Data Repository Item 2009237

Table 1. Elemental and isotopic data of Cenozoic basalts from the Nanpu Sag, Bohai Bay Basin.

Sampling well	M18	M24-1	JH1×1-1	JH1×1-2	JH1×1-3	JH1×1-4	JH1×1-5	M103×1-1	M24-2	M103×1-2
Depth (m)	2125	2039	2490.96	2491.94	2493.96	2494.96	2495.4	2081.87	2037.5	2082.67
Strata	Guantao Group									
Volcanism	Volcanic Cycle 3									
SiO_2	47.28	47.76	46.44	48.8	49.07	48.16	48.35	48.89	43.89	48.29
TiO_2	2.56	2.17	2.13	2.15	2.02	2.04	2.04	2.44	2.4	2.45
Al_2O_3	15.8	13.7	14.73	15.11	15.26	14.6	14.89	14.72	13.93	14.49
Fe_2O_3	1.99	2.26	2.48	2.11	2.18	2.22	2.17	2.39	2.37	2.3
FeO	7.94	9.04	9.93	8.45	8.73	8.89	8.66	9.55	9.47	9.18
MnO	0.27	0.19	0.26	0.19	0.19	0.15	0.16	0.17	0.25	0.26
MgO	5.37	8.84	8.14	6.69	6.74	7.81	7.79	8.1	9.48	8.03
CaO	10.14	7.71	8.76	9.62	8.27	8.74	8.63	7.8	7.81	8.28
Na_2O	2.31	2.74	2.33	2.64	2.74	2.43	2.51	2.84	3.07	2.71
K_2O	2.15	1.34	1.09	1.17	1.49	1.28	1.23	1.44	1.59	1.26
P_2O_5	0.75	0.46	0.43	0.45	0.47	0.43	0.42	0.49	0.51	0.5
CO_2	0.58	0.47	0.13	0.17	0.11	0.27	0.07			
H_2O+	2.2	2.85	2.34	1.94	2.2	2.62	2.57	0.96	4.91	2.28
Total	99.34	99.53	99.19	99.49	99.47	99.64	99.49	99.79	99.68	100.03
Mg#	0.55	0.64	0.6	0.59	0.58	0.61	0.62	0.6	0.64	0.61
Q	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Or	13.16	8.23	6.66	7.10	9.07	7.82	7.51	8.61	9.92	7.62
Ab	20.24	24.10	20.38	22.94	23.86	21.26	21.93	24.32	19.54	23.46
An	27.33	21.96	27.41	26.62	25.67	25.99	26.56	23.44	20.61	24.20
Ne	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.26	0.00
Di(FS)	6.04	3.72	4.31	5.63	4.04	4.38	3.99	3.44	4.15	3.91
Di(MS)	10.06	8.18	7.62	10.17	6.91	8.57	8.05	6.71	9.42	7.86
Hy(MS)	4.44	9.41	8.38	9.87	11.06	11.60	11.95	9.64	0.00	10.31
Hy(FS)	3.06	4.91	5.44	6.26	7.41	6.80	6.80	5.66	0.00	5.88
Ol(MS)	3.33	6.79	6.34	1.77	2.11	3.18	3.05	5.37	14.40	4.56
Ol(FS)	2.53	3.91	4.54	1.24	1.56	2.05	1.91	3.48	8.02	2.86
Mt	2.99	3.41	3.72	3.14	3.25	3.33	3.25	3.51	3.63	3.41
Il	5.04	4.28	4.18	4.19	3.95	4.01	4.00	4.69	4.81	4.76
Ap	1.80	1.11	1.03	1.07	1.12	1.03	1.01	1.15	1.25	1.19
cpx	16.09	11.90	11.92	15.79	10.94	12.95	12.04	10.15	13.57	11.77
opx	7.50	14.32	13.82	16.13	18.47	18.39	18.75	15.30	0.00	16.19
ol	5.85	10.70	10.88	3.01	3.68	5.23	4.96	8.85	22.42	7.42

