0.71	0.71	0.75	0.83	0.87
Yb	5.10	4.97	5.17	5.07	5.13	5.30	5.08	5.10	4.80	4.68	4.65	4.83	5.38	5.55
Lu	0.83	0.83	0.86	0.84	0.85	0.88	0.85	0.86	0.80	0.77	0.78	0.81	0.93	0.96
Hf	6.01	6.21	6.64	5.70	5.94	6.34	6.08	6.27	5.94	6.10	5.91	6.02	5.57	5.59
Ta	1.43	1.26	1.44	1.26	1.43	1.26	1.19	1.46	1.32	1.37	1.37	1.34	1.18	1.20
PD Th	29.0	29.1	30.3	30.7	31.1	30.5	29.9	52.4 29.3	29.7	27.1	29.0 28.1	30.3	33.1	32.0
	20.0	2011	30.5	3017	5	3010	2010	2013	2011	2/11	2011	50.5	55.1	52.0
	DV C2	DV CA	DV CE	DV CC	DV C7	DV CO	BY CO	<b>BX 70</b>	DV 71	DV 72	DV 72	DV 74	DV 75	DV 76
	BX-63 126	BX-64 128	BX-65 130	BX-66 132	BX-67 134	BX-68 136	BX-69 138	BX-70 140	BX-71 142	BX-72 144	BX-73 146	BX-74 148	BX-75 150	BX-76 152
	BX-63 126 27.79	BX-64 128 27.84	BX-65 130 27.90	BX-66 132 27.95	BX-67 134 28.00	BX-68 136 28.06	BX-69 138 28.11	BX-70 140 28.16	BX-71 142 28.22	BX-72 144 28.27	BX-73 146 28.32	BX-74 148 28.38	BX-75 150 28.43	BX-76 152 28.48
Sc	BX-63 126 27.79 30.9	BX-64 128 27.84 32.4	BX-65 130 27.90 32.8	BX-66 132 27.95 32.5	BX-67 134 28.00 32.5	BX-68 136 28.06 32.7	BX-69 138 28.11 31.3	BX-70 140 28.16 30.8	BX-71 142 28.22 31.3	BX-72 144 28.27 30.2	BX-73 146 28.32 30.9	BX-74 148 28.38 28.8	BX-75 150 28.43 28.5	BX-76 152 28.48 29.8
Sc V	BX-63 126 27.79 30.9 236	BX-64 128 27.84 32.4 260	BX-65 130 27.90 32.8 291	BX-66 132 27.95 32.5 281	BX-67 134 28.00 32.5 281	BX-68 136 28.06 32.7 314	BX-69 138 28.11 31.3 239	BX-70 140 28.16 30.8 236 148	BX-71 142 28.22 31.3 219	BX-72 144 28.27 30.2 228	BX-73 146 28.32 30.9 209	BX-74 148 28.38 28.8 206	BX-75 150 28.43 28.5 194	BX-76 152 28.48 29.8 172
Sc V Cr	BX-63 126 27.79 30.9 236 156 23.0	BX-64 128 27.84 32.4 260 170 23.7	BX-65 130 27.90 32.8 291 163 28.4	BX-66 132 27.95 32.5 281 173 34.4	BX-67 134 28.00 32.5 281 177 35 1	BX-68 136 28.06 32.7 314 174 51 3	BX-69 138 28.11 31.3 239 160 31.0	BX-70 140 28.16 30.8 236 148 25.5	BX-71 142 28.22 31.3 219 153 23.9	BX-72 144 28.27 30.2 228 144 26 5	BX-73 146 28.32 30.9 209 149 19.8	BX-74 148 28.38 28.8 206 137 18 7	BX-75 150 28.43 28.5 194 134 175	BX-76 152 28.48 29.8 172 137 19.0
Sc V Cr Co Ni	BX-63 126 27.79 30.9 236 156 23.0 65.4	BX-64 128 27.84 32.4 260 170 23.7 72.1	BX-65 130 27.90 32.8 291 163 28.4 83.3	BX-66 132 27.95 32.5 281 173 34.4 89.6	BX-67 134 28.00 32.5 281 177 35.1 90.6	BX-68 136 28.06 32.7 314 174 51.3 130.2	BX-69 138 28.11 31.3 239 160 31.0 77.1	BX-70 140 28.16 30.8 236 148 25.5 66.8	BX-71 142 28.22 31.3 219 153 23.9 63.2	BX-72 144 28.27 30.2 228 144 26.5 64.0	BX-73 146 28.32 30.9 209 149 19.8 54.2	BX-74 148 28.38 28.8 206 137 18.7 47.6	BX-75 150 28.43 28.5 194 134 17.5 45.9	BX-76 152 28.48 29.8 172 137 19.0 49.6
Sc V Cr Co Ni Cu	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6	BX-64 128 27.84 32.4 260 170 23.7 72.1 94.2	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2	BX-66 132 27.95 32.5 281 173 34.4 89.6 140	BX-67 134 28.00 32.5 281 177 35.1 90.6 129	BX-68 136 28.06 32.7 314 174 51.3 130.2 154	BX-69 138 28.11 31.3 239 160 31.0 77.1 104	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6	BX-74 148 28.38 28.8 206 137 18.7 47.6 49.3	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9
Sc V Cr Co Ni Cu Zn	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8	BX-64 128 27.84 32.4 260 170 23.7 72.1 94.2 69.9	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 73.8	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3	BX-74 148 28.38 28.8 206 137 18.7 47.6 49.3 65.6	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7
Sc V Cr Co Ni Cu Zn Ga	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 2.65	BX-64 128 27.84 32.4 260 170 23.7 72.1 94.2 69.9 34.6 2.77	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 2.42	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3 35.2 2.02	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.52	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 2.06	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 2.80	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 2.75	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 2.72	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 2.66	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 2.46	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 2.52	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 2.50
Sc V Cr Co Ni Cu Zn Ga Ge Rh	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243	BX-64 128 27.84 32.4 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3 35.2 3.92 233	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207	BX-64 128 27.84 32.4 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 198	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 15	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 185	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 25	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 52.5	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Pa	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 207	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 203	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5	BX-66 132 27.95 32.5 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 202	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 600	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 725	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 760	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 722
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65 3	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58 8	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56 7	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64 3	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66 3	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76 5	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 209	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 177	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1 78	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 168	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1 58	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 158	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 192	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1 93	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dv	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62 0.88	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44 0.87 5.44 0.87	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99 0.78	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15 0.83 5.5	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80 0.78	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10 0.80	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86 0.79	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19 0.83	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05 0.79	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32 0.81	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39 0.85	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73 0.83	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79 0.88	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38 0.86
