

Provenance of the siliciclastic Pestehliegh Formation (Early Paleocene) in the Chahchahe section, NE Iran

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Received: 2017/10/11 Accepted: 2018/1/3

Abstract

The Pestehliegh Formation (Lower Paleocene) is composed of 95.5 m of sandstone, shale and evaporate units in the Chahchahe section. Shale samples show that major oxides such as SiO₂, Al₂O₃, Na₂O, P₂O₅ and trace elements like Sr, Ba, Nb and Ce are depleted relative to Upper Continental Crust (UCC) while, U and CaO enriched. The diagram of TiO₂ versus Al₂O₃ and Zr versus Al₂O₃ suggest an intermediate igneous rock as possible source rock for shale of the Pestehliegh Formation. The diagram of K₂O/Na₂O versus SiO₂ and ternary diagram of Th/Co/Zr, La/Th/Sc, Th/Sc/Zr show a continental arc islands as tectonic setting for this Formation. The CIA index values reveal poor to moderate degree for intensity of weathering and arid to semi-arid as paleo-climate in the studied area. In the other hand, the U/Th and Ni/Co indexes indicate oxidant condition in depositional environment. The beginning of Paleocene was along with tectonic activity and regression of sea level in most parts of the world and well the Kopet-Dagh Basin in Iran. These occurrences were most important factor for deposition of siliciclastic sediments of the Pestehliegh Formation. Due to regression, the thickness of this formation decrease, from south east toward north west in Kopet-Dagh Basin.

Keywords: Pestehliegh Formation, Geochemical, Origin rock, tectonic setting, weathering