

Fig. 1

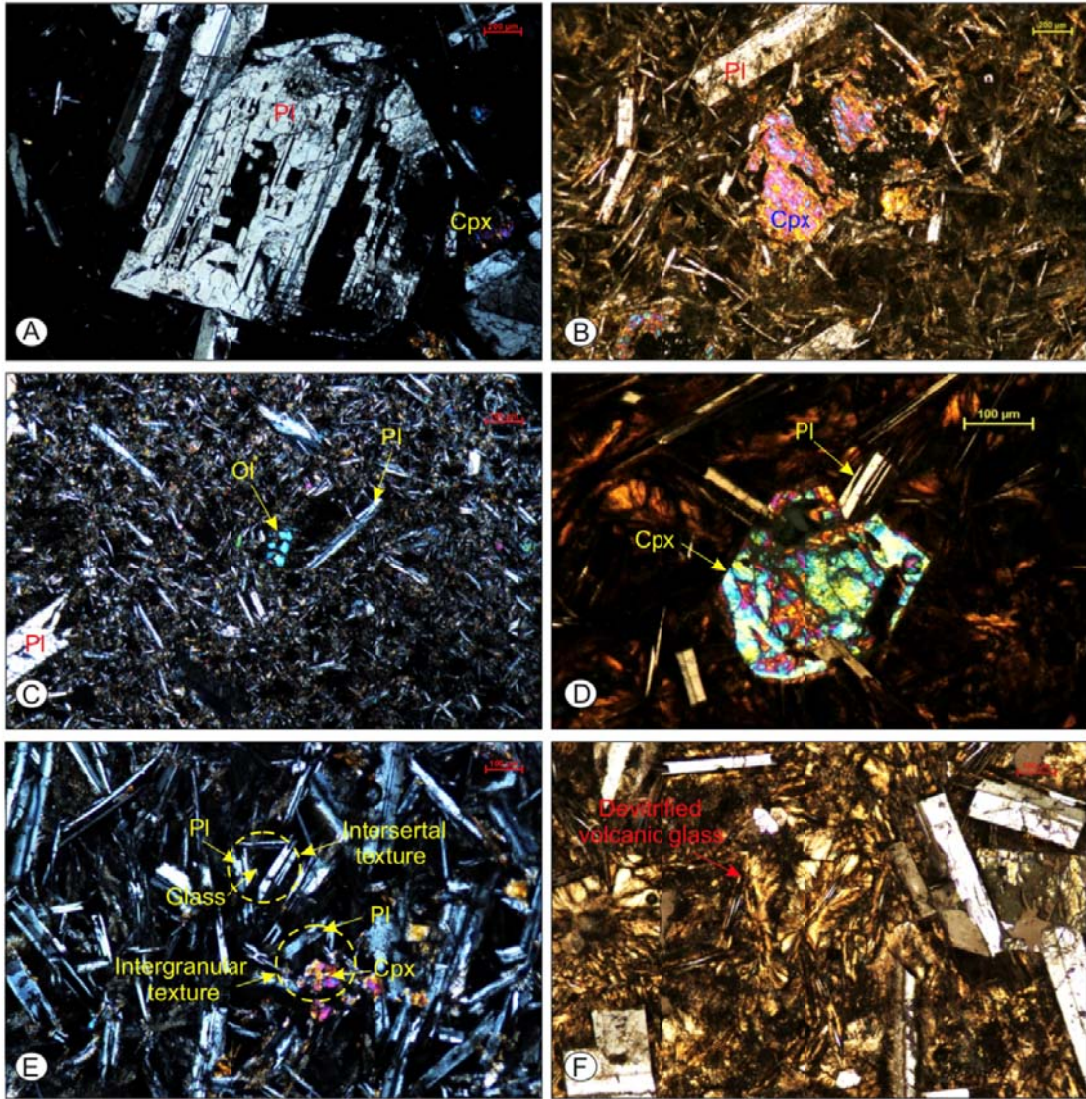
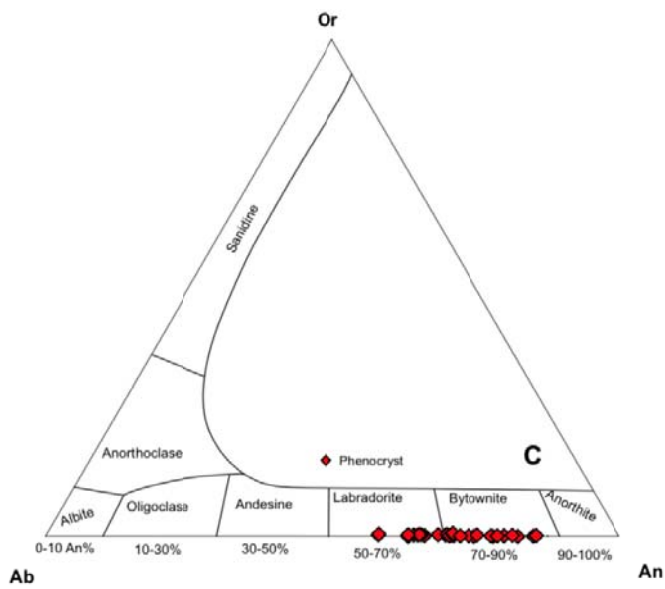
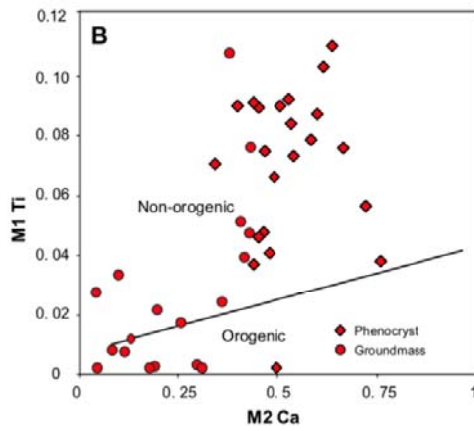
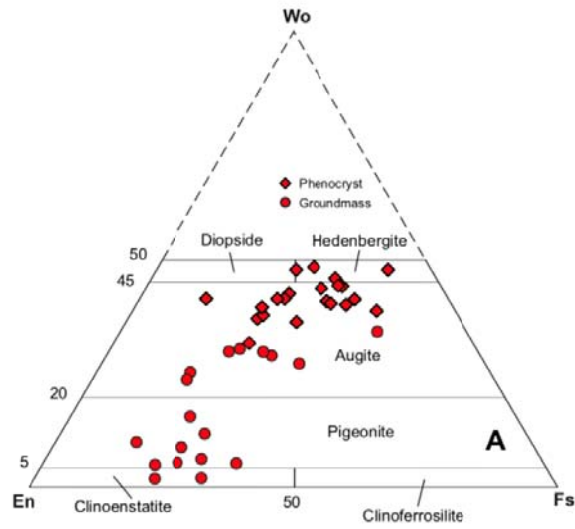
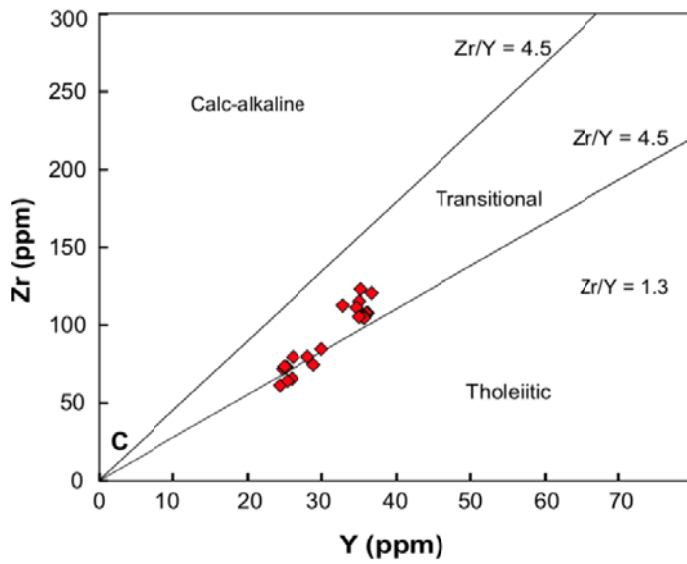
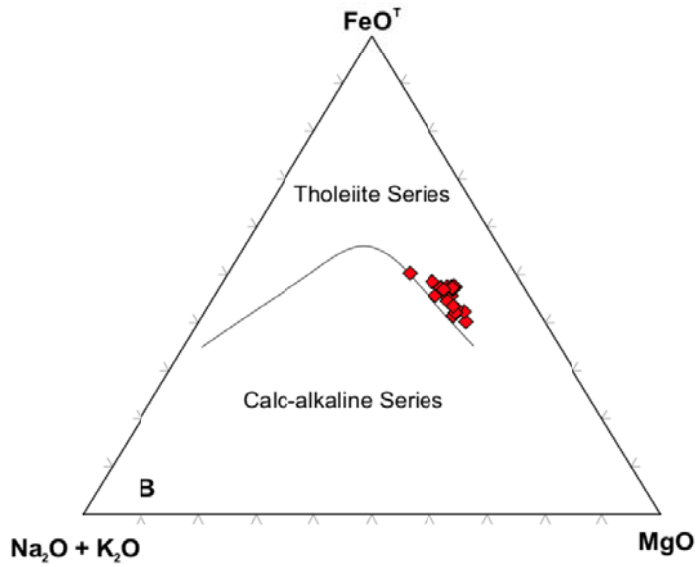
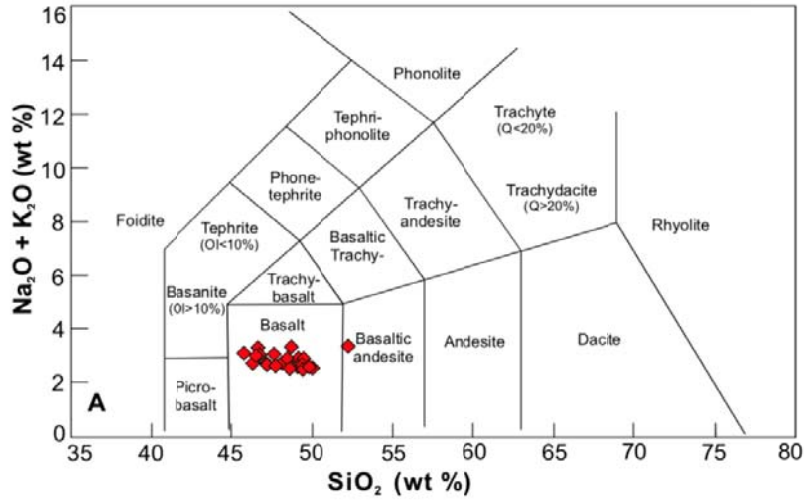