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62 0.88 5.77	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44 0.87 5.73 0.95	BX-65 130 27.90 32.8 291 163 28.4 85.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99 0.78 5.14 2.57	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15 0.83 5.45 2.02	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80 0.78 5.1	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10 0.80 5.17 0.82	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86 0.79 5.08	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 38.9 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19 0.83 5.28	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05 0.79 5.05 0.79 5.06 0.82	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32 0.81 5.32 0.85	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39 0.85 5.40	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73 0.88 5.61	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79 0.88 5.48	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38 0.86 5.30
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62 0.88 5.77 1.00 5.69	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44 0.87 5.73 0.96 5.40	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99 0.78 5.14 0.87 5.07	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15 0.83 5.45 0.93 5.77	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80 0.78 5.11 0.86 5.38	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10 0.80 5.17 0.88 5.57	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86 0.79 5.08 0.84 5.54	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19 0.83 5.28 0.90 5.75	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05 0.79 5.06 0.83 5.50	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32 0.81 5.19 0.85 5.23	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39 0.85 5.40 0.89 5.85	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73 0.88 5.61 0.94 5.66	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79 0.88 5.48 0.93 4.82	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38 0.86 5.30 0.89 4.68
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62 0.88 5.77 1.00 5.69 1.20	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44 0.87 5.73 0.96 5.40 1.19	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99 0.78 5.14 0.87 5.07 1.11	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15 0.83 5.45 0.93 5.77 1.16	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80 0.78 5.11 0.86 5.38 1.16	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10 0.80 5.17 0.88 5.57 1.17	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86 0.79 5.08 0.84 5.54 1.24	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19 0.83 5.28 0.90 5.75 1.54	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05 0.79 5.06 0.83 5.50 1.26	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32 0.81 5.19 0.85 5.23 1.33	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39 0.85 5.40 0.89 5.85 1.22	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73 0.88 5.61 0.94 5.66 1.25	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79 0.88 5.48 0.93 4.82 1.27	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38 0.86 5.30 0.89 4.68 1.25
Sc V Cr Co Ni Cu Zn Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta Pb	BX-63 126 27.79 30.9 236 156 23.0 65.4 96.6 78.8 34.4 3.65 243 114 49.9 207 15.8 726 65.0 171 17.3 69.5 13.4 2.64 12.2 1.77 9.49 1.85 5.62 0.88 5.77 1.00 5.69 1.20 63.8	BX-64 128 27.84 260 170 23.7 72.1 94.2 69.9 34.6 3.77 233 123 49.7 203 16.7 740 65.3 174 17.8 71.8 13.9 2.80 12.3 1.78 9.49 1.90 5.44 0.87 5.73 0.96 5.40 1.19 62.3	BX-65 130 27.90 32.8 291 163 28.4 83.3 95.2 86.3 31.4 3.42 212 118 43.9 209 14.5 705 58.8 152 15.7 63.3 12.3 2.43 11.2 1.64 8.67 1.68 4.99 0.78 5.14 0.87 5.07 1.11 61.6	BX-66 132 27.95 281 173 34.4 89.6 140 78.3 35.2 3.92 233 112 46.9 211 16.3 700 59.6 156 16.3 65.2 12.4 2.53 11.1 1.68 9.00 1.81 5.15 0.83 5.45 0.93 5.77 1.16 68.5	BX-67 134 28.00 32.5 281 177 35.1 90.6 129 81.4 36.5 4.06 233 107 44.4 202 16.6 698 56.7 147 15.6 62.2 11.9 2.44 10.7 1.58 8.46 1.69 4.80 0.78 5.11 0.86 5.38 1.16 69.1	BX-68 136 28.06 32.7 314 174 51.3 130.2 154 89.0 36.7 4.53 223 113 42.9 198 16.0 660 57.2 146 15.4 61.5 11.9 2.36 10.8 1.58 8.80 1.71 5.10 0.80 5.17 0.88 5.57 1.17 77.5	BX-69 138 28.11 31.3 239 160 31.0 77.1 104 85.8 36.9 3.96 238 93.3 44.2 203 17.2 721 59.3 147 15.7 62.3 12.1 2.42 10.6 1.61 8.64 1.69 4.86 0.79 5.08 0.84 5.54 1.24 65.7	BX-70 140 28.16 30.8 236 148 25.5 66.8 83.5 78.4 34.4 3.89 244 96.7 46.9 210 19.2 722 64.9 158 16.7 66.7 12.8 2.53 11.5 1.77 9.30 1.78 5.19 0.83 5.28 0.90 5.75 1.54 61.9	BX-71 142 28.22 31.3 219 153 23.9 63.2 81.8 67.1 34.9 3.75 243 96.9 46.4 199 17.1 746 64.3 155 16.8 66.0 12.6 2.55 11.2 1.72 9.16 1.79 5.05 0.79 5.06 0.83 5.50 1.26 58.7	BX-72 144 28.27 30.2 228 144 26.5 64.0 93.8 73.8 33.1 3.73 238 103 46.6 185 16.3 735 66.3 159 17.1 67.7 13.1 2.56 11.8 1.76 9.49 1.81 5.32 0.81 5.19 0.85 5.23 1.33 62.6	BX-73 146 28.32 30.9 209 149 19.8 54.2 67.6 67.3 33.4 3.66 244 107 50.9 225 17.3 785 67.2 160 18.0 70.4 13.1 2.74 11.9 1.77 9.76 1.91 5.39 0.85 5.40 0.89 5.85 1.22 60.0	BX-74 148 28.38 206 137 18.7 47.6 49.3 65.6 30.4 3.46 221 116 52.3 201 16.1 766 73.4 172 19.3 76.5 14.6 2.85 12.8 1.92 10.2 1.90 5.73 0.88 5.61 0.94 5.66 1.25 58.7	BX-75 150 28.43 28.5 194 134 17.5 45.9 49.6 64.7 29.8 3.52 226 120 52.5 176 16.4 774 76.5 177 19.6 78.2 14.8 2.90 13.6 1.93 10.2 1.94 5.79 0.88 5.48 0.93 4.82 1.27 53.4	BX-76 152 28.48 29.8 172 137 19.0 49.6 52.9 57.7 31.0 3.50 222 118 51.9 182 17.2 792 74.2 171 19.8 78.3 14.6 3.02 13.0 1.93 10.1 1.95 5.38 0.86 5.30 0.89 4.68 1.25 47.2

