Petrological studies of felsic and mafic igneous rocks of Tarazoj-Soushab tectonic window (NE Hashjin-NW Iran)

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Abstract: Tarazoj-Soushab tectonic window is located between Tarazoj and Soushab villages at the upper corner of the northeast of 1:100,000 Hashjin sheet. This area is a part of the West Alborz Tertiary magmatic belt. Mafic igneous rocks include basaltic pillow lava and gabbro bodies and felsic igneous rocks include granite and trachytic flows. The main minerals of the gabbroic and basaltic rocks are plagioclase, olivine and clinopyroxene and the main minerals of the granitic rocks include plagioclase, orthoclase and quartz, and the trachyte consists mainly of potassium feldspar. Gabbroic and basaltic rocks show calc-alkaline nature and granitic and trachytic rocks have shoshonitic nature. Examination of chondrite and primitive-mantle normalized spider diagrams in basalts and gabbros indicates enrichment of LREEs relative to HREEs. The LILE and LREE enrichment and HREE depletion in the pattern may indicate low melting rate, high fugacity of CO₂/H₂O in the magma formation environment or high depth of generation of basaltic and gabbroic magma. Examination of chondrite and ORG-normalized spider diagrams in granites and trachytes indicate enrichment of light rare earth elements (LREE) and incompatible elements relative to heavy rare earth elements (HREE). These patterns show a marked depletion of Eu (especially in granites). Gabbroic and basaltic rocks are located in an oceanic environment with E-MORB basalts tendency and the granites and trachites associated with this assemblage belong to anorogenic granitoids (A-type) and subgroup A1. These features indicate that the studied outcrops in the Tarazoj-Soushab tectonic window belong to the rift-related magmatism and opening of the Paleo-Tethys ocean (Paleo-Tethys II) in the northwest of Iran.

Keywords: Paleo-Tethys; enrichment; anorogenic; Tarazuj-Susahab; Hashjin.

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