Fig. 2



**Fig. 3**



**Fig. 4**

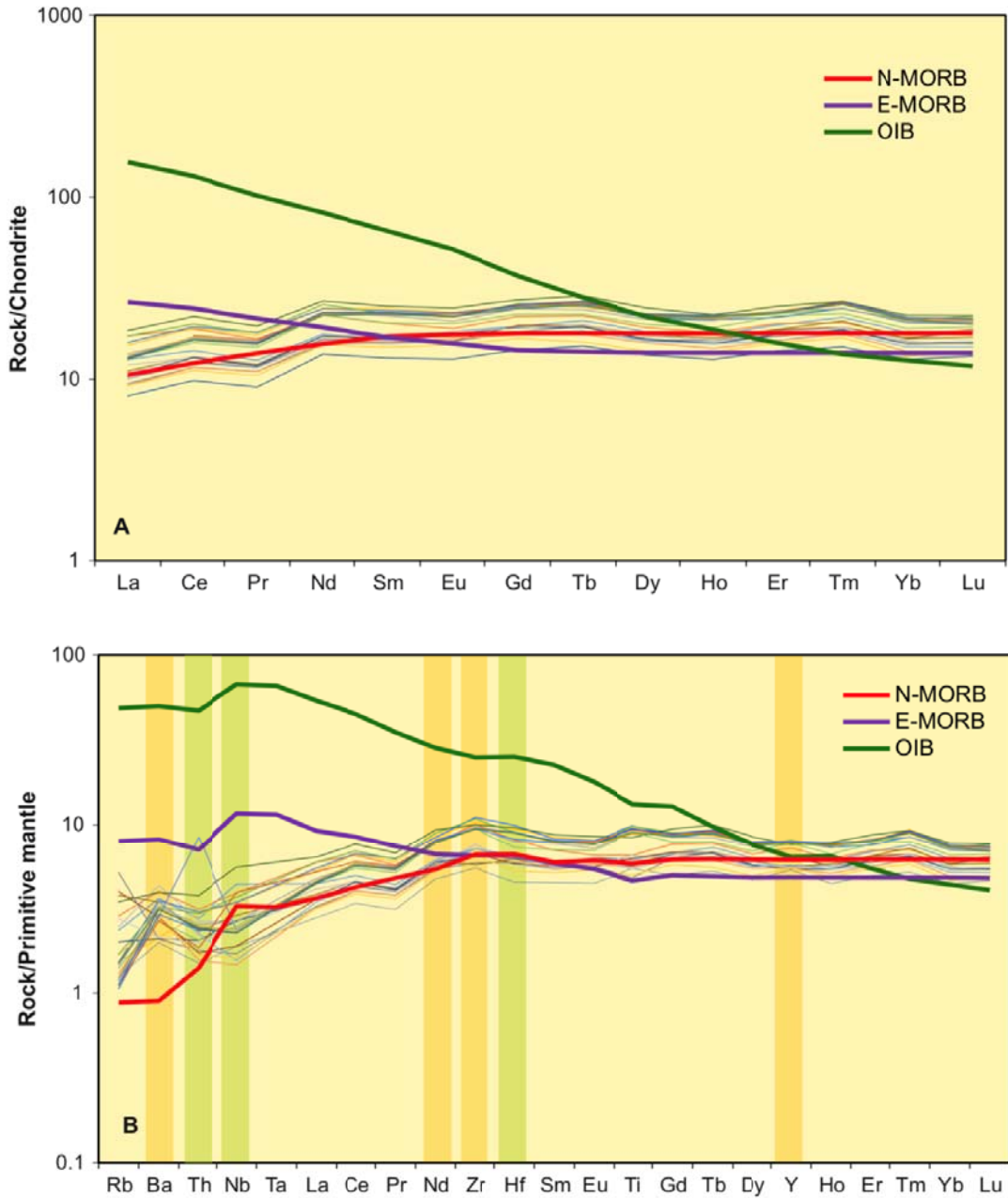
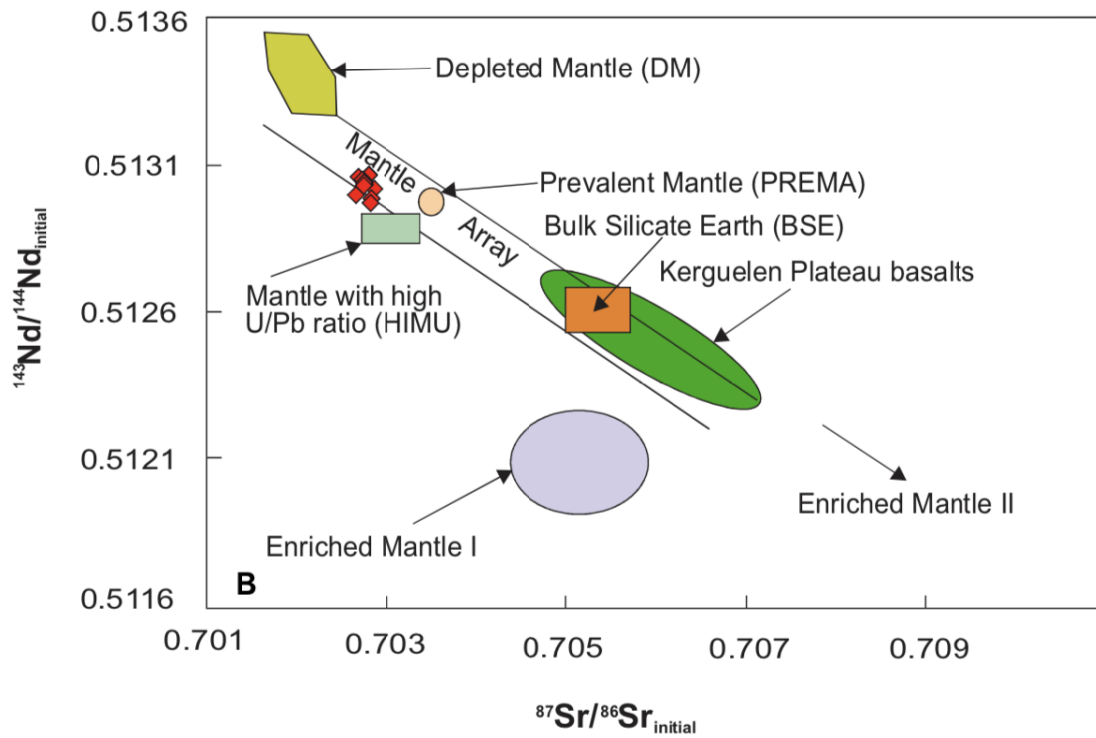
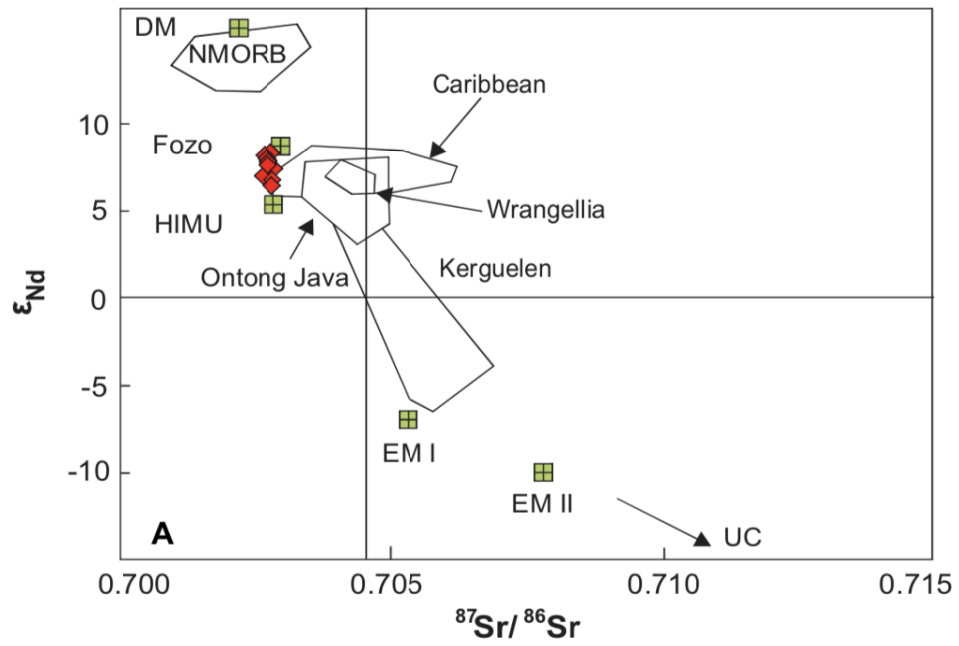
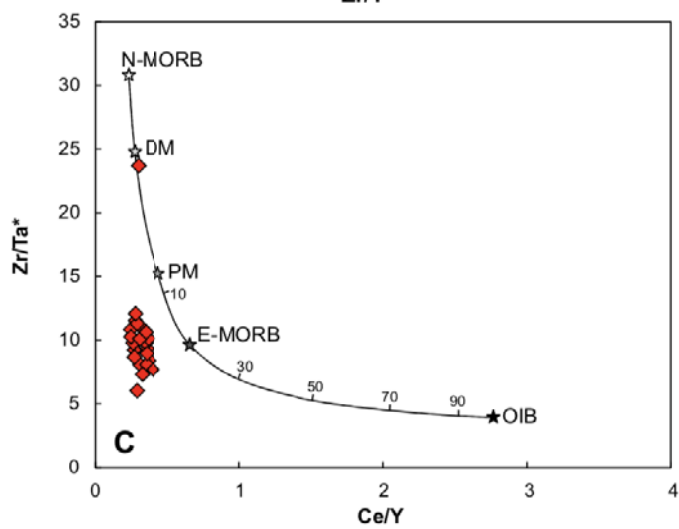
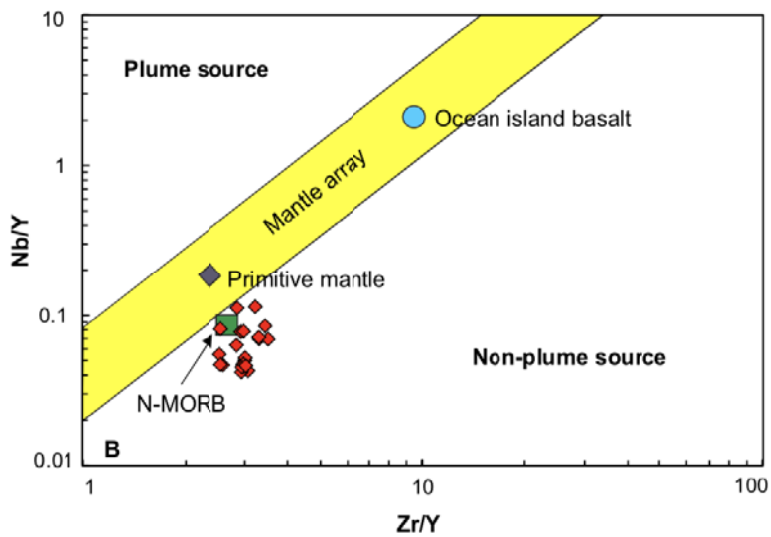
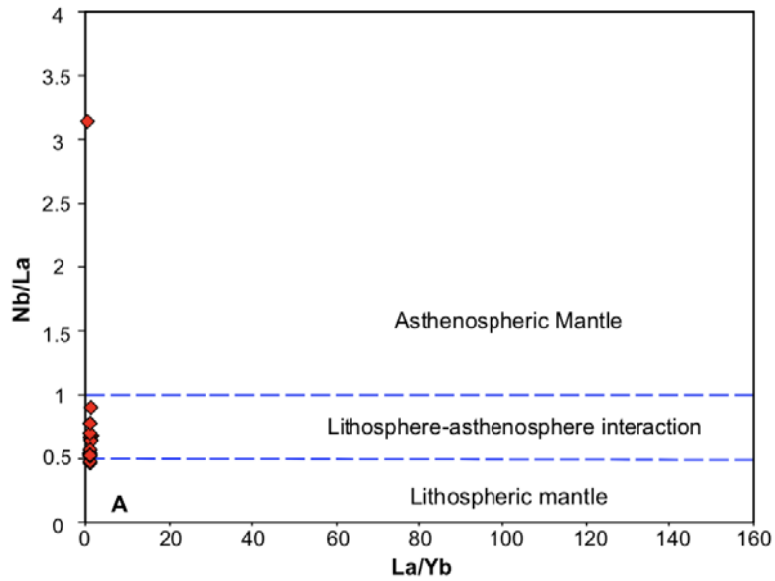