# Table 2 (continued)

	BX-77 154 28.54	BX-78 156 28.59	BX-79 158 28.64	BX-80 160 28.70	BX-81 162 28.75	BX-82 164 28.96	BX-83 166 29.17	BX-84 168 29.37	BX-85 170 29.58	BX-86 172 29.79	BX-87 174 30.00	BX-88 176 30.20	BX-89 178 30.41	BX-90 180 30.62
Sc	30.1	28.4	30.9	30.5	29.8	28.2	30.8	29.5	30.1	28.6	29.4	28.5	29.9	28.6
V	178	178	190	190	191	170	207	198	189	188	195	173	193	178
Cr	132	130	140	137	130	128	133	128	132	123	127	127	130	131
Co	17.8	16.9	17.6	15.9	16.7	15.7	19.0	17.1	18.8	18.9	20.8	16.4	13.8	17.8
NI	49.5 50.8	50.0 60.5	52.2 64.1	49.0 64.7	48.2 56.3	47.9 56.0	58.2 94.5	50.2 69.6	54.3 77.5	49.4 64.5	56.9 72.2	49.4 66.5	44.9 58.0	57.7
Zn	59.8 67.9	65.7	65.0	71 1	72.8	62.4	54.5 78.2	76.6	79.9	96.0	103	80.3	90.0	86.0
Ga	31.8	32.0	33.7	33.0	35.1	35.0	35.4	33.6	34.3	33.4	34.1	33.3	28.6	33.0
Ge	3.44	3.44	3.47	3.36	3.43	3.36	3.64	3.49	3.49	3.49	3.52	3.34	2.92	3.33
Rb	224	226	232	227	244	241	242	241	235	235	238	228	206	227
Sr	97.0	82.8	74.2	71.1	59.6	51.4	60.8	56.8	56.8	51.5	53.6	49.6	52.7	50.9
ř Zr	50.8 198	48.2 213	46.9 214	46.4 205	42.1 192	41.5 242	43.9 229	42.8 217	42.7 235	41.4 203	42.7	38.9 212	37.0 238	38.1 201
Nb	17.4	18.3	18.1	17.8	18.4	18.9	18.2	17.7	18.0	18.0	18.1	18.2	15.9	18.0
Ba	737	712	722	718	719	708	706	705	703	697	714	695	728	692
La	71.1	64.6	61.8	59.1	56.4	47.7	57.2	56.0	53.3	52.0	53.7	49.1	48.7	50.4
Ce	161	146	141	135	124	105	126	123	119	113	118	108	104	112
Nd	72.0	64 9	61.4	15.5 59.8	14.5 55.6	46.8	14.4 56.0	14.0 54.4	52.3	50.4	13.5 52.6	47.8	46.2	49.0
Sm	13.5	12.5	12.0	11.3	10.7	8.94	10.8	10.6	10.1	9.63	9.90	9.11	9.01	9.41
Eu	2.75	2.49	2.43	2.32	2.12	1.84	2.20	2.04	2.04	1.92	1.98	1.84	1.75	1.92
Gd	12.5	11.6	10.4	10.2	9.87	8.26	9.96	9.63	9.20	8.92	9.15	8.13	7.99	8.34
Tb	1.90	1.74	1.66	1.59	1.53	1.38	1.60	1.54	1.48	1.45	1.46	1.37	1.25	1.34
Dy Ho	1 95	9.05	9.14	0.55 1.68	0.49 1.62	1.92	0.04 1.69	0.05 1.66	0.27	8.05 1.60	0.20 1.61	1.52	1.17	1.47
Er	5.63	5.37	4.99	4.65	4.67	4.57	5.03	4.85	4.61	4.68	4.75	4.27	3.99	4.13
Tm	0.87	0.83	0.79	0.76	0.74	0.73	0.77	0.77	0.76	0.74	0.75	0.70	0.65	0.68
Yb	5.52	5.29	5.01	4.86	4.74	4.65	4.89	4.94	4.89	4.71	4.82	4.41	4.25	4.35
Lu	0.92	0.85	0.82	0.79	0.77	0.77	0.82	0.81	0.78	0.78	0.80	0.71	0.68	0.70
HI Ta	5.49 1.43	5.76	5.67	5.42 1.28	5.46	0.00	6.59 1 44	6.25 1.38	0.33	5.86	6.47 1 3 9	5.93 1 37	4.96	5.61 1.35
Pb	49.3	47.7	45.3	42.1	46.7	45.1	55.0	52.8	49.8	50.7	54.9	48.5	46.4	50.9
Th	28.9	28.0	27.0	26.6	27.6	24.2	29.0	27.7	26.7	27.5	28.0	26.4	24.7	27.1
ID Depth (cm) Age (ka)	BX 18 30	(-91 2 .83	BX-92 184 31.03	]	BX-93 186 31.24	BX-94 188 31.45		BX-95 190 31.66	BX-96 192 31.86		BX-97 194 32.07	BX-9 196 32.2	98 8	BX-100 200 32.70
ID Depth (cm) Age (ka)	BX 18 30 28	2-91 2.83	BX-92 184 31.03 28.6	] - - -	BX-93 186 31.24 27 1	BX-94 188 31.45 30.8		BX-95 190 31.66 31.0	BX-96 192 31.86	i	BX-97 194 32.07 31.6	BX-9 196 32.2 31 7	98 8	BX-100 200 32.70
ID Depth (cm) Age (ka) Sc V	BX 18 30 28 18	2-91 2 .83 .3 6	BX-92 184 31.03 28.6 190	]	BX-93 186 31.24 27.1 191	BX-94 188 31.45 30.8 209		BX-95 190 31.66 31.0 234	BX-96 192 31.86 30.9 235	i	BX-97 194 32.07 31.6 228	BX-9 196 32.2 31.7 245	98 8	BX-100 200 32.70 32.3 238
ID Depth (cm) Age (ka) Sc V Cr	BX 18 30 28 18 12	2-91 2 .83 .3 6 3	BX-92 184 31.03 28.6 190 125	] 	BX-93 186 31.24 27.1 191 128	BX-94 188 31.45 30.8 209 144		BX-95 190 31.66 31.0 234 140	BX-96 192 31.86 30.9 235 140		BX-97 194 32.07 31.6 228 147	BX-9 196 32.2 31.7 245 143	98 8	BX-100 200 32.70 32.3 238 151
ID Depth (cm) Age (ka) Sc V Cr Co	BX 18 30 28 18 12 15	2-91 2 .83 .3 6 3 .2	BX-92 184 31.03 28.6 190 125 15.0	]	BX-93 186 31.24 27.1 191 128 21.5	BX-94 188 31.45 30.8 209 144 20.6 6		BX-95 190 31.66 31.0 234 140 25.6 (1.0	BX-96 192 31.86 30.9 235 140 30.7		BX-97 194 32.07 31.6 228 147 26.3 64.5	BX-5 196 32.2 31.7 245 143 49.6	98 8	BX-100 200 32.70 32.3 238 151 49.5 70 4
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu	BX 18 30 28 18 12 15 48 63	2-91 2 .83 .3 6 3 .2 .6 4	BX-92 184 31.03 28.6 190 125 15.0 54.3 62 5		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6	BX-94 188 31.45 30.8 209 144 20.6 62.0 90 3		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6		BX-97 194 32.07 31.6 228 147 26.3 64.5 79 2	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107
ID Depth (cm) Age (ka) Sc V Cr Co Co Ni Cu Zn	BX 18 30 28 18 12 15 48 63 86	2-91 2 .83 .3 6 3 .2 .6 .4 .6	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6	;	BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5	BX-5 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga	BX 18 30 28 18 12 15 48 63 63 86 32	2-91 2 .83 .3 6 3 .2 .6 .4 .6 .4	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4	;	BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3	BX-5 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge	BX 18 30 28 18 12 15 48 63 86 32 3.3	2-91 2.83 .3 6 3 .2 .6 .4 .6 .4 .4 .6 .4 .9	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53	BX-5 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ge Rb Sc	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 25	2-91 2.83 	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 34.1 3.48	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72 8		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 26 2	BX-5 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76 9
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42	2-91 2 .83 6 3 .2 .6 .4 .6 .4 .6 .4 .9 7 7 7 7	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37 9		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47 9	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6	BX-5 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 520	8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 20	(-91 2 .83 .3 6 3 .2 .6 .4 .6 .4 .9 7 7 7 .7 .1 1	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221	8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 20 17	<ul> <li>(-91)</li> <li>2</li> <li>.83</li> <li>.6</li> <li>.2</li> <li>.6</li> <li>.4</li> <li>.6</li> <li>.4</li> <li>.4</li> <li>.39</li> <li>7</li> <li>.7</li> <li>.1</li> <li>1</li> <li>.6</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 20 17 67	<ul> <li>(-91)</li> <li>2</li> <li>.83</li> <li>.6</li> <li>.2</li> <li>.6</li> <li>.4</li> <li>.6</li> <li>.4</li> <li>.4</li> <li>.6</li> <li>.7</li> <li>.1</li> <li>.6</li> <li>8</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 50.5 10 17.1 10 10 10 10 10 10 10 10 10 1	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La	BX 18 30 28 18 12 15 48 63 86 63 22 50 42 20 20 17 67 55	<ul> <li>(-91)</li> <li>(2)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(3)</li> <li>(4)</li> <li>(6)</li> <li>(4)</li> <li>(6)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112</td><td></td><td>BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 166</td><td>BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3</td><td>·</td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 686 71.4</td><td>BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 166	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3	·	BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 686 71.4	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr	BX 18 30 28 18 12 15 48 63 86 63 22 50 42 20 42 20 17 67 55 12	<ul> <li>(-91)</li> <li>(2)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(3)</li> <li>(4)</li> <li>(6)</li> <li>(4)</li> <li>(6)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12 6</td><td></td><td>BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 99.28 34.1 3.48 228 50.9 47.9 210 17.1 685 588.4 156 17.4</td><td>BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18 2</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 196</td><td>·</td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2</td><td>BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 195</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12 6		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 99.28 34.1 3.48 228 50.9 47.9 210 17.1 685 588.4 156 17.4	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18 2	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 196	·	BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 195	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1
