

***Lithostratigraphy, petrography and trace elements geochemistry of the middle part sandstone of the Upper Red Formation in the Hamzelou region (NW Zanjan)***

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**Abstract**

*In this reaserch for the first time, the sandstones of the middle parts of the Upper Red Formation in the Hamzelou region, 70 Km NW of Zanjan, has been studied based on sedimentology and elemental geochemistary. The studied section is 945 m thick and is divided into four parts. These parts from button to top of the formation consist of alteration of evaporite beds; green-marl with interbedded of the gypsum (300 m); alternation of red-marl with the layers of red and grey-sandstone and micro-conglomerate (with less frequency) (355 m); the alternation of red and green-marl with interbedded of the grey and red-sandstone (150 m); the alternation of green-grey marls with interbedded of the layers of gypsum (140 m). Based on petrographic studies, these sandstones manily contain different types of the rock fragmensts such as sedimentary, metamorphic and minor amount of volcanic, monocrystalline quartz with straight extinction and finally feldspar manily orthoclase types with a less frequency. Carbonate cements and matrix are also visible between the grains. These sandstones represent manily a feldspathic-litharenite and litharenite (mainly chertarenite) composition with submature to mature in terms of textural maturity. The micro-conglomerate layers are similar in composition to sandstones and classified as an extra-formational conglomerate, ortho-conglomerate (less than 15% matrix) and polymictic conglomerate. Based on the main components of the studied sandstone and results of chemical analysis of the trace elements, the tectonic setting of these sandstones is related to collision and recycled orogenic. Also, according to the obtained data in this research, the source rocks of these sandstones are intermediate to felsic igneous rocks, which were influenced by semi-arid climates in the source area.*

**Keywords:** *Lithostratigraphy, geochemistary, tectonic setting, Upper Red Formation, Zanjan*