Fig. 5





**Fig. 6**



**Fig. 7**

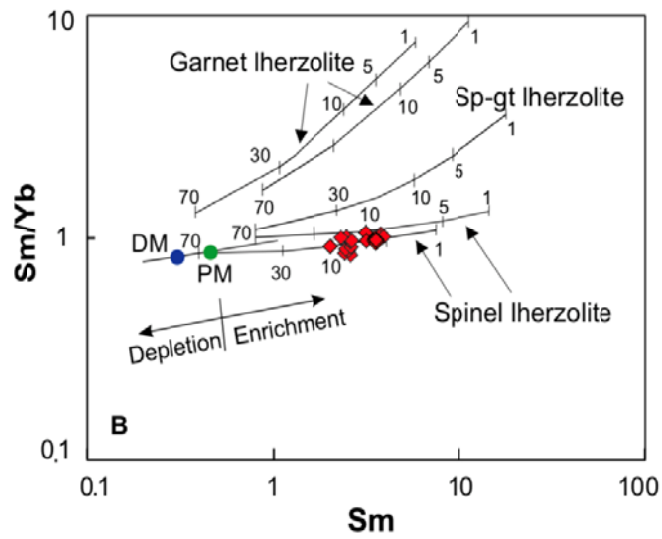
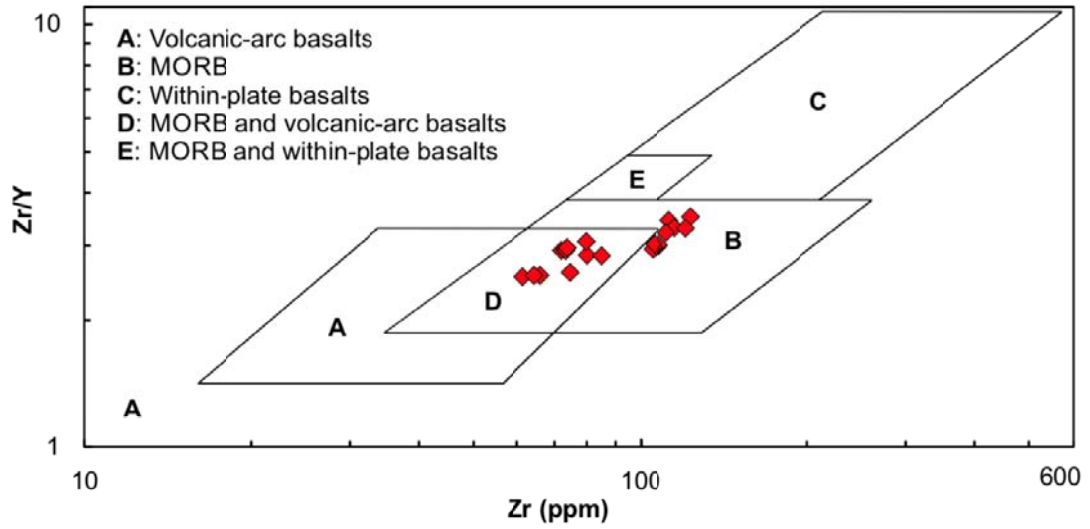