In ppm										
Rb	41.1	27.3	13.4	20.2	30.3	22	21	29	30	22
Ba	601	402	384	328	372	338	331	431	356	362
Th	6.4	3.2	2.2	21	19.3	17.1	10.4	7	6	7
U	3.12	1.53	0.9	4.6	5.23	4.1	3.4	1.23	3.24	2.45
Nb	68	42	33	31	35	31	31	34	32	34
Pb	0.923	0.688	0.467	0.872	0.563	0.588	0.374	0.489	0.51	0.678
Bb	9.23	6.88	4.67	8.72	5.63	5.88	3.74	4.89	5.1	6.78
Sr	653	554	347	381	368	383	353	410	239	395
Nd	38.4	24.5	21.4	21.8	23.7	21.2	21	23	22	23.3
Hf	6.5	5.2	4.1	4	4.2	3.9	4.1	3.1	2.98	3.15
Zr	269	189	168	163	188	165	162	141	124	130
La	44.9	24.54	21.56	22.04	26.51	22.45	21.28	22.43	21.62	22.66
Ce	80.87	46.46	43.35	45.06	54.07	44.96	43.89	45.7	43.16	45.01
Pr	9.87	5.81	5.38	5.52	6.05	5.52	5.38	5.45	5.28	5.59
Nd	38.35	24.54	21.43	21.79	23.68	21.15	21.03	23.03	22.02	23.3
Sm	7.55	5.52	4.76	4.9	5.03	4.73	4.73	5.78	5.56	5.84
Eu	2.45	1.84	1.58	1.66	1.07	1.61	1.59	1.86	1.81	1.91
Gd	6.78	5.37	4.68	4.89	4.95	4.71	4.75	5.25	5.07	5.77
Tb	1.01	0.83	0.74	0.78	0.75	0.71	0.71	0.75	0.7	0.91
Dy	5.62	4.74	4.31	4.5	4.46	4.24	4.26	4.53	4.61	4.97
Ho	1.01	0.82	0.78	0.81	0.81	0.79	0.78	0.88	0.92	0.94
Er	2.84	2.35	2.01	2.77	2.02	1.9	1.96	1.89	1.98	2.17
Tm	0.36	0.31	0.3	0.31	0.31	0.29	0.3	0.28	0.3	0.32
Yb	2.3	1.87	1.71	1.77	1.81	1.72	1.72	1.82	1.9	2.02
Lu	0.34	0.28	0.26	0.27	0.28	0.26	0.26	0.28	0.3	0.33
Y	27.56	22.08	20.68	22.27	22.32	21.39	21.74	21.23	22.45	31.09
Total REE	231.81	147.36	133.53	139.34	154.12	136.43	134.38	141.16	137.68	152.83

Nd（ppm）	38.35	24.54	21.79	23.68		21.03
Sm（ppm）	7.55	5.52	4.9	5.03		4.73
$^{147}Sm/^{144}Nd$	0.119	0.136	0.136	0.1284		0.136
$^{143}Nd/^{144}Nd$	0.51266	0.512889	0.512979	0.512976		0.512908
2a	2	2	1	1		1
Rb（ppm）	41.1	27.3	20.2	30.3		21
Sr（ppm）	653	554	381	368		353
$^{87}Rb/^{86}Sr$	0.182	0.143	0.153	0.238		0.172
$^{87}Sr/^{86}Sr$	0.705491	0.70391	0.703627	0.703673		0.706621
2a	2	3	5	2		5
Sri	0.705432	0.703863	0.703577	0.703595		0.706565
εNd	0.66	5.07	6.83	6.79		5.45
$^{206}Pb/^{204}Pb$	18.354	17.604	18.158			18.122
$^{207}Pb/^{204}Pb$	15.566	15.431	15.564			15.609

$^{208}Pb/^{204}Pb$	38.454	37.619	38.325				38.348			

$Mg^{\#}$ = Mg/(Mg+Fe2+); $^{143}Nd/^{144}Nd$ CHUR is cited from (Goldstein, O'Nions et al. 1984)

Table 1 continued.