ID Depth (cm) Age (ka) Sc V Cr Co Co Ni Cu Zn Ga Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 20 42 20 0 42 20 17 67 55 12 13 52	<ul> <li>(-91)</li> <li>(2)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(3)</li> <li>(4)</li> <li>(6)</li> <li>(4)</li> <li>(6)</li> <li>(7)</li> <li>(9)</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 17.4 68.3	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 19.5 77.1	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 20 20 42 20 17 67 55 12 13 52 10	<ul> <li>(-91)</li> <li>(2)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(4)</li> <li>(6)</li> <li>(4)</li> <li>(6)</li> <li>(7)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 210 17.1 685 68.4 156 68.4 156 68.3 13.0	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2	BX-9 196 32.2 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 19.5 77.1 14.8	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu	BX 18 30 28 18 12 15 48 63 86 32 3.3 22 50 42 200 42 200 42 200 20 55 12 17 67 55 12 13 352 10 2.0	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(4)</li> <li>(6)</li> <li>(7)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> <li>(9)</li> <li>(10)</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 99.28 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 17.3 668 58.4 132 15.1 58.9 11.4 2.32		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81	BX-96 192 31.86 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb	BX 18 30 28 18 12 15 48 63 86 63 22 50 42 20 20 42 20 20 42 20 17 67 55 12 13 52 10 2.0 9.4	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(7)</li> <li>(7)</li> <li>(7)</li> <li>(7)</li> <li>(7)</li> <li>(7)</li> <li>(8)</li> <li>(6)</li> <li>(8)</li> <li>(9)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> <li>(12)</li> <li>(12)</li> </ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 8.36		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 34.1 3.48 228 50.9 247.9 210 17.1 585 58.4 156 17.4 58.3 13.0 2.60 11.8 1.70	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.52		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 2.81 13.0	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.62		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 1686 71.4 1688 19.2 75.1 14.2 2.95 12.8	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.0 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.0	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.05
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dv	BX 18 30 28 18 12 15 48 63 86 32 20 50 42 200 42 200 42 200 42 200 20 55 12 13 352 10 2.0 9.4 8 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	<ul> <li>(-91)</li> <li>(-83)</li> <li>(-83)</li> <li>(-10)</li> &lt;</ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7 66		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60 11.8 1.79 9.65	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.0 3	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 1686 71.4 1686 71.4 1686 71.4 1686 75.1 14.2 2.95 12.8 1.88 10.21	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 2.02	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 200	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> <li>(10)</li> <li>(11)</li> <li>(6)</li> <li>(8)</li> <li>(6)</li> <li>(7)</li> <li>(9)</li> <li>(12)</li> <li>(12)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52</td><td></td><td>BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 58.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81</td><td>BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05</td><td></td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01</td><td>BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 58.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er	BX 18 30 28 18 12 15 48 63 86 32 20 50 42 200 42 200 42 200 42 200 20 20 20 20 20 20 20 20 20 20 20 2	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(7)</li> <li>(7)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> <li>(10)</li> <li>(11)</li> <li>(6)</li> <li>(8)</li> <li>(6)</li> <li>(7)</li> <li>(9)</li> <li>(3)</li> <li>(12)</li> &lt;</ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43		BX-93 186 31.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88	98 8	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 200	<ul> <li>(-91)</li> <li>(-83)</li> <li>(-83)</li> <li>(-10)</li> &lt;</ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39 0.82	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 42 42 42 42 42 42 42 42 42	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68 4.36 1.37 1.52 4.43 0.68 4.36 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 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58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99</td><td></td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.548</td><td>BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 2.22</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68 4.36 1.37 1.52 4.43 0.68 4.36 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 1.52 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13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.548	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 2.22
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 55 55 12 50 50 50 50 50 50 50 50 50 50	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.37 7.66 1.52 4.43 0.68 4.36 0.71 6.01</td><td></td><td>BX-93 186 131.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39 0.82 5.33 0.87 5.64</td><td>BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66 0.78 5.59</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74 0.92 5.92</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 75.3 178 19.6 75.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99 0.98 6.28</td><td></td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.58 0.94 5.58</td><td>BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85 0.94 5.81</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 0.92 5.64</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.37 7.66 1.52 4.43 0.68 4.36 0.71 6.01		BX-93 186 131.24 27.1 191 128 21.5 58.7 69.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 68.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39 0.82 5.33 0.87 5.64	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66 0.78 5.59		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74 0.92 5.92	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 75.3 178 19.6 75.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99 0.98 6.28		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.58 0.94 5.58	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85 0.94 5.81	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 0.92 5.64
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 20 42 20 42 20 42 20 42 45 45 45 45 45 45 45 45 45 45	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68 4.36 0.71 6.01 1.33</td><td></td><td>BX-93 B8-93 B8-93 B8-93 B8-93 B8-93 B928 B4-19 B928 B4-19 B928 B4-19 B928 B4-19 B928 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 B4-19 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62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66 0.78 5.59 1.28</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 10.33 10.33 10.33 10.33 1.97 5.67 0.90 5.74 0.92 5.92 1.28</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99 0.98 6.28 1.24</td><td></td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.58 0.94 5.85 1.25</td><td>BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85 0.94 4.5.81 1.25</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 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0.92 5.58
ID Depth (cm) Age (ka) Sc V Cr Co Ni Cu Zn Ga Ga Ge Rb Sr Y Zr Nb Ba La Ce Pr Nb Ba La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu Hf Ta Pb	BX 18 30 28 18 12 15 48 63 86 32 20 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 42 200 55 12 13 35 20 55 12 12 13 35 20 55 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 35 20 55 12 12 13 55 12 12 13 55 12 12 13 55 12 12 13 55 12 12 13 13 55 12 12 12 12 12 12 13 13 55 12 12 12 12 13 13 55 12 12 12 12 12 12 12 12 12 12	<ul> <li>(-91)</li> <li>(2)</li> <li>(83)</li> <li>(3)</li> <li>(6)</li> <li>(3)</li> <li>(2)</li> <li>(6)</li> <li>(3)</li> <li>(7)</li> <li>(7)<td>BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68 4.36 0.71 6.01 1.33 52.6</td><td></td><td>BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 568.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39 0.82 5.33 0.87 5.64 1.33 62.4</td><td>BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66 0.78 5.59 1.28 60.9</td><td></td><td>BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74 0.92 5.92 1.28 65.0</td><td>BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99 0.98 6.28 1.24 69.5</td><td></td><td>BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.58 0.94 5.85 1.25 65.2</td><td>BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85 0.94 5.81 1.25 73.0</td><td>98</td><td>BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 0.92 5.58 0.92 5.58</td></li></ul>	BX-92 184 31.03 28.6 190 125 15.0 54.3 62.5 90.4 32.2 3.32 211 51.4 37.9 221 17.1 681 49.8 112 12.6 49.2 9.44 1.86 8.36 1.37 7.66 1.52 4.43 0.68 4.36 0.71 6.01 1.33 52.6		BX-93 186 31.24 27.1 191 128 21.5 58.7 59.6 92.8 34.1 3.48 228 50.9 47.9 210 17.1 685 568.4 156 68.3 13.0 2.60 11.8 1.79 9.65 1.81 5.39 0.82 5.33 0.87 5.64 1.33 62.4	BX-94 188 31.45 30.8 209 144 20.6 62.0 90.3 104 33.8 3.41 219 62.6 40.9 199 17.3 668 58.4 132 15.1 58.9 11.4 2.32 9.97 1.53 8.23 1.62 4.55 0.73 4.66 0.78 5.59 1.28 60.9		BX-95 190 31.66 31.0 234 140 25.6 61.9 72.0 98.8 34.3 3.47 229 68.4 51.1 197 16.6 681 73.3 165 18.2 73.6 13.9 2.81 13.0 1.93 10.33 1.97 5.67 0.90 5.74 0.92 5.92 1.28 65.0	BX-96 192 31.86 30.9 235 140 30.7 66.3 83.6 97.6 33.4 3.38 222 72.8 53.5 206 16.2 680 75.3 178 19.6 78.4 14.9 3.08 13.7 2.03 10.92 2.05 6.05 0.95 5.99 0.98 6.28 1.24 69.5		BX-97 194 32.07 31.6 228 147 26.3 64.5 79.2 96.5 34.3 3.53 224 76.2 51.6 217 17.1 686 71.4 168 19.2 75.1 14.2 2.95 12.8 1.88 10.21 2.01 5.48 0.88 5.58 0.94 5.85 1.25 65.2	BX-9 196 32.2 31.7 245 143 49.6 90.1 98.8 96.5 33.1 3.54 216 81.5 52.00 221 16.8 676 75.5 178 19.5 77.1 14.8 3.02 13.5 2.02 10.6 2.01 5.88 0.89 5.85 0.94 5.81 1.25 73.0	98	BX-100 200 32.70 32.3 238 151 49.5 79.4 107 89.3 34.3 3.53 220 76.8 51.4 205 17.2 674 72.4 172 19.1 75.1 14.4 2.96 12.7 1.95 10.26 1.99 5.50 0.88 5.58 0.92 5.58 0.92 5.58