Fig. 8



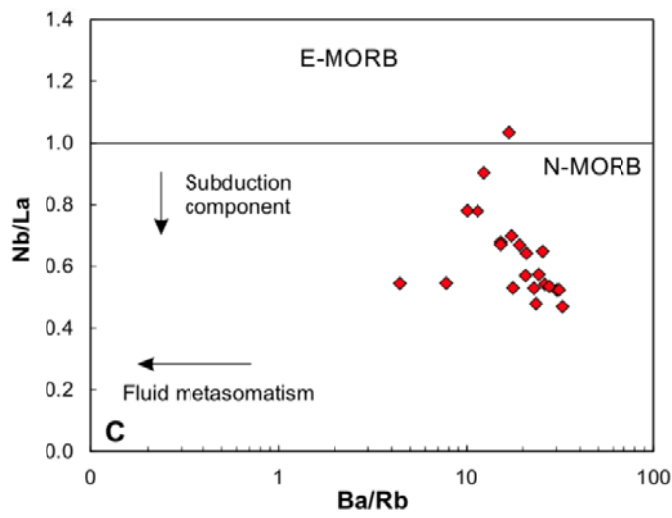
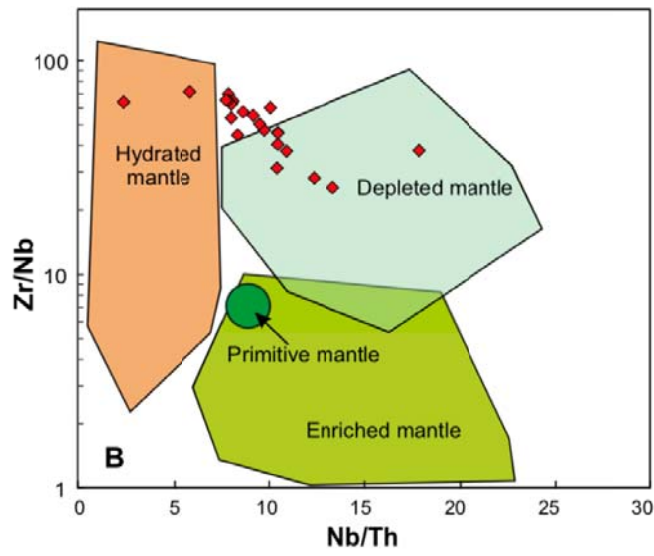
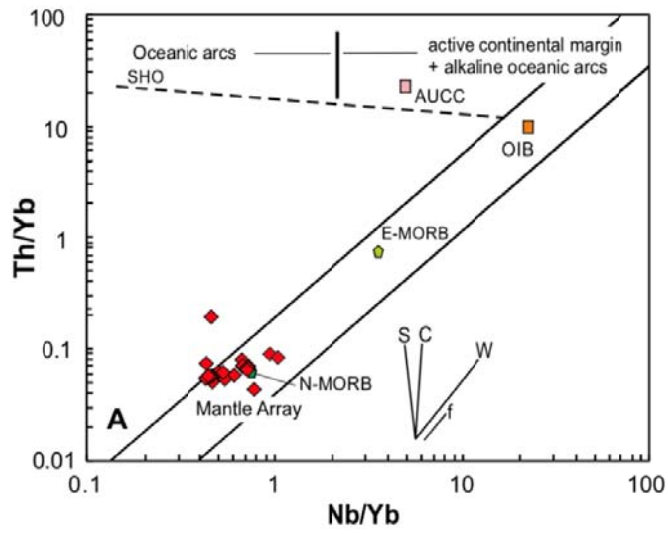
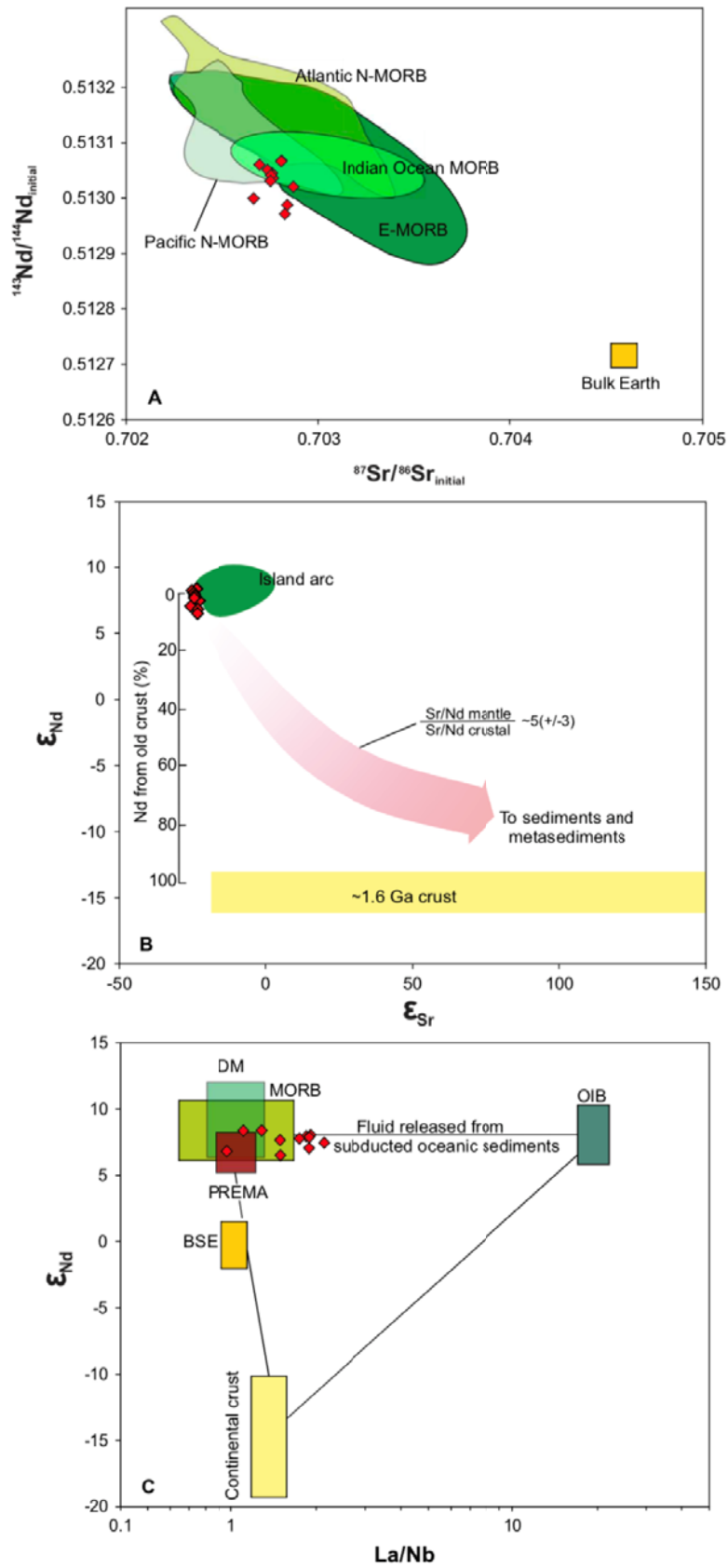