Sampling well	B15	G10	JH1×1-6	B8	B8×1	N4	B5-1	BS28-1	BS28-2	BS28-3
Depth (m)	2278	2242	3780.5	3670.85		2720	4150.2	4256.2	4257.36	4258.8
Strata	Guantao Group	Upper Dongyingjie Group	Dongyingjie Group	Upper Shahejie Group						
Volcanism	Volcanic Cycle 3		Volcanic Cycle 2							
SiO_2	48.68	48.88	47.77	45.1	42.07	43.8	50.85	46.94	44.15	44.03
TiO_2	1.58	1.96	1.76	2.54	2.44	2.88	1.72	3.81	2.72	2.66
Al_2O3	15.1	14.81	17.05	14.59	17.47	13.94	15.53	13.47	15.13	18.38
$Fe2O_3$	2.18	2.16	2.17	2.44	2.21	2.33	2.13	2.58	2.51	2.65
FeO	8.7	8.65	8.67	9.76	8.85	9.32	8.5	10.33	10.03	10.6
MnO	0.16	0.15	0.1	0.13	0.1	0.2	0.08	0.24	0.28	0.22
MgO	7.39	8.19	3.12	6.85	7.56	10.02	5.82	4.93	5.22	5.58
CaO	8.79	7.25	9.69	10.53	10.78	8.06	8.14	10.35	10.9	6.6
Na_2O	3.4	3.1	3.91	2.67	1.87	3.4	2.96	3.11	4	4.05
K_2O	0.5	0.75	1.15	0.72	0.67	2	0.78	0.06	0.23	0.31
P_2O_5	0.18	0.4	0.22	0.43	0.5	0.82	0.27	0.63	0.56	0.6
CO_2	0.6	0.82				0.28				
H_2O+	2.25	2.29	4	4.4	5.06	3.15	2.63	4.16	4.06	4.12
Total	99.51	99.41	99.61	100.16	99.58	100.2	99.41	100.61	99.79	99.8
Mg#	0.6	0.63	0.39	0.56	0.61	0.66	0.55	0.46	0.48	0.49
Q	0.00	0.00	0.00	0.00	0.00	0.00	2.86	1.23	0.00	0.00
C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86
Or	3.06	4.60	7.11	4.44	4.19	12.22	4.76	0.37	1.42	1.92
Ab	29.76	27.24	29.66	23.59	16.74	14.85	25.88	27.28	22.86	35.02
An	25.31	25.21	26.75	26.84	39.46	17.43	27.68	23.45	23.66	30.13
Ne	0.00	0.00	2.68	0.00	0.00	8.06	0.00	0.00	6.77	0.43
Di(FS)	5.46	2.47	10.37	7.69	3.65	4.06	4.03	9.22	10.86	0.00
Di(MS)	9.71	5.18	8.10	12.58	7.45	10.75	6.00	11.82	13.10	0.00
Hy(MS)	5.56	14.48	0.00	0.45	0.72	0.00	12.20	7.25	0.00	0.00
Hy(FS)	3.58	7.91	0.00	0.32	0.41	0.00	9.39	6.49	0.00	0.00
Ol(MS)	6.30	3.01	3.06	8.08	11.03	14.58	0.00	0.00	5.26	10.18
Ol(FS)	4.47	1.81	4.96	6.24	6.83	6.96	0.00	0.00	5.52	10.73
Mt	3.27	3.25	3.29	3.69	3.39	3.49	3.19	3.88	3.80	4.02
Il	3.11	3.87	3.50	5.04	4.90	5.65	3.38	7.50	5.40	5.28
Ap	0.43	0.96	0.53	1.04	1.23	1.96	0.65	1.51	1.36	1.45
cpx	15.16	7.65	18.47	20.27	11.10	14.80	10.03	21.04	23.96	0.00
opx	9.14	22.39	0.00	0.77	1.13	0.00	21.58	13.75	0.00	0.00
ol	10.77	4.83	8.02	14.32	17.87	21.54	0.00	0.00	10.78	20.91