Depth (cm)	Sample type	Conventional age (yr BP)	68% range <sup>a</sup> (cal yr BP)	Calendric age <sup>a</sup> (cal yr BP)
76	Grass root	15360 ± 110	18750-18128	18439 ± 311
96	Grass root	19160 ± 120	23249-22659	22954 ± 295
120	Grass root	23040 ± 360	28122-27067	27595 ± 527
162	Grass root	23770 ± 350	29194-28224	28709 ± 485
196	Grass root	27610 ± 490	32744-31861	32303 ± 441

 Table 3

 Summary of the calibrated <sup>14</sup>C ages of the peats.

<sup>a</sup> The calibration was carried out by using the Calpal 2007<sup>online</sup> software at http://www.calpal-online.de.

The ash samples were digested by an HNO<sub>3</sub> + HF acid mixture, and the solutions were used for both major and trace element measurements. Major elements were measured on a Varian Vista Pro ICP-AES at the State Key Laboratory of Geochemistry in Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, and trace elements were measured on a Perkin-Elmer Elan 6000 ICP-MS at the same laboratory. Analytical details of the major and trace element measurements are described in Li et al. (2002) and Liu et al. (1996), respectively. The precision for the measurement of the major elements was better than 1% (Li et al., 2002), and generally better than 5% (RSD) for the trace elements (Liu et al., 1996). The major and trace elemental results are presented in Tables 1 and Table 2, respectively. Several USGS and Chinese soil and sediment standard references, such as GSS-5, GSS-7, GXR-6 (soils), and GSD-9, GSD-12 (sediments) were repeatedly measured with the samples to monitor the quality of the major and trace element measurements, and the results were generally within the range of  $\pm 10\%$  (RSD) of the certified values.

The contents of the total organic carbon (TOC) of the samples were measured using a Vario EL III elemental analyzer by Lu (2003), and the results are included in Table 1. Grass roots from five samples were selected for AMS <sup>14</sup>C dating (Lu, 2003), and the ages were calibrated using Calpal-2007 online software (Danze-glocke et al., 2010). The calibrated ages are summarized in Table 3.

#### 3. Results

The LOIs at 900 °C vary from 20% to 80%, which are roughly double the TOC contents. An excellent linear correlation exists between the LOIs and TOC contents (Fig. 2), with a correlation coefficient of about 0.97 (N = 80, p < 0.0000001), and a regression equation of LOI (%) = 1.43 × TOC (%) + 13.9.

Among the major elements,  $Al_2O_3$ , MgO, and TiO<sub>2</sub> show limited variation, ranging from 22.42% to 28.82%, from 1.09% to 1.70%, and from 0.79% to 1.08%, respectively. Their averages are 25.95 ± 1.31%, 1.34 ± 0.13%, and 0.92 ± 0.07% (all 1 $\sigma$ ), respectively, and the relative deviations are from 5% to 10%. The variations for FeO(T), K<sub>2</sub>O, and Na<sub>2</sub>O are slightly larger, with averages of 5.36 ± 1.06%, 2.87 ± 0.44%, and 0.20 ± 0.05%, respectively, and relative deviations from 15% to 23%. Large variations are found for CaO, MnO, and P<sub>2</sub>O<sub>5</sub>, with averages of 2.61 ± 1.04%, 0.03 ± 0.01%, and 0.24 ± 0.11%, respectively, and relative deviations of 40%, 32%, and 47%, respectively.

Most of the trace elements show limited variation, except for some transition metals, such as V, Co, Ni, Cu, Zn, and Sr, which show a relative variation range of >15%. The variation ranges for rare earth elements (From La to Tb), Pb and U are slightly less than the above transition metals, from 10% to 15%. The relative variations of the other elements are generally less than 10%.

## 4. Discussion

The age model for the peat core in this study is built on five AMS <sup>14</sup>C dating results. Linear accumulation rates were assumed between these five age control points to calculate the age of each



Fig. 2. Correlation between the loss on ignition (LOI) at 900 °C and the TOC content.

sample. The top measured sample, at 42 cm, has an age of 11.42 kyr Cal BP, while the bottom sample (200 cm) has an age of 32.70 kyr Cal BP. Thus, the geochemical records of this core extend from the late MIS 3 to the early Holocene, and may provide details of the climatic and environmental changes during the last glacial maximum in this region.

#### 4.1. Authigenic contributions of the elements in the peats

The major elements found in the ashes (see Table 1) are typical of silicate dominated sediments. This agrees well with our rough estimates of the mineralogical composition of the ashes using X-ray diffraction (XRD). Rock-forming minerals such as quartz, K-feldspar and albite, as well as clay minerals, account for over 90% of the content of the ashes. Thus silicate weathering products comprise the main part of the inorganic materials of the peats. However, organic materials are the main components of the whole peats/sediments, as indicated by the 20–80% LOIs in Table 1.

The TOC content is certainly the best indicator of organic materials, whereas the LOIs represent all the volatile components. The excellent correlation between the TOC contents and LOIs suggests that organic materials account for most of the LOIs; the  $\sim 14\%$ intercept may indicate the presence of non-organic volatile materials, such as water in clays and CO<sub>2</sub> in carbonate. Ti can be one of the best indicators for silicate detritus in sediments (Schroeder et al., 1997; Wei et al., 2004), as Ti generally does not concentrate in biogenic materials and is relatively conserved during weathering, transportation, and deposition processes. Fig. 3 shows the variations in the TOC contents, the LOIs and the Ti concentrations in the peats, where Ti concentrations in the peats are calculated from those in the ashes using the following equation: [Ti]<sub>neat</sub> =  $[Ti]_{ash} \times (100 - LOI)/100$ . Inverse variations are clearly shown between the Ti concentrations and the TOC and LOI contents, with high Ti concentrations generally corresponding to low TOC and LOI contents, and vice versa. Robust negative correlations can also be observed between Ti concentrations and the TOC contents and the LOIs, with correlation coefficients of -0.92 (*N* = 80, p < 0.0000001) and -0.96 (N = 80, p < 0.0000001), respectively.



**Fig. 3.** In-depth variations of the LOIs, the TOC contents, and the  $TiO_2$  contents in the peats. The data demonstrate the correlation between the  $TiO_2$  contents and the LOIs.

The inter-influences of the contents of organic materials and silicate materials in the peats indicated by these co-variations and correlations is called the dilution effect.

After being baked at 900 °C, all the organic materials and other volatile components were removed, but the non-volatile components were retained, along with the elements they contributed. The simplest way to assess such contributions is to test the correlation between the concentration of the elements in the ashes and the TOC contents in the whole peats. As all of the non-volatile components in the organic materials are retained in the ashes, if an element originated in the organic material, its concentration in the ashes will positively correlate with the TOC contents in the peats, and the variation patterns between samples for such elements will be similar to that of the TOC contents. If the elements are not derived from the organic material, there should be no

significant positive correlation with the TOC and there may even be a negative correlation. The correlation coefficients between the concentrations of the elements in the ash and the TOC contents in the peats are summarized in Table 4. A significant threshold of p < 0.001 is used, and all the positive correlations with correlation significance better than p < 0.001 are shown in bold font in Table 4.

The relationships between the element concentrations in the ash and the TOC contents in the peats are clearer when the core is separated into two sections. The top section consists of the samples above 122 cm. The TOC contents in this section are generally less than 25%, with an average of 19.8%. The bottom section consists of the samples below 122 cm. The TOC contents in this section are higher than in the top section, with an average of 27.9%. As shown in Table 4. a number of elements. such as Fe. Mg. Mn. P. V. Co. Ni, Sr. Y. and all the REEs, except for La, Pb, and Th, show significant positive correlations (p < 0.001) with the TOC contents of all the samples. Among these elements, P and V show the most robust positive correlations, not only for the whole core, but also for each section. Moreover, the variation patterns of P and V are exactly the same as that of the TOC contents; all the peaks can be correlated with each other (Fig. 4). P is an essential nutrient that can be used by all organisms for energy transport and growth, and it tends to concentrate in biogenic materials such as plants. Its robust and positive correlation with the TOC content, as well as its similar pattern variations, indicate that the P in these peat samples is primarily from organic materials. Similarly, the V in these peat samples may also be mainly from organic materials.

