

A unique magmatic suite among EM oceanic suites

A. Yu. Borisova

Vernadsky Institute of Geochemistry, Kosygin str., 19, Moscow,
117975, Russia

B. V. Belyatsky

Institute of Precambrian Geology and Geochronology, Makarova
emb., 2, St. Petersburg, 119034, Russia

Until now it has been described EM-1 magmas displaying Nb/U ratios very close to those of average MORB (Hofmann, 1997) in contrast with EM-2 magmas which usually show Pb maximum and Nb minimum of mantle-normalized patterns and have low Nb/U and Ce/Pb ratios confirming the inference that EM-2 contain recycled material of continental origin (Hofmann, 1997).

Olivine-phyric suite of the Afanasij Nikitin rise, Indian Ocean

The parental melt of the olivine-phyric suite of the Afanasij Nikitin rise evidences both EM-1 isotope composition and Pb maximum and Nb minimum of mantle-normalized pattern, high La/Nb = 1.7, La/Ta = 32, La/Th = 17 ratios and low Nb/U = 30, Ce/Pb = 14 ratios (Borisova, 1997) in contrast with Nb/U = 47 and Ce/Pb = 25 ratios which are typical for MORB and OIB.

Genesis of anomalous tholeiitic suites of Cretaceous Indian Ocean plateaux

Figure 1 illustrates composition of basalts of tholeiitic suites of the Afanasij Nikitin Rise (Borisova, 1997), the Kerguelen Plateau (Alibert, 1991; Salters *et al.*, 1992), the Naturaliste Plateau (Mahoney *et al.*, 1995) and the Broken Ridge (Mahoney *et al.*, 1995) having EM isotope compositions and erupted from 115 to 75 My ago close to rifting continental margins. These data points obviously form two different trends suggesting various compositions of continental material involved in magmas generation of these basalts. The first trend determined by the points of olivine-phyric basalts of the Afanasij Nikitin Rise is characterized by strong decrease of $^{206}\text{Pb}/^{204}\text{Pb}$ ratio and increase of La/Nb, La/Ta, $^{87}\text{Sr}/^{86}\text{Sr}$, La/Th, ratios evidencing contamination process of mantle-derived magmas by lower continental crust

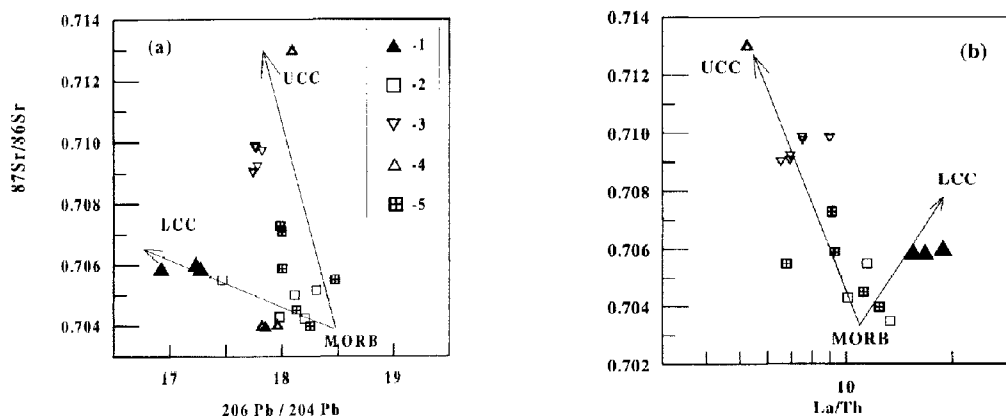


FIG. 1. Composition of basalts of tholeiitic suites of the olivine-phyric suite of the Afanasij Nikitin Rise (1), the Kerguelen ([2-sites 748-750]; [3-site 738]) and the Naturaliste Plateaus (4) and the Broken Ridge (5); It is shown trends of MORB melts contaminated by: LCC-lower continental crust, UCC - upper continental crust.

(Borisova, 1997). The data points of the Kerguelen (site 738) and the Naturaliste Plateaus basalts and those of the Broken Ridge lye on the trend of La/Ta, La/Nb, $^{87}\text{Sr}/^{86}\text{Sr}$ ratios increase, and decrease of La/Th ratio. The lack of Th depletion for these magmas indicates the contamination of mantle-derived magmas by another continental material than the lower continental crust. Indeed, isotope features of basalts suggest that the Kerguelen (738 site), the Naturaliste Plateaus and the Broken Ridge magmas were contaminated by material with higher $^{206}\text{Pb}/^{204}\text{Pb}$, $^{208}\text{Pb}/^{204}\text{Pb}$, $^{207}\text{Pb}/^{204}\text{Pb}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ isotope ratios which are intermediate between EM-1 and EM-2. These isotope ratios result from high Rb/Sr, U/Pb, Th/Pb ratios of a material, that could be

presented by upper continental crust.

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