

The role of fractional crystallization and crustal contamination in the magmatic evolution of Paleogene volcanic rocks of Damash area in Guilan Province

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Abstract: The Paleogene volcanic rocks of Damash have a considerable outcrops in Alborz structural zone in Guilan Province. These volcanic rocks show a compositional range from olivine basalt, basaltic andesite, pyroxene andesite to andesite. The petrographical and geochemical studies indicate that the fractional crystallization of clinopyroxene and olivine play an important role in lithological varieties of the Damash volcanic rocks. The positive correlation of Hf and Nb v.s Zr, CaO/Al₂O₃ v.s MgO and Al₂O₃/CaO v.s SiO₂ are geochemical signatures of differentiation of clinopyroxene and olivine. The depletion in elements such as Nb, Ta, Zr, Hf, P, Ti and high ratios of Ba/Nb, La/Nb and Rb/Y, and low ratios of Zr/Nb and Y/Nb are geochemical evidences of crustal contamination of these volcanic rocks. The range of the incompatible elements and comparison with the crustal data range show that these volcanic rocks have a clear elemental equilibrium with continental crust and have been contaminated with it.

Keywords: Volcanic rocks; fractional crystallization; crustal contamination; Damash; Guilan.

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