It is worth noting that the Pb in the peats is closely associated with organic materials; the correlation coefficient between Pb and the TOC contents is above the *p* < 0.001 threshold throughout the whole core and in both sections (Table 4). This is consistent with the observation that plants can generally accumulate Pb from soils and dust, resulting in fairy high Pb concentrations in roots and leaves (Singh et al., 1997). Fig. 5 shows the down-core variation of the Pb/Ti ratios. The Pb/Ti ratios range from  $7 \times 10^{-3}$  to  $15.4 \times 10^{-3}$ , which are significantly higher than the average upper continental crust ratio of about  $4.43 \times 10^{-3}$  (Rudnick and Gao, 2003). It will be shown in the following section that the provenance of the silicate materials has not changed significantly in this

#### Table 4

Correlations between the concentrations of the elements and TOC.

	m . 1	100	100			100	100
Element	Total	>122 cm	<122 cm	Element	Total	>122 cm	<122 cm
	(N = 80)	(N = 40)	(N = 40)		(N = 80)	(N = 40)	(N = 40)
Al <sub>2</sub> O <sub>3</sub>	0.03	-0.43	0.59	Zr	-0.20	0.05	-0.27
CaO	0.20	0.14	0.77	Nb	-0.31	-0.01	-0.48
$Fe_2O_3(T)$	0.36	-0.27	0.82	Ba	0.23	-0.52	-0.01
K <sub>2</sub> O	-0.21	-0.19	-0.68	La	0.33	0.07	0.19
MgO	0.59	0.26	0.83	Ce	0.43	0.19	0.46
MnO	0.40	-0.21	0.74	Pr	0.45	0.34	0.31
Na <sub>2</sub> O	0.25	0.44	0.90	Nd	0.48	0.44	0.35
$P_2O_5$	0.59	0.71	0.90	Sm	0.49	0.48	0.38
TiO <sub>2</sub>	-0.36	-0.06	-0.77	Eu	0.49	0.49	0.36
				Gd	0.47	0.51	0.35
Sc	0.24	0.11	0.79	Tb	0.46	0.59	0.27
V	0.53	0.62	0.86	Dy	0.43	0.58	0.21
Cr	0.34	0.11	0.86	Ho	0.50	0.62	0.27
Со	0.47	-0.11	0.67	Er	0.47	0.63	0.28
Ni	0.46	0.13	0.80	Tm	0.51	0.61	0.33
Cu	0.19	0.39	0.85	Yb	0.53	0.70	0.39
Zn	-0.15	-0.36	-0.03	Lu	0.57	0.73	0.47
Ga	-0.17	-0.27	0.43	Hf	-0.11	0.27	-0.33
Ge	0.27	-0.31	0.79	Ta	-0.25	0.15	-0.54
Rb	0.03	-0.19	0.12	Pb	0.43	0.48	0.64
Sr	0.42	0.22	0.71	Th	0.52	0.36	0.72
Y	0.39	0.30	0.23	U	-0.21	-0.24	-0.10

\* The data shown in bold style indicate that they are above the significance thresholds of the correlations as follows: N = 80, r = 0.35, p < 0.001; and N = 40, r = 0.48, p < 0.001.



Fig. 4. In-depth variations of the TOC contents of the peats and the  $P_2O_5$  and V concentrations in the ashes. The shaded bars mark the in-pace variations of these records.



**Fig. 5.** In-depth variations of the Pb/Ti ratios in the ashes and the TOC contents of the peats. The horizontal dash line marks the average Pb/Ti ratio of the upper crust. The data demonstrate the correlation between the Pb/Ti ratios and the TOC contents.

core. Thus, heterogenic Pb concentrations in the silicates are not the likely cause of such large Pb/Ti variations, and much of the Pb in these peats may come from non-silicate materials. This is further supported by the similar variation patterns of the Pb/Ti ratios and the TOC contents (Fig. 5). There is a significant positive correlation between the Pb/Ti ratios and the TOC contents, with a correlation coefficient of 0.49 (N = 80, p < 0.00002). Furthermore, in the section below 120 cm, which has higher TOC values, the correlation is much more significant (r = 0.75, N = 40, p < 0.0000001). It is thus likely that the Pb in peats is largely from organic materials. Pb is among the most concerned elements in peats, and both Pb concentrations and isotopes have been broadly used in tracing anthropogenic impacts on the environment, in particular atmospheric inputs by anthropogenic activities (Farmer et al., 2006; Kamenov et al., 2009; Shotyk et al., 2001). The likely enrichment of Pb by organic materials, shown in our analysis, suggests on the one hand, that Pb in peats and organic rich sediments is indeed sensitive to changes in environmental Pb due to the accumulation ability of plants. On the other hand, plants may accumulate such Pb

enrichment through soils rather than through the absorption of atmospheric dust. Therefore, caution is appropriate when using Pb in peats to trace atmospheric inputs, in particular in peat pots where water flow influence is significant or Pb recycling is active.

The apparent positive correlations between REEs (except for La) can only be observed in the top section of the core (Table 4), whereas correlations in the bottom section of the core are poor. The relative deviations in the variation in the REE concentrations in the top section are generally less than 10%, close to the analytical precision for REEs, which suggests that the apparent correlations to TOC contents in the top section may not be meaningful. However, in the bottom section, even though the variations in the REE concentrations are slightly larger and the TOC contents are much higher, correlations between them are all below the *p* < 0.001 significance level. Thus, the correlations between the REEs in these peats that come from organic materials may be very small.

In addition to P, V, and Pb, some other elements also show significant and positive correlations with the TOC contents in the bottom section of the core (Table 4). These elements include most of the major elements, except for K and Ti, and most of the transition metals, such as Sc, Cr, Co, Ni, Cu, Sr, and Th. The significant positive correlation of these elements with the TOC contents indicates that they may also be partly derived from the organic materials.

In addition to organic materials, carbonates are the other important non-silicate component of peats. As carbonates are generally rich in Ca, Mg, and Sr, the existence of carbonates may result in robust positive correlations between the concentrations of each two of these elements. An alternative method to determine the existence of carbonate in sediments is to show their Ti normalized ratios (Schroeder et al., 1997; Wei et al., 2004). As Ti mainly concentrates in silicate components, and its concentration in carbonates is very low, if carbonates exist the Ti normalized ratios for Ca, Mg and Sr should be significantly higher than their corresponding values in the silicate components. Fig. 6 shows the down-core variations of the CaO/TiO<sub>2</sub>, MgO/TiO<sub>2</sub>, Sr/Ti, FeO(T)/  $TiO_2$  and  $MnO/TiO_2$  ratios. They all show a similar variation pattern. and there are robust correlations between each pair of these elements; the correlation efficient is generally >0.80 (N = 80, p < 0.0000001). Moreover, these Ti normalized ratios all show large variation amplitudes, with relative variations up to 200-300% (Fig. 6). These indicate that Ca, Mg, Sr, Fe and Mn are closely associated with carbonates in these peats. Higher Ti normalized ratios for these elements in the core, shade-marked in Fig. 6, indicate higher carbonate contents. These sections also generally have higher TOC contents.

The close association of Fe and Mn with carbonates in these peats is interesting. Fe and Mn concentrations in normal carbonates, such as biogenic carbonates and those chemically deposited under oxic environments, are generally very low; there is no positive correlation between Fe and Mn concentrations and carbonate contents. However, authigenic FeCO<sub>3</sub> and MnCO<sub>3</sub> can be formed in anoxic sediments where Fe<sup>2+</sup> and Mn<sup>2+</sup> supplies are sufficient (Calvert and Pedersen, 1996; Pedersen and Price, 1982; Postma, 1981, 1982). The close correlations between Fe, Mn, and Ca suggest this may be the case in these sediments. Moreover, the higher Fe and Mn concentrations are generally accompanied by higher TOC contents as shown in Fig. 6. This agrees with the fact that organic materials are the most effective reductant in sediments. More organic materials in sediments may consume more oxidants and result in more reductive conditions, which may favor the deposit of authigenic FeCO<sub>3</sub> and MnCO<sub>3</sub>. As a result, it is likely that the Fe and Mn in these peats are largely from authigenic carbonates.

K, Ti, Zn, Ge, Rb, Zr, Nb, Ba, La, Hf, Ta, and U concentrations in the ashes show no positive correlations with the TOC contents; some even show negative correlations, both in the separated sec-



**Fig. 6.** In-depth variations of CaO/TiO<sub>2</sub>, MgO/TiO<sub>2</sub>, Sr/Ti, FeO (T)/TiO<sub>2</sub>, and MnO/TiO<sub>2</sub> and the TOC contents in the peats. Shaded bars mark the in-pace variations of these records.

tions and in the entire core. These elements probably did not originate in the organic materials or other authigenic components, but are mainly hosted in the silicate detrital components of the peats.

#### 4.2. Provenance of the silicate materials

As previously mentioned, silicate materials are the main components of the ashes. These materials may have been incorporated into the peat through local weathering products, such as soils and sediments in the local drainage. However, dust from north China, particularly from the Loess Plateau, may also contribute to the peats, as these peats were deposited during the last glacial maximum, when both the drought in north China and the strength of the winter monsoon were enhanced (Wang et al., 2008). This would have resulted in enhanced dust fluxes to the south of the Plateau.