Fig. 9



**Fig. 10**

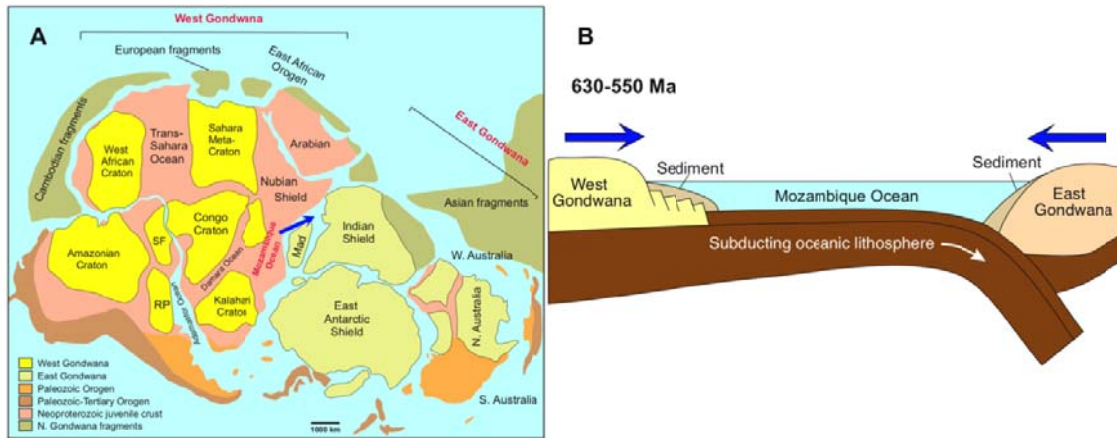


Fig. 11

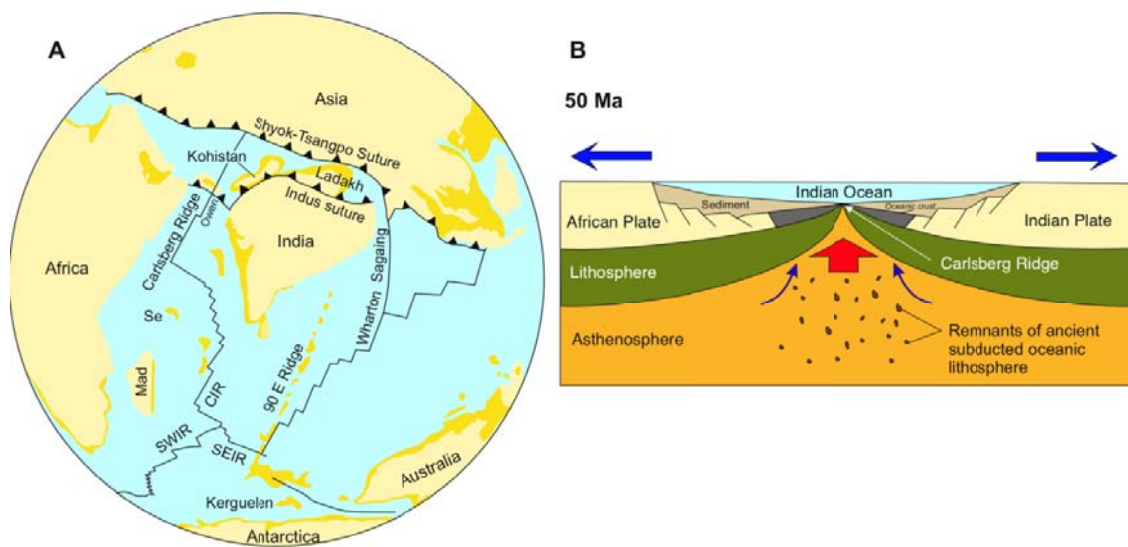


Fig. 12

**Table 1: Major and trace element composition of studied basalts from Carlsberg Ridge**

	SK 114/STN4/BB	SK 114/STN4/HPPB	SK114/STN4/MP <sup>2</sup> B	SK114/STN9/BB
<i>wt %</i>				
SiO <sub>2</sub>	47.14	49.03	49.09	49.11
TiO <sub>2</sub>	1.33	1.42	1.42	2.07
Al <sub>2</sub> O <sub>3</sub>	16.39	14.84	14.82	14.51
Fe <sub>2</sub> O <sub>3</sub>	11.29	10.25	10.24	11.03
MnO	0.16	0.16	0.16	0.16
MgO	8.58	7.97	7.98	8.00
CaO	11.77	11.69	11.66	11.23
Na <sub>2</sub> O	2.59	2.69	2.68	2.81
K <sub>2</sub> O	0.15	0.17	0.17	0.12
P <sub>2</sub> O <sub>5</sub>	0.07	0.09	0.09	0.11
LOI	0.53	1.69	1.69	0.85
<i>Total</i>	99.47	98.31	98.31	99.15
Mg#	39.58	40.13	40.19	38.47
<i>ppm</i>				
Sc	36.58	34.11	41.05	41.71
V	222.94	267.14	260.11	265.21
Cr	199.59	241.22	260.59	172.88
Co	94.49	123.77	91.76	131.01
Ni	60.44	77.47	116.33	86.43
Cu	58.98	72.63	91.23	66.64
Zn	82.14	91.53	82.10	87.84
Ga	10.28	9.26	9.33	10.88
Rb	1.49	1.82	1.57	0.97
Sr	138.14	160.48	138.15	127.13
Y	28.08	32.79	29.92	34.98
Zr	80.04	112.91	84.97	115.65
Nb	3.14	2.78	1.90	2.44
Cs	0.03	0.05	0.05	0.02
Ba	25.30	27.87	30.17	14.90
Hf	2.02	2.51	1.80	2.90
Ta	1.77	1.18	0.56	1.27
Pb	9.97	29.26	30.33	13.24
Th	0.24	0.27	0.23	0.25
U	0.14	0.11	0.09	0.10
La	3.04	4.10	2.84	3.64
Ce	8.80	11.57	8.06	11.71
Pr	1.21	1.58	1.12	1.66
Nd	8.28	10.50	7.65	11.47
Sm	2.57	3.11	2.39	3.74
Eu	1.07	1.10	0.94	1.35
Gd	4.01	4.54	3.70	5.18
Tb	0.79	0.83	0.69	0.95
Dy	4.64	4.88	4.14	5.80
Ho	0.99	1.03	0.91	1.24
Er	3.28	3.35	3.07	3.81
Tm	0.56	0.52	0.48	0.69
Yb	3.08	2.94	2.81	3.59
Lu	0.47	0.48	0.47	0.52
$\Sigma$ REE	42.77	50.52	39.26	55.34

**Table 1: Contd...**

	SK 114/STN4/BB	SK 114/STN4/HPPB	SK114/STN4/MPPB	SK114/STN9/BB
(La/Sm) <sub>CN</sub>	0.76	0.85	0.77	0.63
(Ce/Yb) <sub>CN</sub>	0.79	1.09	0.80	0.91
(Gd/Yb) <sub>CN</sub>	1.08	1.28	1.09	1.20
(Sm/Yb) <sub>CN</sub>	0.93	1.17	0.95	1.16
(Dy/Yb) <sub>CN</sub>	1.01	1.11	0.99	1.08
(Nb/La) <sub>PM</sub>	1.00	0.65	0.64	0.65
Ce/Ce*	1.13	1.11	1.11	1.17
Hf/Hf*	1.11	1.13	1.07	1.11
Dy/Dy*	1.12	1.11	1.09	1.19
Nb/Ta	1.77	2.37	3.37	1.93
Zr/Y	2.85	3.44	2.84	3.31
Nb/Y	0.11	0.08	0.06	0.07
Zr/Sm	31.16	36.35	35.54	30.94
Nb/La	1.03	0.68	0.67	0.67
Zr/Nb	25.47	40.59	44.82	47.40
Nb/Yb	1.02	0.95	0.67	0.68
Nb/Th	13.37	10.46	8.39	9.76
Zr/Nb	25.47	40.59	44.82	47.40
Zr/Hf	39.58	45.02	47.31	39.89
Th/Ce	0.03	0.02	0.03	0.02
Zr/Yb	26.01	38.38	30.25	32.26
La/Nb	0.97	1.47	1.50	1.49
Ba/Nb	107.65	104.76	133.50	59.61
Ba/Th	107.65	104.76	133.50	59.61
Rb/Nb	0.48	0.65	0.83	0.40
Th/Nb	0.07	0.10	0.12	0.10
Th/La	0.08	0.06	0.08	0.07
K/Nb	396.12	507.19	744.20	408.20
Ba/La	8.32	6.80	10.64	4.10
Th/Yb	0.08	0.09	0.08	0.07
Nd/Hf	4.09	4.19	4.26	3.96
Ce/Nb	2.80	4.16	4.25	4.80
Th/Nb	0.07	0.10	0.12	0.10

Normalization factors after Sun and McDonough (1989)

Table 1: Contd...

	SK114/STN9/TB	SK114/STN9SB	SK154/D11/1	SK154/D11/2	SK154/D11/3
<b>wt %</b>					
SiO <sub>2</sub>	49.41	49.54	49.44	49.98	52.25
TiO <sub>2</sub>	2.13	2.12	1.18	1.36	1.04
Al <sub>2</sub> O <sub>3</sub>	13.83	13.37	13.97	14.97	15.93
Fe <sub>2</sub> O <sub>3</sub>	11.16	11.15	9.77	9.85	10.44
MnO	0.16	0.17	0.15	0.15	0.15
MgO	8.42	8.26	10.05	7.93	5.82
CaO	11.32	11.19	10.94	12.11	9.64
Na <sub>2</sub> O	2.70	2.60	2.82	2.37	2.63
K <sub>2</sub> O	0.11	0.11	0.10	0.19	0.74
P <sub>2</sub> O <sub>5</sub>	0.11	0.11	0.09	0.10	0.09
LOI	0.65	1.38	1.49	0.99	1.27
<b>Total</b>	<b>99.35</b>	<b>98.62</b>	<b>98.51</b>	<b>99.01</b>	<b>98.73</b>
<b>Mg#</b>	<b>39.41</b>	<b>38.98</b>	<b>47.00</b>	<b>40.97</b>	<b>32.46</b>
<b>ppm</b>					
Sc	42.03	35.46	34.17	34.64	38.86
V	275.85	303.27	231.98	250.40	236.40
Cr	184.40	288.99	257.57	246.88	190.25
Co	162.49	113.24	34.86	38.39	36.19
Ni	87.29	84.97	77.74	64.83	62.24
Cu	65.70	69.52	59.69	70.96	56.91
Zn	91.85	99.63	62.66	77.42	66.34
Ga	11.50	9.13	7.53	8.44	10.46
Rb	0.97	1.08	0.80	2.53	3.29
Sr	128.67	131.53	103.26	115.78	116.12
Y	35.18	36.65	24.30	28.88	25.88
Zr	123.55	120.99	61.55	74.81	66.04
Nb	2.45	2.63	1.34	1.35	1.22
Cs	0.02	0.03	0.03	0.11	0.16
Ba	24.58	22.63	13.91	19.59	14.54
Hf	3.06	2.79	1.40	1.79	1.83
Ta	1.43	0.93	0.31	0.27	0.24
Pb	34.75	30.41	8.14	31.03	10.35
Th	0.26	0.25	0.13	0.15	0.15
U	0.10	0.09	0.12	0.16	0.20
La	3.77	4.09	1.92	2.48	2.24
Ce	11.91	12.32	6.03	7.64	7.13
Pr	1.72	1.71	0.86	1.10	1.05
Nd	11.37	12.04	6.41	7.76	7.29
Sm	3.64	3.50	2.00	2.52	2.43
Eu	1.35	1.28	0.75	0.94	0.93
Gd	5.17	5.34	2.97	4.05	3.75
Tb	1.00	0.96	0.57	0.74	0.73
Dy	5.76	5.56	3.44	4.38	4.14
Ho	1.26	1.21	0.73	0.93	0.93
Er	3.82	3.78	2.37	3.10	2.84
Tm	0.66	0.62	0.38	0.49	0.48
Yb	3.59	3.59	2.19	2.87	2.73
Lu	0.53	0.56	0.34	0.47	0.40
<b>ΣREE</b>	<b>55.54</b>	<b>56.55</b>	<b>30.95</b>	<b>39.46</b>	<b>37.07</b>



Table 1: Contd...

