

New Data On Stratigraphic Situation Of The Salt Deposits In Garmsar Area, Central Iran

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Abstract

The salt deposits of Garmsar area crop out across a large area (700 km²) in west and northwest of Garmsar, Central Iran. These deposits has Eocene-Oligocene age and as diapirs consist of mighty bulk of evaporates (salt and gypsum), red marls, shales and volcanic rocks that largely cut the Upper Red Formation, Qom Formation and younger formations such as Hezar-Dareh conglomerate. For detailed studying of stratigraphic situation of the salt deposits in Garmsar area, 12 sections of diapirs were studied in northwest and west of Garmsar. They can be subdivided into six rock units that respectively from the oldest to the youngest unit include; 1) thick salt, 2) alternating red marl, salt and chalk with gypsum, 3) alternating sandstone, microconglomerate, shale, marl, periodic chalk beds and gypsum 4) thick salt, 5) mostly chalk with some alternating marl and 6) alternating green sandstone, microconglomerate, shale, marl and occasionally chalk beds. According to present study, situation of salt deposits are at the base and middle part of stratigraphic sequence. Volcanic activities of the studied area happened in two steps; old volcanic activity which is younger than evaporate deposits and situated over chinks and slats, and young volcanic activity which probably is overlap with diapirs and infiltrated into evaporates deposits.

Keywords: *Stratigraphy, diapir, salt, Garmsar, Central Iran*

1. Introduction

The studied area is located in a structural region called Central Iran, 100 kilometers of southeast of Tehran, covering an area between longitudes 52° and 52°, 22'N and latitudes 35°, 13' and 35°, 18'E. The salt deposits crop out across a large area (700 km²) in west and northwest of Garmsar [1].

The first research on the Garmsar area was carried out by Hubber [2, 3, 4] for finding petroleum reservoirs. He studied all rock units of the studied area and prepared geological map of area on a 1:50.000 scale. Gansser [5] studied diapirs in south of Semnan. Kalhor [6] carried out some investigations concerning the geology in this region and especially introduced the Qom Formation and younger formations. Hubber [7, 8] had some investigations concerning salt formations and their structures. The Garmsar area of central Iran has been studied by other geologists such as Shazan [9] Sharabi [10], Safaie [11], Dori [12], Dori et al. [13] and Namadmalian et al. [14].

2. Diapir in Garmsar area

In the Garmsar area evaporates is the oldest unit which crop out in tension of faults. They cut younger units and outspread as diapir. Diapirs have directly relation with trend of faults and have movement on the surface that called salt slacier. The main part of diapirs composed of salt which there are not any data about their base, but in their upper part, there is purple marl

that can be seen in all parts of study area. However, salts crop out in tension of faults and valleys, and covered by thin crust of clay.

Diapirs consist mainly of massive evaporates (salt and gypsum), red-purple marls, shales and volcanic rocks which have faulted contact with the Upper Red and Qom formations and also younger formations such as Hezar-Dareh conglomerate. According to latest studies, diapirs have Eocene-Oligocene age [6, 13]. Dori et al. [13] believed diapirs consist of seven units that respectively from the oldest to the youngest unit include salt, purple marl, green shale, massive gypsum, quaternary chalk and volcanic rocks.

In the present study, for detailed studying of stratigraphic situation of the salt deposits in Garmsar area, 12 sections of diapirs were studied in northwest and west of Garmsar which include salt mines; Negin, Khybar, Salar, Milad, Derakhshan, Noavar, Mohood, Kalrez, Rahrak and Siyalak (Fig. 2 A-H). According to this study, stratigraphic sequence of diapirs can be subdivided into six rock units that situation of salt deposits are at the base and middle part of sequence (Fig. 1). So, there are two thick outcrops of salt deposits in sequences of Garmsar area that usually are reasonable for derivation.

3. Conclusions

1. Diapirs in Garmsar area consist of mighty bulk of evaporates (salt and gypsum), red marls, shales and volcanic rocks with Eocene-Oligocene age that largely cut the Upper Red Formation, Qom Formation and younger formations such as Hezar-Dareh conglomerate. They have more elevation than adjacent grounds.
2. According to the present study, stratigraphic sequence of diapirs can be subdivided into six rock units that respectively from the oldest to the youngest unit include; 1) thick salt which is reasonable for derivation 2) alternating red and purple marl, salt and chalk with gypsum, 3) alternating green sandstone, microconglomerate, shale, marl, periodic chalk beds and gypsum 4) thick salt which is reasonable for derivation 5) mostly chalk with some intercalation of marl and 6) alternating green sandstone, microconglomerate, shale and marl with some chalk beds. Therefore, situation of salt deposits are at the base and middle part of stratigraphic sequence.
3. Volcanic activities of studied area happened in two steps; 1) Old volcanic activity which is younger than evaporate deposits and situated over chinks and slats. These volcanic rocks by diapirs stand as bulks inside of diapir and are very rusty. 2) Young volcanic activity which probably is overlap with diapirs and infiltrated into evaporates deposits.
4. Respectively from the oldest to the youngest rock units in study area including salt and alternating sandstone, microconglomerate, shale, marl and occasionally chalk beds that have a green cliff-forming feature.