Elements such as Sc, Ti, Zr, Hf, Nb, Ta, REE, and Th are generally conserved during chemical weathering (Braun et al., 1993; Nesbitt and Markovics, 1997), and the discrimination diagrams of these elements can generally be used to trace the origins of the silicate materials (Bhatia and Crook, 1986; Fralick and Kronberg, 1997). The above analysis suggests that the Sc and Th in the peat samples from the bottom section of the core were partly derived from or-



**Fig. 7.** Range of the chondrite-normalized REE patterns of the peat ashes. The pattern for PAAS is also presented for comparison.

ganic materials (Table 4). Thus, we exclude Sc and Th from the provenance tracing.

The REEs in these peats do not come from organic materials, and they can be used in provenance tracing. Fig. 7 shows the chondrite normalized REE patterns of the peat samples, as well as those of the Post-Archaean average Australian sedimentary rock (PAAS). All the peat samples exhibit nearly the same REE patterns as the PAAS. Additionally, the REE variation ranges of these samples are concentrated in a very narrow range (Fig. 7), suggesting similar sources for the silicate materials in these peats. This can also be inferred from their Eu anomalies, defined as  $Eu^* = 2Eu_N/(Sm_N + Gd_N)$ , where N indicates normalization by chondrite. The Eu\* varies from 0.61 to 0.66, with an average of 0.633 ± 0.014 (1 $\sigma$ ). This value is very close to that of the PAAS, about 0.632 (McLennan, 1989), and the average of some selected loess samples (0.631 ± 0.014) from Xining, Xifeng, and Jixian, which are located at the west, center, and east of the Loess Plateau, respectively (Jahn et al., 2001).

Further provenance information can be obtained from the TiO<sub>2</sub> \* 10/Nb-La discrimination diagram. Ti, Nb, and La do not come from organic materials, and thus they may provide reliable provenance information (Fig. 8). The loess samples of Jahn et al. (2001) are also plotted in this diagram for comparison. The peat samples are shown in the separated sections mentioned above (Fig. 8). The samples of the two sections largely overlap, and they all concentrate within a narrow range. This again indicates that the silicate materials in these peats are from the same sources. The loess samples also have lower La concentrations and slightly higher  $TiO_2 * 10/Nb$  ratios; except for one sample in the diagram, they can be clearly separated from the peats, which implies that the sources of the silicate materials in these peats are different from those of the loess. Giving that dust inputs might be enhanced during the glacial maximum, if dust had contributed to the silicate materials in these peats, it might be from primarily local sources similar to those transported by water flow rather than blown from northern China. Thus, local weathering products may be the main source of the silicate materials in these peats.

#### 4.3. Proxies indicating local chemical weathering intensity

Chemical weathering can alter the mineral and chemical components of continental surfaces, and its products include soils and sediments. Chemical and mineral components in soils and sediments are records of the intensity of chemical weathering in their source regions (Kronberg et al., 1986; Nesbitt and Young, 1982; Wei et al., 2004, 2006).

Ratios between alkali elements, such as K<sub>2</sub>O/Na<sub>2</sub>O, K/Rb, or Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub>, are good markers of changes in intensity between incipient to moderate weathering (Nesbitt and Markovics, 1997; Nesbitt et al., 1980; Wei et al., 2004). The down-core variations of these ratios are shown in Fig. 9. All these ratios show similar var-



**Fig. 8.** La–Ti/Nb \* 1000 diagrams for the peat ashes and selected loess samples from northern China. Open rectangles indicate the ashes from the top section of the core (above 122 cm), and the open circles indicate those from the bottom section of the core (beneath 122 cm). The solid triangles indicate the loess. The loess data are from Jahn et al. (2001). Except for one loess sample, the ashes and the loess are well-separated.



**Fig. 9.** In-depth variations of the  $Al_2O_3/TiO_2$ ,  $K_2O/Na_2O$ , K/Rb ratios and the TOC contents in the peats. Shaded bars mark the in-pace variations of these records. The data indicate the correlations between  $Al_2O_3/TiO_2$  and  $K_2O/Na_2O$  in different sections of the core.

iation patterns in the top section of the core (above 122 cm). This is consistent with the general behaviors of these elements during chemical weathering (Nesbitt and Markovics, 1997; Nesbitt et al., 1980), suggesting that they can reliably indicate the changes in chemical weathering intensity in this basin. Positive correlations can be observed between every pair of ratios in this section. For example, the correlation coefficient between  $Al_2O_3/TiO_2$  and  $K_2O/Na_2O$  was 0.70 (N = 40, p < 0.000001). However, in the bottom section (below 122 cm), Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> expressed a variation pattern opposite to the others. A robust and negative correlation occurred between Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> and K<sub>2</sub>O/Na<sub>2</sub>O, with a correlation coefficient of -0.84 (N = 40, p < 0.000001). As mentioned above, organic materials were the source for some of the Al and Na in this section, whereas Ti and K had no organic origins. Thus, the Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> ratios might be expected to increase and K<sub>2</sub>O/Na<sub>2</sub>O ratios to decrease along with increasing TOC contents, resulting in an inverse variation pattern (Fig. 9). Therefore, using the Al<sub>2</sub>O<sub>3</sub>/TiO<sub>2</sub> and K<sub>2</sub>O/Na<sub>2</sub>O ratios in the bottom section of the core may bias the measurement of changes in chemical weathering intensity.

Unlike the  $Al_2O_3/TiO_2$  and  $K_2O/Na_2O$  ratios, as both K and Rb do not originate from non-silicate materials, the ratios of K/Rb can reliably indicate changes in chemical weathering intensity throughout the entire core. As shown in Fig. 9, high K/Rb ratios occur from 96 cm to 122 cm and from 156 cm to 190 cm, indicating stronger chemical weathering intensity, whereas weathering intensities around 80 cm and 130 cm are relatively incipient. It is interesting to see that the  $K_2O/Na_2O$  ratios show the same variation pattern as the K/Rb ratios throughout the core even though some Na in the bottom section may be part of the organic contribution. The extra Na from organic materials does not appear to affect the changes in the  $K_2O/Na_2O$  ratio caused by chemical weathering in the bottom section. Thus, the  $K_2O/Na_2O$  ratios can also be used to measure changes in chemical weathering intensity in these peats.

The variations in chemical weathering intensity shown in Fig. 9 is converse to that of the TOC contents, with high K/Rb and K<sub>2</sub>O/ $Na_2O$  ratios generally corresponding to low TOC contents. As the TOC contents in peats are controlled by the balance of silicate material inputs and organic material accumulations, intensive chemical weathering, which favors the erosion of continental crust, may enhance the inputs of silicate materials. As a result, the proportion of silicate materials to organic materials increases, and the TOC content decreases. This is how we interpret the inverse variation patterns between chemical weathering intensity and the TOC content.

## 4.4. Response to the East Asian monsoon climate

Continental chemical weathering is largely controlled by climate. Warm and humid climates favor intensive chemical weathering, and humidity is particularly important (Berner and Berner, 1997). In East Asia, the climate is dominated by the East Asian monsoon, and precipitation in this region is mostly supplied by the East Asian summer monsoon (Ding, 1994). Thus, temporal changes in chemical weathering intensity induced by the change in humidity may closely relate to changes in intensity of the summer monsoon. Evaluating the elemental compositions of our peats may allow us to observe such chemical weathering changes in terrestrial sediments.

Fig. 10 shows the temporal variation of chemical weathering intensity in Baoxiu Basin as represented by the K/Rb and K<sub>2</sub>O/ Na<sub>2</sub>O ratios of these peat samples. The temporal variation in the East Asian summer monsoon, represented by the  $\delta^{18}$ O of some stalagmites from Dongge and Hulu caves (Wang et al., 2008), is also shown in Fig. 10 for comparison. Studies by Wang et al. (2008) indicate that the variations in the  $\delta^{18}$ O in stalagmites from these two caves are highly consistent, suggesting that they are all controlled by the East Asian summer monsoon (Wang et al., 2008). The more recent  $\delta^{18}$ O of the stalagmites from the Wulu and Dashibao caves, which are located to the west of the EASM boundary, very close to Baoxiu Basin (Fig. 1), show similar patterns to those from the Hulu and Dongge caves not only temporally, but also in shape and amplitude (Zhao et al., 2010). This again indicates that the climate changes in this region are largely controlled by the East



**Fig. 10.** Comparisons between the variations of the K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O in the peat ashes, the  $\delta^{18}$ O of the stalagmite from the Dongge and Hulu Caves, and the  $\delta^{18}O_{SW}$  of core SK218/1 from Bengal Bay. The thin arrows indicate the possible correspondence between these records. YD: Younger Dryas, LGM: Last Glacial Maximum, and MIS 2/3: boundary between Stage 3 and Stage 2. The stars mark the age controls of the peats.