	SK114/STN9/TB	SK114/STN9SB	SK154/D11/1	SK154/D11/2	SK154/D11/3
(La/Sm) <sub>CN</sub>	0.67	0.75	0.62	0.64	0.60
(Ce/Yb) <sub>CN</sub>	0.92	0.95	0.77	0.74	0.72
(Gd/Yb) <sub>CN</sub>	1.19	1.23	1.12	1.17	1.13
(Sm/Yb) <sub>CN</sub>	1.13	1.08	1.02	0.97	0.99
(Dy/Yb) <sub>CN</sub>	1.08	1.04	1.05	1.02	1.01
(Nb/La) <sub>PM</sub>	0.62	0.62	0.67	0.53	0.53
Ce/Ce*	1.14	1.14	1.15	1.13	1.14
Hf/Hf*	1.20	1.11	0.99	1.02	1.08
Dy/Dy*	1.17	1.10	1.22	1.18	1.19
Nb/Ta	1.71	2.82	4.33	5.00	5.03
Zr/Y	3.51	3.30	2.53	2.59	2.55
Nb/Y	0.07	0.07	0.06	0.05	0.05
Zr/Sm	33.92	34.58	30.79	29.75	27.19
Nb/La	0.65	0.64	0.70	0.55	0.55
Zr/Nb	50.51	46.07	45.90	55.42	54.00
Nb/Yb	0.68	0.73	0.61	0.47	0.45
Nb/Th	9.52	10.46	10.48	9.18	8.05
Zr/Nb	50.51	46.07	45.90	55.42	54.00
Zr/Hf	40.32	43.40	43.99	41.70	36.16
Th/Ce	0.02	0.02	0.02	0.02	0.02
Zr/Yb	34.43	33.73	28.16	26.08	24.15
La/Nb	1.54	1.56	1.43	1.83	1.83
Ba/Nb	95.63	90.16	108.70	133.29	95.66
Ba/Th	95.63	90.16	108.70	133.29	95.66
Rb/Nb	0.40	0.41	0.60	1.87	2.69
Th/Nb	0.11	0.10	0.10	0.11	0.12
Th/La	0.07	0.06	0.07	0.06	0.07
K/Nb	373.26	347.68	618.94	1168.15	5022.08
Ba/La	6.51	5.54	7.25	7.92	6.48
Th/Yb	0.07	0.07	0.06	0.05	0.06
Nd/Hf	3.71	4.32	4.58	4.33	3.99
Ce/Nb	4.87	4.69	4.49	5.66	5.83
Th/Nb	0.11	0.10	0.10	0.11	0.12

Normalization factors after Sun and McDonough (1989)

Table 1: Contd...

	SK154/D11/5	SK154/D2/1	SK154/D2/2	SK154/D2/4
<i>wt %</i>				
SiO <sub>2</sub>	46.31	45.76	46.63	49.07
TiO <sub>2</sub>	1.27	1.22	1.82	1.18
Al <sub>2</sub> O <sub>3</sub>	18.48	17.72	16.56	15.28
Fe <sub>2</sub> O <sub>3</sub>	9.43	9.57	10.60	9.75
MnO	0.15	0.15	0.16	0.15
MgO	7.76	9.00	7.95	9.25
CaO	13.29	12.58	11.86	12.08
Na <sub>2</sub> O	2.53	2.96	3.10	2.54
K <sub>2</sub> O	0.21	0.15	0.22	0.07
P <sub>2</sub> O <sub>5</sub>	0.11	0.08	0.11	0.07
LOI	0.46	0.81	0.99	0.56
<b>Total</b>	99.54	99.19	99.01	99.44
<b>Mg#</b>	41.50	44.78	39.27	44.99
<i>ppm</i>				
Sc	31.51	33.96	38.39	39.81
V	241.96	217.29	289.12	236.12
Cr	169.70	275.80	220.60	255.40
Co	34.19	42.62	43.14	45.00
Ni	36.03	64.64	59.14	127.81
Cu	40.26	60.95	54.78	93.85
Zn	74.06	78.33	107.76	71.02
Ga	9.42	9.33	10.49	10.34
Rb	2.40	1.28	2.20	0.75
Sr	132.63	124.95	153.51	122.76
Y	25.26	24.66	34.64	26.04
Zr	64.45	72.09	111.71	79.85
Nb	2.06	1.91	3.97	1.12
Cs	0.09	0.16	0.09	0.03
Ba	24.11	14.63	27.45	24.36
Hf	1.91	1.93	2.96	1.97
Ta	0.48	0.46	0.89	0.18
Pb	7.46	14.22	31.17	65.53
Th	0.20	0.18	0.32	0.19
U	0.17	0.14	0.31	0.10
La	2.63	2.46	4.39	2.38
Ce	8.16	8.04	13.55	7.52
Pr	1.14	1.13	1.86	1.10
Nd	8.11	8.05	12.56	7.70
Sm	2.59	2.56	3.86	2.50
Eu	1.06	1.03	1.43	1.01
Gd	3.92	3.94	5.61	3.71
Tb	0.74	0.72	1.08	0.69
Dy	4.45	4.23	6.26	4.12
Ho	0.95	0.89	1.28	0.89
Er	3.11	2.91	4.17	2.70
Tm	0.53	0.48	0.68	0.46
Yb	2.84	2.66	3.81	2.56
Lu	0.43	0.40	0.57	0.38
<b>ΣREE</b>	40.67	39.50	61.11	37.72

**Table 1: Contd...**

	SK154/D11/5	SK154/D2/1	SK154/D2/2	SK154/D2/4
(La/Sm) <sub>CN</sub>	0.66	0.62	0.73	0.61
(Ce/Yb) <sub>CN</sub>	0.80	0.84	0.99	0.82
(Gd/Yb) <sub>CN</sub>	1.14	1.22	1.22	1.20
(Sm/Yb) <sub>CN</sub>	1.01	1.07	1.12	1.09
(Dy/Yb) <sub>CN</sub>	1.05	1.06	1.10	1.08
(Nb/La) <sub>PM</sub>	0.75	0.75	0.87	0.45
Ce/Ce*	1.15	1.18	1.16	1.14
Hf/Hf*	1.05	1.08	1.08	1.12
Dy/Dy*	1.19	1.21	1.17	1.22
Nb/Ta	4.25	4.16	4.46	6.10
Zr/Y	2.55	2.92	3.23	3.07
Nb/Y	0.08	0.08	0.11	0.04
Zr/Sm	24.91	28.17	28.95	31.92
Nb/La	0.78	0.78	0.90	0.47
Zr/Nb	31.36	37.71	28.15	71.49
Nb/Yb	0.72	0.72	1.04	0.44
Nb/Th	10.43	10.93	12.36	5.88
Zr/Nb	31.36	37.71	28.15	71.49
Zr/Hf	33.79	37.30	37.73	40.64
Th/Ce	0.02	0.02	0.02	0.03
Zr/Yb	22.67	27.06	29.30	31.24
La/Nb	1.28	1.28	1.11	2.13
Ba/Nb	122.41	83.61	85.52	128.22
Ba/Th	122.41	83.61	85.52	128.22
Rb/Nb	1.17	0.67	0.55	0.67
Th/Nb	0.10	0.09	0.08	0.17
Th/La	0.07	0.07	0.07	0.08
K/Nb	848.18	651.15	460.18	520.14
Ba/La	9.16	5.96	6.25	10.23
Th/Yb	0.07	0.07	0.08	0.07
Nd/Hf	4.25	4.17	4.24	3.92
Ce/Nb	3.97	4.21	3.41	6.74
Th/Nb	0.10	0.09	0.08	0.17

Normalization factors after Sun and McDonough (1989)

Table 1: Contd...

