

Geology and Geochemistry of the Bayankhongor ophiolite complex, Mongolia

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The Bayankhongor ophiolite complex is located in the central part of Mongolia. This complex is 160 km in length and 10-12 km in width, and its entire configuration is southeast trending. Ophiolite complex is composed of serpentinite, gabbro, sheeted dike complex, pillow lava and hyaloclastite breccia. The sheeted dike complex is composed of plagiophiric dolerite and phenocryst-free dolerite. Each dike supplied eruptive equivalent. Although ophiolite rocks have mostly oceanic tholeiitic composition, some plagiophiric rocks are unusually enriched in K₂O. The rare earth and trace element concentrations of the gabbro, dolerite and lava in the Bayankhongor ophiolite complex indicate that all of the rocks were derived from E- and N-types MORB.

The Bayankhongor area is located in the central part of Mongolia, SW 700 km from Ulaanbaatar city. This area is geotectonically divided into Baidrag, Burd gol, Bayankhongor, Dzag and Khangai zones from south to north. The Bayankhongor zone is Vendian (Upper Proterozoic) to Lower Cambrian geological unit and consist of Jirmiin nuruu and Ulziit gol sediment formations and Bayankhongor ophiolite complex.

The Bayankhongor ophiolite complex is 160 km in length and 10-12 km in width, and its entire configuration is southeast trending. Author is investigated the ophiolite in Altan am gorge, which located in the middle part of the complex. Ophiolite complex is composed of serpentinite, gabbro, sheeted dike complex, pillow lava and hyaloclastite breccia. Rocks of Bayankhongor ophiolite complex are lightly metamorphosed and the associated ultrabasic rocks are fully metamorphosed.

The sheeted dike complex is composed of plagiophiric dolerite and phenocryst-free dolerite. Each dike supplied eruptive equivalent. Plagiophiric dolerites and lavas are originated in result of crystallization differentiation.

Phenocryst and groundmass of the rocks are composed of plagioclase, clinopyroxene and rarely olivine. Opaque mineral is represented by titanomagnetite. Clinopyroxene is commonly replaced by chlorite and actinolite. Plagioclase phenocrysts are replaced by albite, prehnite, chlorite and carbonate. A finely dispersed aggregate of almost isotropic hydrogarnet (hydrogrossular) developed.

Although ophiolite rocks have mostly oceanic tholeiitic composition, some plagiophiric rocks are unusually enriched in K₂O.

Chemical compositions of the gabbro from the upper part of the complex and dolerite are similar. It is possible that these rocks originated almost simultaneously and from similar place of magma chamber.

In the Bayankhongor ophiolite complex all rocks are characterized by high Cr and Ni concentration.

The rare earth and trace element concentrations of the gabbro, dolerite and lava in the Bayankhongor ophiolite complex indicate that all of the rocks were derived from E- and N-types MORB. Although more possible from N-MORB.