Asian summer monsoon. The variation patterns in the K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratios in the peat are similar to the patterns in the stalagmite  $\delta^{18}$ O, with higher K/Rb values generally corresponding to lower  $\delta^{18}$ O in stalagmites, and vice versa, indicating that the variations of local chemical weathering are active responses to the East Asian summer monsoon changes.

However, time offsets between the corresponding peaks and valleys of the elemental and  $\delta^{18}$ O records are generally observed, with the variations of peat K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O generally leading those of the stalagmite  $\delta^{18}$ O by about 3–4 ka. For example, the minimum K/Rb around 18.9 ka may correspond to the highest  $\delta^{18}$ O around 15.8 ka with a gap of 3 ka, and the low peat K/Rb ratios around 28 ka may correspond to the high stalagmite  $\delta^{18}$ O around 24 ka, a time offset of about 4 ka. The maximum K/Rb value around 30.6 ka may correspond to the minimum  $\delta^{18}$ O around 29.4 ka, and the time offset is still about 1 ka.

Time offsets of major climate events between different records from different archives are common in paleoclimate studies. Differences in age models and different responses of the proxies to climatic/environmental changes may account for most of the time offsets. The age model of the peat samples was established from five AMS <sup>14</sup>C ages of grass roots. The age control points are shown in Fig. 10. The age models for the stalagmites were based on a number of <sup>238</sup>U–<sup>234</sup>U–<sup>230</sup>Th ages. Grass roots are good materials for AMS <sup>14</sup>C dating, and their calibrated ages could not be biased significantly. However, the number of age control points is very limited compared to those for the stalagmites. Poor age controls in the peat core may partly account for the time offsets between the peat record and the stalagmite record, in particular for the YD and LGM events occurring after 20 ka. The low K/Rb and K<sub>2</sub>O/ Na<sub>2</sub>O ratios between 120 cm and 160 cm were well defined by the two AMS <sup>14</sup>C ages (Table 3), yielding ages from 27.6 to 28.7 cal kyr B.P. If this decrease in chemical weathering intensity correlated to the rapid decrease of the EASM strength during 28–29 ka, there is nearly no time offset between these two records. However, the most significant decrease of the EASM strength around this period occurred at the boundary of MIS2/3 as shown in the stalagmite  $\delta^{18}$ O record. There is no oscillation as large as those from 27.6 ka to 28.7 ka that can be correlated to the MIS2/3 event in the K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O records. Thus, we would like to assign the low elemental ratios to MIS2/3 rather than to the rapid decrease of the EASM strength during 28–29 ka recorded by the stalagmite  $\delta^{18}$ O. This, however, is a very rough estimate. More age controls are needed to establish a better comparison between the chemical weathering records in peats and the EASM changes.

Despite such time offsets, the variations of the peat K/Rb and  $K_2O/Na_2O$  ratios and the stalagmite  $\delta^{18}O$  are consistent. Lower stalagmite  $\delta^{18}$ O indicates more precipitation by the enhanced summer monsoon (Wang et al., 2008). Such correspondence between the peat K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratio and stalagmite  $\delta^{18}$ O agrees with the fact that enhanced summer monsoons bring about more precipitation and improve humidity, which favors intensive chemical weathering and results in higher K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratios. Declining summer monsoons result in less precipitation and low humidity, thus decreasing local chemical weathering intensity and resulting in lower K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratios in the peat samples, as during the YD, LGM and MIS2/3 events shown in Fig. 10. Therefore, selected element ratios in the peat samples, such as K/Rb, K<sub>2</sub>O/Na<sub>2</sub>O and others, actively respond to changes in the East Asian summer monsoon and can proxy changes in local chemical weathering intensity.

Baoxiu Basin is located at the edge of the region influenced by the modern East Asian summer monsoon, as shown in Fig. 1. The consistency between the variation in K/Rb ratios in the peats from Baoxiu and the  $\delta^{18}$ O in the stalagmites from the Hulu, Dongge, Wulu and Dashibao caves suggests that the influence of the EASM could also have extended to this region during the last glacial maximum, when the strength of the EASM was significantly decreased. Lower K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O ratios during the YD and LGM indicate a relative dry climate in this region, which was induced by declined EASM during the LGM.

An alternative interpretation for these chemical weathering records is that they may be responses to changes in the Indian summer monsoon (ISM) during this period, as Baoxiu Basin is next to the region influenced by the ISM at present (Fig. 1). The  $\delta^{18}O_{SW}$ of a sediment core, SK218/1, from the Bengal Bay was included in Fig. 10 to illustrate the changes in the ISM (Govil and Naidu, 2011).  $\delta^{18}O_{SW}$  shows changes in seawater  $\delta^{18}O$ , which were calculated from paired Mg/Ca (proxy of SST) and  $\delta^{18}$ O of planktonic foraminifer, G. ruber. The  $\delta^{18}O_{SW}$  variation in core SK218/1 is associated with the terrestrial runoff controlled by changes in summer precipitation, and reflects changes in the ISM (Govil and Naidu, 2011). This record, however, has poor time resolution compared to the stalagmite  $\delta^{18}$ O, and its variation details could not be identified clearly. The variations in K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O identified in the peat samples are more like the stalagmite  $\delta^{18}$ O than the  $\delta^{18}O_{SW}$  of core SK218/1. It is therefore more likely that the changes in chemical weathering intensity in Baoxiu Basin during the last glacial periods were a response to changes in the East Asian summer monsoon. The influence of the ISM does not appear to be an important factor in this region.

## 5. Summary

The elemental geochemistry of the peats from a peat core collected in Baoxiu Basin, Yunan Province, southwestern China, were used to investigate the extent to which organic materials contributed to the elemental composition of the peats, and whether change in the elemental composition of the peats could be related to climate change. The main findings are summarized as follows.

- (1) Organic materials are the main components of the peats, with TOC contents ranging from 6.64% to 44.46%, and LOIs from 20.63% to 80.43%. Organic materials appear to have made significant contributions to the elements retained in the ashes baked from the peats at 900 °C. Among these elements, P and V appear to be almost entirely from the organic materials with variation patterns very similar to that of the TOC. Al, Na, and most of the transition metals, such as Sc, Cr, Co, Ni, and Cu, as well as Pb and Th are partly from organic materials, particularly in the section below 122 cm. The concentrations of Ca, Mg, Sr, Fe, and Mn in the peats share the same variation pattern, suggesting that they are primarily associated with carbonates, such as authigenic FeCO<sub>3</sub> and MnCO<sub>3</sub> formed under the anoxic environment of peats. In contrast, K, Ti, Zn, Ge, Rb, Zr, Nb, Ba, REEs, Hf, Ta, and U do not appear to be part of the organic and authigenic materials, and are mainly hosted in the silicate detrital components of the peats.
- (2) The silicate materials in the peats are mainly composed of local weathering products. Dust from northern China contributed very little to these peats.
- (3) The ratios of K/Rb and K<sub>2</sub>O/Na<sub>2</sub>O in these peats reliably reflect changes in chemical weathering intensity. Their variation patterns match that of changes in the East Asian summer monsoon from  $\sim$ 30 to  $\sim$ 10 ka, with stronger summer monsoons favoring intense chemical weathering. This suggests that the selected elemental ratios in peats are reliable proxies for changes in the monsoon climate.

### Acknowledgements

The authors are most grateful to Xiangling Tu from the Guangzhou Institute of Geochemistry, CAS for his assistance in the ICP-MS measurements. We also thank the two anonymous reviewers for their critical and constructive comments that helped to improve the manuscript. This study was supported by the Knowledge Innovation Project of the Chinese Academy of Sciences (Grant No. KZCX2-YW-138), and the National Natural Sciences Foundation of China (Grant Nos. 40973008, 40272058 and 40830852) This is contribution No. IS-1530 from GIG-CAS.

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