

## Mineralogy and petrology of the basalts from the Erdenetsogt Formation, Hangay-Hentey fold belt of central Mongolia

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This paper deals with the first mineralogical and petrological study of the basaltic rocks from the Erdenetsogt Formation (EF) in middle Paleozoic accretionary complex hosted by Tsetserleg terrane, which is westernmost part of the Hangay-Hentey fold belt (HHFB) of central Mongolia. EF is mainly made up of intensively deformed oceanic plate stratigraphy (OPS): pelagic radiolarian/ribbon chert, red and green quartzites (metachert), fine to medium-grained sandstone, siltstone with minor amount of limestone, and some basaltic rocks which have been discovered lately during geological mapping in the south Hangay region. The basaltic rocks exhibit mostly metabasalts, dolerites, microgabbros, and occasional meta-picrites composition with subophitic, intersertal, and partly intergranular textures. The phenocryst assemblage is composed of olivine (completely altered by chlorite, carbonate and serpentine and is only observed in meta-picrite) and clinopyroxene (well-preserved in all basaltic rocks) and smaller matrix plagioclase (replaced by albite). Accessory minerals include chromian-spinel, titanomagnetite and pyrite. Here, we present preliminary major element data for phenocryst and groundmass clinopyroxene (Ca-rich augite/diopside) and chromian-spinel measured by electron microprobe from the north and south of Uyanga Soum (village), where these basaltic rocks are exposed. There was no chemical variation in relict minerals observed from the basaltic rocks from these two parts. The preserved clinopyroxenes in basaltic rocks have a Mg# between 78-85, and follow a typical tholeiitic trend in the Ca-Mg-Fe diagram with rims slightly enriched in Fe relative to the cores. On the basis of Ca +Na vs. Ti and Ca vs. Ti+Cr discrimination diagrams, our results are consistent with tholeiitic magma of non-orogenic origin. The relict chromian-spinels (up to 0.25 mm in size) are found only in completely altered olivine phenocrysts of meta-picrite and its chemistry exhibits very limited in composition with Cr# of 55-68 numbers, which consistent with intraplate tholeiite. Spinel plot of Al<sub>2</sub>O<sub>3</sub> wt.% vs. TiO<sub>2</sub> wt.% (range from 0.9 to 1.8 wt.%) ratio suggests OIB rather than MORB. In the Cr-Al-Fe+3 diagram, along with the Cr-Al line with low ferric iron content, resembling spinel among spinel peridotite xenoliths. In Mg# vs. Cr# diagram, it implies more fractionated magma than MORB. From this fact it is concluded that the chromian spinel of meta-picrite may have been derived from a mantle plume source. Our review of previous limited geochemical studies suggests enriched OIB for these basalts. In general, the mineral chemistry of the basalts from EF indicates tholeiitic OIB (hot spot/seamount) affinity in agreement with previous suggestions by some researchers. The OIB have been developed within Paleo-Pacific Ocean plate located between the Siberian and the North China Cratons, and then accreted to the active continental margin of Siberian Craton during middle to late Paleozoic.

Keywords: Hangay-Hentey fold belt, Erdenetsogt Formation, mineral chemistry, basaltic rock, clinopyroxene, chromian spinel