4. References

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System	Formation	Rock unit	Series	Stratigraphic Column	Lithology
Paleogene	Eocene-Oligocene	Kond-Lower Red	6		Alternation of green, thin to medium-bedded sandstone, microconglomerate, shale, marl with intercalation of chalk
			5		Red and green gypsum and chalk with marl
			4		White and red salt
			3		Alternation of green, thin to medium-bedded sandstone, microconglomerate, shale, marl and gypsum
			2		Alternation of dark red marl, salt and chalk-gypsum
			1		White, red, grey and green thin to thick-bedded salt

Without scale

Fig.1: Stratigraphic situation of the salt deposits in sequences of Garmsar area, Central Iran

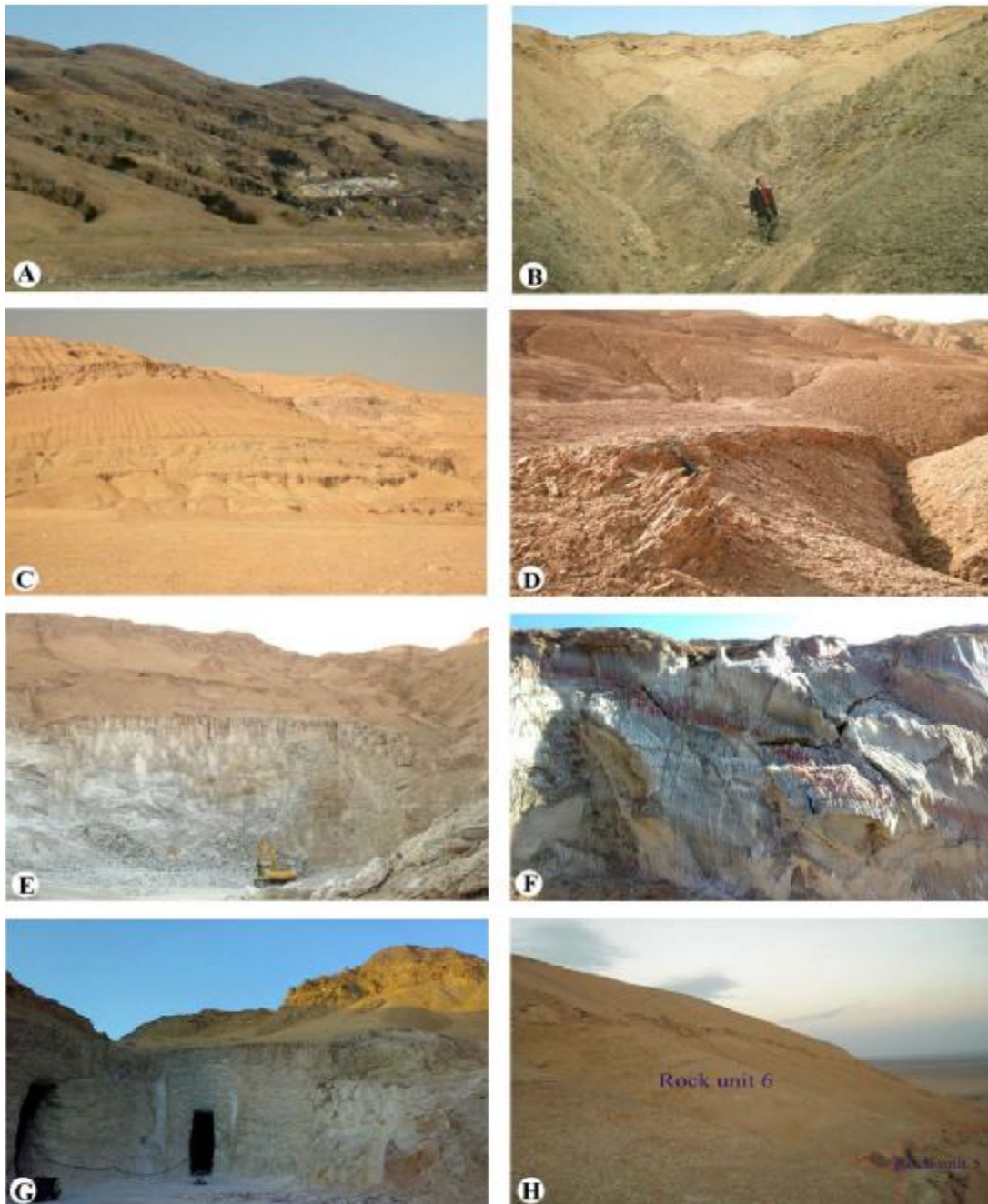


Fig. 2: (A) Thick salt (rock unit 1) in Siyalak Mine. (B) Volcanic rocks in diapirs. (C) Rock unit 3 in Salar Mine. (D) Chalk and gypsum in purple marls (rock unit 5). (E) Thick salt (rock unit 4) and red-green gypsum and chalk with marl (rock unit 5) in Negin Mine. (F) Salt stone (rock unit 4) in Derakhshan Mine. (G) Salt stone (rock unit 4) and red-green gypsum and chalk with marl (rock unit 5) in Mohood Mine. (H) Rock units 5 and 6 in Negin Mine.