In ppm

Rb	35.2	6.3	22	28.1	4.3	5.7	11.9	3	5.4	5
Ba	456.8	257.2	224	401	405	148	327	175	242	457
Th	5.5	0.9	1.6	3.2	3.7	0.8	1.9	10.6	12.6	10.5
U	1.33	1.2	1	1.2	1.32					
Nb	52	12	14.6	40.4	41.6	11.3	14.6	32	30.2	33.7
Pb	0.597	0.344	0.677	2.05	0.786	0.629	1.123	0.839	1.287	0.455
Bb	5.97	3.44	6.77	20.5	7.86	6.29	11.23	8.39	12.87	4.55
Sr	225	438	263	435	421	437	578	443	554	386
Nd	38.9	11.8	12.9	26.9	10.8	10.7	15.7	31.7	27.5	30.8
Hf	6.19	2.31	3.4	4.32	3.31	1.97	4.6	6.6	6.5	6.5
Zr	257	83	122	174.26	145.32	77.28	173	258	231	266
La	37.98	8.17	11.44	25.85	12.4	7.87	14.02	26.34	23.48	25.47
Ce	79.31	18.86	22.32	52.83	22	17.85	26.92	57.54	51.33	57.61
Pr	9.7	2.6	3.1	6.52	2.41	2.4	3.66	7.16	6.21	7.09
Nd	38.96	11.84	12.85	26.94	10.8	10.69	15.7	31.7	27.46	30.83
Sm	8.33	3.38	3.31	6.1	3.11	2.94	3.84	7.49	6.48	7.22
Eu	2.31	1.22	1.18	1.93	1.01	1.07	1.3	2.41	2.01	2.3
Gd	7.49	3.43	3.68	6	2.95	3.06	3.99	8.07	6.65	7.14
Tb	1.08	0.56	0.62	0.86	0.45	0.47	0.66	1.28	1.04	1.15
Dy	6.34	3.4	3.9	5.38	2.75	2.93	3.86	7.14	5.78	6.61
Ho	1.26	0.66	0.71	1	0.49	0.57	0.71	1.34	1.06	1.2
Er	3.15	1.61	2.17	2.46	1.37	1.39	2.08	3.5	2.76	3.19
Tm	0.37	0.21	0.31	0.33	0.2	0.2	0.3	0.49	0.41	0.26
Yb	2.42	1.33	2	1.98	1.06	1.15	1.84	2.87	2.03	2.62
Lu	0.36	0.2	0.3	0.26	0.16	0.17	0.27	0.42	0.33	0.38
Y	32.16	17.11	17.74	26.74	13.53	14.72	18.86	36.58	28.83	33.78
Total REE	231.22	74.55	85.63	165.18	64.69	67.48	98.01	194.33	165.86	186.75
Nd（ppm）	39	11.8	12.85	26.9		10.7	15.7		31.7	27.46
Sm（ppm）	8.33	3.38	3.31	6.1		2.94	3.84		7.49	6.48
$^{147}Sm/^{144}Nd$	0.1291	0.1732	0.1557	0.1371		0.1661	0.1479		0.1429	0.1427
$^{143}Nd/^{144}Nd$	0.512748	0.512795	0.512776	0.512779		0.512963	0.512706		0.512923	0.512875
2a	5	0.8	0.9	1		0.7	1		0.7	1
Rb（ppm）	35.2	6.31	22	28.1		5.72	11.9		3	5.4
Sr（ppm）	225.2	438.4	263	435.3		437	578		554	386
$^{87}Rb/^{86}Sr$	0.452	0.042	0.242	0.186		0.038	0.06		0.02	0.028
$^{87}Sr/^{86}Sr$	0.706757	0.704209	0.704412	0.704076		0.704175	0.705863		0.70817	0.703828
2a	2	2	2	2		2	2		3	2
Sri	0.706609	0.704193	0.704301	0.70399		0.704158	0.705834		0.70816	0.703814
εNd	2.34	6.66	2.9	3		6.5	1.5		5.8	4.9
$^{206}Pb/^{204}Pb$		18.093		17.783		18.185	17.434			
$^{207}Pb/^{204}Pb$		15.518	15.476	15.489		15.607	15.43			
$^{208}Pb/^{204}Pb$		38.073	37.352	37.884		38.334	37.686			

Table 1 continued.