	SK154/D2/5	SK154/D2/6C	SK154/D2/6T	SK154/D3/1
<i>wt %</i>				
SiO <sub>2</sub>	48.09	48.42	49.35	47.19
TiO <sub>2</sub>	1.21	1.17	1.08	2.04
Al <sub>2</sub> O <sub>3</sub>	16.72	16.19	15.62	15.07
Fe <sub>2</sub> O <sub>3</sub>	9.66	9.67	9.31	11.49
MnO	0.15	0.15	0.15	0.16
MgO	8.68	8.93	8.14	8.89
CaO	12.40	12.09	11.90	11.93
Na <sub>2</sub> O	2.64	2.76	2.57	2.59
K <sub>2</sub> O	0.11	0.16	0.11	0.10
P <sub>2</sub> O <sub>5</sub>	0.07	0.07	0.06	0.12
LOI	0.27	0.39	1.71	0.42
<i>Total</i>	99.73	99.61	98.29	99.58
Mg#	43.65	44.33	42.98	40.01
<i>ppm</i>				
Sc	38.74	33.49	34.44	43.44
V	218.62	222.35	220.63	273.70
Cr	247.22	256.22	282.59	222.99
Co	43.40	42.39	42.87	46.45
Ni	124.13	62.56	118.15	115.24
Cu	87.76	62.50	92.72	71.21
Zn	69.08	81.26	73.40	88.31
Ga	9.68	9.30	7.86	11.01
Rb	0.84	1.75	1.06	0.76
Sr	121.95	121.32	122.60	109.34
Y	24.94	25.13	24.87	36.16
Zr	73.20	73.49	73.81	108.18
Nb	1.05	-	1.16	1.69
Cs	0.02	0.07	0.03	0.03
Ba	19.61	14.91	18.92	19.82
Hf	1.90	2.01	1.64	2.78
Ta	0.15	0.50	0.25	0.25
Pb	8.86	7.34	32.72	15.55
Th	0.13	0.17	0.14	0.72
U	0.08	0.10	0.12	0.07
La	2.19	2.57	2.18	3.11
Ce	7.10	8.18	6.85	10.41
Pr	1.05	1.16	1.00	1.52
Nd	7.54	8.18	7.22	10.88
Sm	2.44	2.62	2.29	3.56
Eu	0.97	1.07	0.90	1.32
Gd	3.59	3.91	3.44	5.13
Tb	0.66	0.75	0.60	0.97
Dy	4.02	4.39	3.63	5.79
Ho	0.84	0.93	0.80	1.27
Er	2.69	2.94	2.61	3.82
Tm	0.45	0.49	0.43	0.67
Yb	2.42	2.69	2.28	3.64
Lu	0.36	0.41	0.36	0.51
$\Sigma$ REE	36.31	40.28	34.59	52.61

Table 1: Contd...

	SK154/D2/5	SK154/D2/6C	SK154/D2/6T	SK154/D3/1
(La/Sm) <sub>CN</sub>	0.58	0.63	0.62	0.56
(Ce/Yb) <sub>CN</sub>	0.82	0.84	0.83	0.79
(Gd/Yb) <sub>CN</sub>	1.23	1.20	1.25	1.17
(Sm/Yb) <sub>CN</sub>	1.12	1.08	1.11	1.09
(Dy/Yb) <sub>CN</sub>	1.11	1.09	1.06	1.07
(Nb/La) <sub>PM</sub>	0.46	-	0.51	0.52
Ce/Ce*	1.14	1.16	1.14	1.17
Hf/Hf*	1.11	1.10	1.02	1.12
Dy/Dy*	1.27	1.23	1.20	1.24
Nb/Ta	6.82	-	4.68	6.70
Zr/Y	2.93	2.92	2.97	2.99
Nb/Y	0.04	-	0.05	0.05
Zr/Sm	29.97	28.10	32.27	30.42
Nb/La	0.48	-	0.53	0.54
Zr/Nb	69.71	-	63.79	64.05
Nb/Yb	0.43	-	0.51	0.46
Nb/Th	7.89	-	8.09	2.36
Zr/Nb	69.71	-	63.79	64.05
Zr/Hf	38.50	36.58	45.11	38.98
Th/Ce	0.02	0.02	0.02	0.07
Zr/Yb	30.28	27.30	32.34	29.74
La/Nb	2.09	-	1.89	1.84
Ba/Nb	147.46	89.30	132.30	27.72
Ba/Th	147.46	89.30	132.30	27.72
Rb/Nb	0.80	-	0.92	0.45
Th/Nb	0.13	-	0.12	0.42
Th/La	0.06	0.06	0.07	0.23
K/Nb	869.52	-	789.11	491.42
Ba/La	8.95	5.80	8.67	6.37
Th/Yb	0.06	0.06	0.06	0.20
Nd/Hf	3.96	4.07	4.41	3.92
Ce/Nb	6.76	-	5.92	6.16
Th/Nb	0.13	-	0.12	0.42

Normalization factors after Sun and McDonough (1989)

Table 1: Contd...

	SK154/D3/11	SK154/D3/2	SK154/D3/3	SK154/D3/4
<i>wt %</i>				
SiO <sub>2</sub>	49.39	48.58	47.72	46.71
TiO <sub>2</sub>	1.95	2.06	2.02	1.97
Al <sub>2</sub> O <sub>3</sub>	13.17	14.04	14.79	15.92
Fe <sub>2</sub> O <sub>3</sub>	11.43	11.52	11.45	11.31
MnO	0.16	0.16	0.16	0.16
MgO	8.78	8.74	8.64	8.22
CaO	11.24	11.76	11.79	11.65
Na <sub>2</sub> O	2.43	2.45	2.54	2.94
K <sub>2</sub> O	0.08	0.09	0.10	0.12
P <sub>2</sub> O <sub>5</sub>	0.10	0.11	0.12	0.12
LOI	1.27	0.49	0.67	0.88
<i>Total</i>	98.73	99.51	99.33	99.12
Mg#	39.84	39.54	39.42	38.52
<i>ppm</i>				
Sc	37.72	41.38	42.51	34.92
V	307.65	278.49	272.95	281.05
Cr	264.63	182.83	217.81	246.98
Co	45.15	44.76	45.13	44.70
Ni	107.68	113.36	102.22	107.23
Cu	74.84	77.71	67.29	75.19
Zn	92.64	91.27	91.94	98.21
Ga	8.83	11.19	8.83	8.88
Rb	0.90	0.68	0.71	0.93
Sr	107.67	114.00	114.09	110.66
Y	35.32	35.66	35.85	35.93
Zr	106.18	106.27	106.73	108.27
Nb	1.76	1.63	2.81	1.88
Cs	0.03	0.02	0.01	0.03
Ba	18.55	20.39	18.75	22.55
Hf	2.25	2.53	2.77	2.44
Ta	0.37	0.25	0.92	0.33
Pb	32.98	10.79	8.39	32.09
Th	0.18	0.20	0.16	0.22
U	0.07	0.08	0.07	0.10
La	3.09	3.12	0.89	3.28
Ce	9.72	10.16	10.66	10.05
Pr	1.42	1.50	1.56	1.47
Nd	10.54	10.48	10.82	10.77
Sm	3.13	3.46	3.49	3.42
Eu	1.17	1.28	1.32	1.21
Gd	4.68	5.02	5.22	5.01
Tb	0.85	0.95	0.99	0.90
Dy	5.08	5.54	5.67	5.41
Ho	1.09	1.20	1.23	1.19
Er	3.67	3.62	3.92	3.93
Tm	0.59	0.63	0.66	0.63
Yb	3.23	3.48	3.60	3.51
Lu	0.49	0.51	0.53	0.53
$\Sigma$ REE	48.74	50.95	50.56	51.30



Table 1: Contd...

	SK154/D3/11	SK154/D3/2	SK154/D3/3	SK154/D3/4
(La/Sm) <sub>CN</sub>	0.64	0.58	0.17	0.62
(Ce/Yb) <sub>CN</sub>	0.84	0.81	0.82	0.80
(Gd/Yb) <sub>CN</sub>	1.20	1.19	1.20	1.18
(Sm/Yb) <sub>CN</sub>	1.08	1.10	1.08	1.08
(Dy/Yb) <sub>CN</sub>	1.05	1.07	1.06	1.03
(Nb/La) <sub>PM</sub>	0.55	0.50	3.03	0.55
Ce/Ce*	1.13	1.15	1.73	1.12
Hf/Hf*	1.01	1.05	1.14	1.02
Dy/Dy*	1.18	1.22	1.80	1.17
Nb/Ta	4.82	6.61	3.04	5.68
Zr/Y	3.01	2.98	2.98	3.01
Nb/Y	0.05	0.05	0.08	0.05
Zr/Sm	33.96	30.75	30.63	31.70
Nb/La	0.57	0.52	3.14	0.57
Zr/Nb	60.19	65.08	38.02	57.59
Nb/Yb	0.55	0.47	0.78	0.54
Nb/Th	10.08	8.12	17.88	8.66
Zr/Nb	60.19	65.08	38.02	57.59
Zr/Hf	47.11	42.04	38.55	44.37
Th/Ce	0.02	0.02	0.01	0.02
Zr/Yb	32.87	30.57	29.68	30.85
La/Nb	1.75	1.91	0.32	1.74
Ba/Nb	105.98	101.45	119.45	103.91
Ba/Th	105.98	101.45	119.45	103.91
Rb/Nb	0.51	0.41	0.25	0.49
Th/Nb	0.10	0.12	0.06	0.12
Th/La	0.06	0.06	0.18	0.07
K/Nb	376.42	457.44	295.69	529.79
Ba/La	6.00	6.54	21.00	6.88
Th/Yb	0.05	0.06	0.04	0.06
Nd/Hf	4.67	4.15	3.91	4.41
Ce/Nb	5.51	6.22	3.80	5.35
Th/Nb	0.10	0.12	0.06	0.12

