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NEW GEOCHEMICAL DATA OF BASALTS IN THE TSOROIDOG AREA, CENTRAL MONGOLIA

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At present, geochemical data are widely used for reconstructing geodynamic settings, especially, volcanic rocks of mafic composition, i.e., basalts, because they are widespread in many orogenic belts and are indicative of different geodynamic environments. In general, we propose the reconstruction of the tectonic settings of basalts according to their relationships with associated ocean plate stratigraphy (OPS) sediments, their petrogenesis and their geochemical features.

In this paper, we present new data on geochemistry of basalts from the Tsoroidog and Bumbattolgoi formations in the Tsetserleg accretionary wedge terrane in southwestern part of the Khangai-Khentey orogenic system [*Tomurtogoo, 2012*], which have been identified as the key region in the Central Asian Orogenic Belt (CAOB), the world largest accretionary orogeny. Detailed study of their geochemistry of volcanic rocks allowed us to recognize two types of chert-basalt association.

Middle Silurian – Lower Devonian Tsoroidog formation is mainly composed of basaltic rocks with thin layers/lenses of thin-bedded, red-whitish color chert-quartzite and slates. Basaltic rocks are characterized by medium TiO_2 and high Zr/Nb ratio, Mg#=36–47, which is depleted in REE, Nb and Ti. Concentrations of TiO_2, Fe_2O_3 and P_2O_5 decrease when MgO is increased in the binary diagram, whereas Al_2O_3 is normal, furthermore, Nb, La and Sm decrease when MgO increases to compare with the rare elements. Nb is relatively less than La and Th. $(Nb/La)_{PM}$ value less than 1 is generally indicated in the MORB [*Haase, 2002*].

Lower Devonian Bumbattolgoi formation mainly consists of basaltic rocks associated with shale, sandstone and red color cherts, which is represented by

Mg#=37–50, enriched incompatible elements (LREE, HFSE), whose variations suggest a mantle plume source and variable degrees of partial melting in the spinel and garnet stability, are characterized by high TiO_2 and low Zr/Nb ratio, compositionally similar to OIB. Concentrations of TiO_2, Fe_2O_3 and P_2O_5 decrease when MgO is increased in the binary diagram, furthermore, Nb, La, Sm and Th increase when MgO decrease on the diagram compared with the rare elements. It was enriched by HFSE and Nb is relatively less than Th and La [$(Nb/La)_{PM}$=0.72–0.86; $(Nb/Th)_{PM}$=0.52–0.67] by rare element diagram that compared with the primitive mantle. This characteristic represents in the OIB relative to mantle plume [*Safonova et al., 2012*].

These basalts degrees of melting were estimated from Nb versus Nb/Yb systematics [*Johnson, 1998; Bédard, 1994*]: MORB could be produced at relatively high degrees of melting (5–20 %) of a depleted mantle source, OIB is formed at even lower degrees of partial melting (3–5 %) of a source containing both spinel and garnet lherzolite. The geochemical data show that Tsoroidog formation basalts were formed in mid-oceanic ridges, but Bumbattolgoi formation basalts generated in geodynamic settings of oceanic islands.

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