Sampling well	B5-2	B5-3	B5-4	B5-5	B28	M1	NP1	BS28-4	BS28-5	BS28-6	BS28-7
Depth (m)	4147.12	4147.4	4149.6	4213		4054	4045.6	4461	4451.65	4495.55	4511.22
Strata	Upper Shahejie Group							Lower Shahejie Group			
Volcanism	Volcanic Cycle 2							Volcanic Cycle 1			
SiO_2	48.34	47.74	50.32	48.4	40.24	46.62	45.96	48	49.7	47.04	47.07
TiO_2	1.99	2.31	1.88	1.95	3.25	2.41	2.43	1.39	2.38	2.3	2.85
Al_2O_3	16.54	15.42	15.48	16.34	19.42	15.39	15.05	16	13.84	15.5	15.32
Fe_2O_3	2.1	2.59	2.22	2.09	3.05	2.2	2.4	2.11	2.15	2.46	2.42
FeO	8.41	10.36	8.89	8.35	12.19	8.81	9.81	8.44	8.61	9.83	9.69
MnO	0.14	0.09	0.1	0.13	0.06	0.16	0.14	0.14	0.23	0.15	0.2
MgO	5.08	5.45	4.87	4.33	5.95	4.7	8.21	7.85	6.34	7.91	4.4
CaO	10.57	8.83	9.41	9.54	5.03	10.35	9.04	8.81	6.67	8.04	10.93
Na_2O	2.84	2.39	2.37	4.01	3.22	3.14	2.96	2.91	4.3	2.54	2.56
K_2O	0.75	0.44	0.53	0.59	0.03	1.45	1.2	0.42	1.31	0.6	0.7
P_2O_5	0.36	0.28	0.33	0.37	0.64	0.56	0.47	0.19	0.32	0.31	0.54
CO_2						0.58		0.23	0.37	0.17	
H_2O+	2.5	3.8	3.12	3.51	6.14	3.25	2.34	2.93	3.85	2.7	2.86
Total	99.62	99.7	99.52	99.61	99.22	99.62	100.01	99.42	100.07	99.55	99.54
Mg#	0.52	0.49	0.5	0.48	0.47	0.49	0.6	0.63	0.57	0.59	0.45
Q	0.00	2.55	6.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.70
C	0.00	0.00	0.00	0.00	6.96	0.00	0.00	0.00	0.00	0.00	0.00
Or	4.56	2.71	3.25	3.63	0.19	8.95	7.26	2.58	8.08	3.67	4.28
Ab	24.74	21.09	20.81	35.17	29.27	25.17	23.59	25.58	37.96	22.23	22.41
An	31.06	31.33	31.15	25.85	22.32	24.65	24.81	30.50	15.22	30.12	29.21
Ne	0.00	0.00	0.00	0.08	0.00	1.39	1.11	0.00	0.00	0.00	0.00
Di(FS)	7.15	4.73	5.64	7.98	0.00	9.18	5.03	3.80	5.14	2.63	9.18
Di(MS)	9.72	5.56	6.78	9.29	0.00	11.55	9.60	7.28	8.84	4.75	10.07
Hy(MS)	6.81	11.58	9.44	0.00	9.57	0.00	0.00	9.59	2.16	13.56	6.67
Hy(FS)	5.75	11.29	9.01	0.00	9.44	0.00	0.00	5.75	1.44	8.60	6.97
Ol(MS)	1.20	0.00	0.00	4.85	4.45	4.81	11.55	5.15	7.16	3.24	0.00
Ol(FS)	1.12	0.00	0.00	5.26	4.83	4.84	7.64	3.40	5.26	2.26	0.00
Mt	3.14	3.92	3.34	3.15	4.75	3.33	3.56	3.18	3.25	3.69	3.63
Il	3.89	4.58	3.70	3.85	6.63	4.78	4.73	2.74	4.72	4.52	5.60
Ap	0.86	0.68	0.79	0.89	1.59	1.36	1.11	0.46	0.77	0.74	1.30
cpx	16.87	10.29	12.42	17.27	0.00	20.73	14.63	11.09	13.98	7.37	19.24
opx	12.56	22.87	18.44	0.00	19.01	0.00	0.00	15.33	3.60	22.16	13.64
ol	2.32	0.00	0.00	10.11	9.28	9.65	19.20	8.55	12.43	5.50	0.00
In ppm											
Rb	7.5	6.7	5.9	7.8	1.2	28.3	19.5	5.4	20	8.2	6.6
Ba	575	557	381	506	143	431	1010.9	266	1459	196	357