Normalization factors after Sun and McDonough (1989)

**Table 1: Contd...**

	SK154/D3/7	SK154/D3/8	SK154/D3/9
<i>wt %</i>			
SiO <sub>2</sub>	49.78	46.52	47.62
TiO <sub>2</sub>	1.91	2.04	1.96
Al <sub>2</sub> O <sub>3</sub>	13.30	15.72	16.62
Fe <sub>2</sub> O <sub>3</sub>	11.28	11.43	11.10
MnO	0.16	0.16	0.16
MgO	8.61	8.50	7.41
CaO	10.98	11.82	11.61
Na <sub>2</sub> O	2.51	2.89	2.92
K <sub>2</sub> O	0.09	0.13	0.16
P <sub>2</sub> O <sub>5</sub>	0.10	0.12	0.13
LOI	1.28	0.67	0.31
<b>Total</b>	98.72	99.33	99.69
<b>Mg#</b>	39.69	39.07	36.53
<i>ppm</i>			
Sc	42.80	45.53	43.68
V	278.60	283.28	271.37
Cr	354.11	227.43	224.97
Co	45.40	45.56	44.74
Ni	112.50	111.87	111.71
Cu	73.70	70.70	74.17
Zn	90.51	87.18	94.09
Ga	11.36	11.45	10.95
Rb	0.79	0.71	0.96
Sr	110.10	109.32	107.75
Y	35.70	35.67	34.96
Zr	106.10	105.02	105.78
Nb	1.70	1.61	1.62
Cs	0.03	0.02	0.02
Ba	21.76	22.03	21.97
Hf	2.75	2.77	2.76
Ta	0.23	0.24	0.29
Pb	16.94	7.69	22.09
Th	0.21	0.20	0.21
U	0.07	0.08	0.22
La	3.17	3.08	3.05
Ce	10.41	10.06	10.07
Pr	1.50	1.51	1.49
Nd	10.63	10.86	10.50
Sm	3.50	3.56	3.52
Eu	1.28	1.29	1.28
Gd	5.29	5.27	5.06
Tb	0.93	1.00	0.96
Dy	5.75	5.78	5.58
Ho	1.25	1.26	1.25
Er	3.81	3.82	3.84
Tm	0.68	0.68	0.66
Yb	3.69	3.71	3.61
Lu	0.54	0.55	0.51
<b>ΣREE</b>	52.42	52.42	51.37

**Table 1: Contd...**

	SK154/D3/7	SK154/D3/8	SK154/D3/9
(La/Sm) <sub>CN</sub>	0.59	0.56	0.56
(Ce/Yb) <sub>CN</sub>	0.78	0.75	0.78
(Gd/Yb) <sub>CN</sub>	1.19	1.18	1.16
(Sm/Yb) <sub>CN</sub>	1.05	1.07	1.08
(Dy/Yb) <sub>CN</sub>	1.04	1.04	1.03
(Nb/La) <sub>PM</sub>	0.52	0.51	0.51
Ce/Ce*	1.17	1.14	1.15
Hf/Hf*	1.13	1.12	1.13
Dy/Dy*	1.21	1.22	1.21
Nb/Ta	7.26	6.69	5.60
Zr/Y	2.97	2.94	3.03
Nb/Y	0.05	0.05	0.05
Zr/Sm	30.35	29.49	30.09
Nb/La	0.53	0.52	0.53
Zr/Nb	62.49	65.11	65.38
Nb/Yb	0.46	0.44	0.45
Nb/Th	8.05	7.91	7.78
Zr/Nb	62.49	65.11	65.38
Zr/Hf	38.57	37.87	38.40
Th/Ce	0.02	0.02	0.02
Zr/Yb	28.75	28.34	29.33
La/Nb	1.87	1.91	1.89
Ba/Nb	103.13	108.00	105.64
Ba/Th	103.13	108.00	105.64
Rb/Nb	0.47	0.44	0.59
Th/Nb	0.12	0.13	0.13
Th/La	0.07	0.07	0.07
K/Nb	439.93	668.94	820.77
Ba/La	6.86	7.16	7.19
Th/Yb	0.06	0.06	0.06
Nd/Hf	3.86	3.92	3.81
Ce/Nb	6.13	6.24	6.22
Th/Nb	0.12	0.13	0.13

Normalization factors after Sun and McDonough (1989)

**Table 2** Sr and Nd isotopic compositions in studied samples from Carlsberg Ridge  
Rb-Sr compositions

Sample	Rock type	Rb (ppm)	Sr (ppm)	<sup>87</sup> Sr/ <sup>86</sup> Sr	2σ	<sup>87</sup> Rb/ <sup>86</sup> Sr	ε <sub>Sr</sub>
SK114/STN4/BB	Basalts	1.49	138.14	0.702841	0.000009	0.228101	-23.55
SK114/STN9/BB	Basalts	0.97	127.13	0.702755	0.000010	0.219575	-24.77
SK114/STN4/MPPB	Basalts	1.57	138.15	0.702830	0.000014	0.229656	-23.71
SK154 D2/1	Basalts	1.28	124.95	0.702812	0.000019	0.226633	-23.96
SK154 D2/2	Basalts	2.20	153.51	0.702811	0.000002	0.237643	-23.98
SK154/D2/4	Basalts	0.75	122.76	0.702872	0.000012	0.215512	-23.10
SK154 D2/6T	Basalts	1.06	122.60	0.702668	0.000011	0.222287	-26.01
SK154 D2/6C	Basalts	1.75	121.32	0.702699	0.000010	0.237863	-25.57
SK154 D3/1	Basalts	0.76	109.34	0.702762	0.000010	0.217747	-24.68
SK154 D3/2	Basalts	0.68	114.00	0.702739	0.000020	0.215085	-24.99
SK154 D3/4	Basalts	0.93	110.66	0.702768	0.000012	0.221664	-24.58
SK154 D3/9	Basalts	0.96	107.75	0.702758	0.000011	0.223022	-24.73

Sm-Nd compositions

Sample	Rock type	Sm (ppm)	Nd (ppm)	<sup>143</sup> Nd/ <sup>144</sup> Nd	2σ	<sup>147</sup> Sm/ <sup>144</sup> Nd	ε <sub>Nd</sub>
SK114/STN4/BB	Basalts	3.52	10.50	0.512988	0.000007	0.251293	6.82
SK114/STN9/BB	Basalts	2.57	8.28	0.513031	0.000006	0.238091	7.66
SK114/STN4/MPPB	Basalts	2.39	7.65	0.512972	0.000006	0.239162	6.51
SK154 D2/1	Basalts	2.57	8.28	0.513068	0.000006	0.238096	8.39
SK154 D2/2	Basalts	2.56	8.65	0.513067	0.000006	0.242149	8.36
SK154/D2/4	Basalts	3.86	12.56	0.513021	0.000005	0.236462	7.46
SK154 D2/6T	Basalts	2.50	7.70	0.513000	0.000005	0.245681	7.05
SK154 D2/6C	Basalts	2.29	7.22	0.513060	0.000007	0.241703	8.24
SK154 D3/1	Basalts	2.62	8.18	0.513045	0.000006	0.243358	7.95
SK154 D3/2	Basalts	3.56	10.88	0.513051	0.000007	0.247033	8.06
SK154 D3/4	Basalts	3.46	10.48	0.513036	0.000005	0.248597	7.77
SK154 D3/9	Basalts	3.42	10.77	0.513042	0.000004	0.241899	7.87

Initial Sr and Nd isotopic ratios along with epsilon values were calculated assuming an emplacement age of 0 Ma for South West Indian Ridge (SWIR) (after Mahoney et al., 1998). Epsilon values are calculated using present-day ratios of <sup>87</sup>Sr/<sup>86</sup>Sr=0.7045 (DePaolo, 1988) and <sup>87</sup>Rb/<sup>86</sup>Sr=0.0827 (DePaolo, 1988) for Bulk Silicate Earth (BSE); <sup>143</sup>Nd/<sup>144</sup>Nd=0.512638 (Goldstein et al., 1984) and <sup>147</sup>Sm/<sup>144</sup>Nd = 0.1967 (Jacobsen and Wasserburg, 1980) for Chondritic Uniform Reservoir (CHUR).

**Table 3** Critical trace element ratios for Carlsberg Ridge rocks with N-MORB, E-MORB and OIB

	Studied rock	N-MORB	E-MORB	OIB
	(Range) Average			
Zr/Nb	(25.5 - 71.5) 51.75	31.76	8.80	5.83
Th/Nb	(0.1 - 0.2) 0.12	0.05	0.07	0.08
Nb/U	(6.1 - 21.8) 11.83	49.57	46.11	47.06
Ba/Nb	(27.7-133.5) 103.88	2.70	6.87	7.29
Ba/Th	(59.6 - 147.5) 103.88	52.50	95.00	87.50
Ba/La	(4.1 - 10.6) 7.77	2.52	9.05	9.46
La/Nb	(0.32-2.13) 1.59	1.07	-	0.77

N-MORB, E-MORB and OIB data have been taken from Sun and McDonough (1989)