Th	9.9	11.4	9.5	10.3	4.4	2.5	2.6	0.6	7.6	9.3	13.1
U											
Nb	17.8	16.4	17.1	21.1	43.3	41.6	36.2	10.9	17.2	16.7	26.7
Pb	0.681	0.615	0.478	0.743	0.456	0.731	0.847	1.026	0.877	0.534	0.345
Bb	6.81	6.15	4.78	7.43	4.56	7.31	8.47	10.26	8.77	5.34	3.45
Sr	636	539	534	450	117	554	740	538	318	422	482
Nd	19.3	14.1	15.9	17.9	20	27.15	24.25	10.28	19.04	17.61	27.74
Hf	4.1	3.2	3.3	4.2	4.31	4.5	3.91	2.8	5.9	8.1	5.1
Zr	156	131	147	178	182.4	187	157.9	86.4	155	136	208
La	16.59	12.06	12.51	15.51	22.8	27.22	22.73	7.91	14.02	13.57	22.05
Ce	35.33	25.73	27.46	32.9	36.8	51.19	47.63	16.13	23.21	30.11	47.75
Pr	4.66	3.57	3.92	4.58	4.81	6.55	5.86	2.35	4.07	3.88	6.09
Nd	19.32	14.11	15.87	17.88	20	27.2	24.3	10.3	19	17.6	27.7
Sm	4.77	3.57	4.01	4.29	6.07	5.77	5.64	2.62	4.76	4.47	6.62
Eu	1.67	1.21	1.35	1.52	1.88	1.9	1.82	1.1	1.64	1.59	2.17
Gd	5.12	3.69	4.13	4.43	6.08	5.4	5.34	2.88	5.19	4.69	6.79
Tb	0.82	0.57	0.65	0.68	0.9	0.81	0.79	0.46	0.83	0.74	1.05
Dy	4.84	3.45	3.88	4.11	4.85	4.73	4.86	2.73	4.09	4.24	5.96
Ho	0.89	0.65	0.74	0.76	1.07	0.84	0.94	0.49	0.89	0.77	1.05
Er	2.4	1.53	1.82	1.83	2.63	2.36	2.36	1.4	2.31	1.99	2.71
Tm	0.35	0.24	0.27	0.28	0.35	0.31	0.32	0.19	0.35	0.29	0.4
Yb	1.89	1.37	1.66	1.67	1.88	1.85	1.94	1.13	1.94	1.65	2.17
Lu	0.3	0.2	0.25	0.25	0.27	0.28	0.28	0.17	0.29	0.24	0.32
Y	25.18	16.77	19.48	20.46	21.3	22.01	24.84	13.2	24.35	20.93	28.89
Total REE	124.13	88.72	98	111.15	131.69	158.37	149.6	63.04	106.98	106.77	161.76
Nd（ppm）							24.3	10.28	19.04	17.61	27.74
Sm（ppm）							5.64	2.62	4.76	4.47	6.62
$^{147}Sm/^{144}Nd$							0.1403	0.1541	0.1512	0.1535	0.1443
$^{143}Nd/^{144}Nd$							0.512886	0.512967	0.512962	0.512973	0.512968
2a							2	2	2	2	2
Rb（ppm）							19.5	5.4	20	8.2	6.6
Sr（ppm）							739.84	538	318	422	482
$^{87}Rb/^{86}Sr$							0.076	0.029	0.182	0.056	0.04
$^{87}Sr/^{86}Sr$							0.705906	0.704552	0.704609	0.704591	0.704754
2a							2	2	2	2	2
Sri							0.705866	0.704541	0.704514	0.704562	0.704732
εNd							5.1	6.6	6.5	6.6	6.8
$^{206}Pb/^{204}Pb$								19.1877	17.9476	19.0419	18.146
$^{207}Pb/^{204}Pb$								15.6435	15.5381	15.6722	15.5229
$^{208}Pb/^{204}Pb$								38.3939	37.9773	38.6429	38.0212