Facies analysis and depositional environments of the Qom Formation in Vieh section, south of Saveh

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Abstract

The Qom Formation (Oligo- Miocene) is the most important hydrocarbon source in central Iran. The Qom Formation stands between the Lower Red and Upper Red Formations with unconformity. The Qom Formation in Vieh section in south of Saveh was studied for stratigraphic survey, facies analysis and environmental interpretation. The Qom Formation has 220 meter of thickness. In the studied area, it mainly consists of medium-thick layered to massive limestone, marl and sandstone. The Assessment of thin sections in Vieh section led to recognition of 4 facies groups related to coast, lagoon, barrier and open marine. Lagoonal facies consist of packstone and wackestone textures. Barrier facies were formed boundestone and bioclastic grainstone and open marine facies have turbidities and talus characteristics.

Keyword: *Facies, Sedimentary environments, Qom Formation, Oligomiocene, Vieh and saveh.*

1- Introduction

The age of the Qom Formation generally has been determined from early Oligocene till middle Miocene and it is equivalent to the Asmari Formation. In the coarse of oil exploration of the Qom Formation in the south part of the Qom town, six lithological units (a-f) has been recognized (Ganser, 1955; Soder and Furrer, 1955). The studied area located in the south part of Saveh province (Fig. 1). The purpose of this study is to investigate facies and to recognize sedimentary environment of the Qom Formation in Vieh region. After field study one stratigraphy section has been chosen and sampling it. Thin sections have been provided from the samples.

2- facies description:

Microschopic properties of thin section lead into recognition of 11 microfacies in form of 2 groups of carbonate & terrigeneous facies.

A: The group of beach facies

Beach facies of Qom formation in Vieh area are sandstone. Among most important facies of this group the fallowing samples can be pointed out;

A1) Fine to medium sandstone: calcite cemented submature litharenite

Quartz is the Main components in this facies. Quartz with parallel extinction and undulatery extinction exists in this facies. Frequency of Qrtuz and Plagioclase are worthless. Also chert, Siltstone, calcareous rock fragments and shale are exist (Fig 3, A).

A2) sandy limestone-calcareous sandstone

Some times in some samples quantity of terrigenous and carbonate components are to the extent that nomenclature and their segregation to terrigenous or carbonate facies is impossible. Elements constitute mainly are red algae, benthic foraminifera, echinoderma, bryozoa, quartz (Fig 3, B).

B:The group of lagoonal facies

In the studied area lagoonal facies can be divided to:

B1) Gastropoda benthic Foraminifera Bioclast Packstone

The most important skeletal allochems in this facies are benthic foraminifera, gastropoda, neoalveolina, echinoderma, red algae and bryozoa. These grains settle in the micritic background which recrystalizate to microspar (Fig 3, C).

B2) Benthic foraminifera bioclast wackestone

Major elements in this facies are benthic foraminifera, echinoderm, red algae and peloid (fig 3, D).

B3) Red algal bioclast packstone

Red algae are the major allochems in this facies. Among other allochems can be mentioned to echinoderma and benthic foraminifera with slightly frequency (Fig 3, E).

C: The group of barrier facies:

Barrier facies in the studied area are boundstonic reef and bioclastic barrier that can be classified into:

C1) Coralgal boundstone:

Coral and algae are the major components in reefal facies and according to Emberry and Klovan (1971), framestone and bindstone rocks are recognized in this facies (Fig 3, F).

C2) Benthic foraminifera bryozoa bioclast grainstone

Components of this facies are bryozoa, red algae, echinoderma, benthic foraminifera, oyster, gastropod and interaclast.

C3) Sandy echinoderm benthic foraminifera bioclast grainstone

Components of this facies are benthic foraminifera, echinoderm, Also micritic ooids and intraclast exists in these facies, frequency of terrigeneous particles such as quartz is high. (Fig 3, G).

C4) Intraclast Pelecypoda Algal Bioclast Packstone

Major components in this facies are red algal, oysters, bryozoa, echinoderms, sorithida and benthic foraminifera. Large intraclast exist in this facies (Fig 3, H)

D: the group of open marine facies

Facies of open marine can be sub divided into:

D1) Echinoderm coralgal bioclast packstone

Major components in these facies formed reefs most of the times, these organisms to consist of red algae; allochtonous corals, echinoderm and brozoa.

D2) Benthic Foraminifera Bryozoa Packstone

major elements in this facies firstly is bryozoa. Other important element is large benthic foraminifera. Spaces between these allochems filled by matrix which shows low energy environment (Fig 3, I).

D3) Benthic/ planktonic foraminifera bioclast wackestone

In this facies both type of benthic and planktonic foraminifers. Echinoderm and red algae with slightly frequency are other allochems in this facies (Fig 3, J).

D4) shale/ marl

This facies has green looking grey color and very thin lamination; mostly it has periodicity with carbonate facies.

Conclusion:

Qom Formation in Vieh section includes terrigeneus-carbonate deposition that started by beach terrigeneus facies and ended by carbonate facies. Microscopic surveys due to recognition 4 group facies: A-beach, B-lagoon, C- barrier and D- open marine (Fig, 2). Beach facies are sandstone but in some thin sections terrigeneous and carbonate components mixed together. Lagoonal facies have wackestone and packstone textures. Coral- algae boundstone and open marine facies have talus and turbidities characteristics most probably facies of Qom Formation in Vieh section was shaped in a carbonate platform type Rimmed shelf.

Fig 1- geological position and connection roadway to the study area

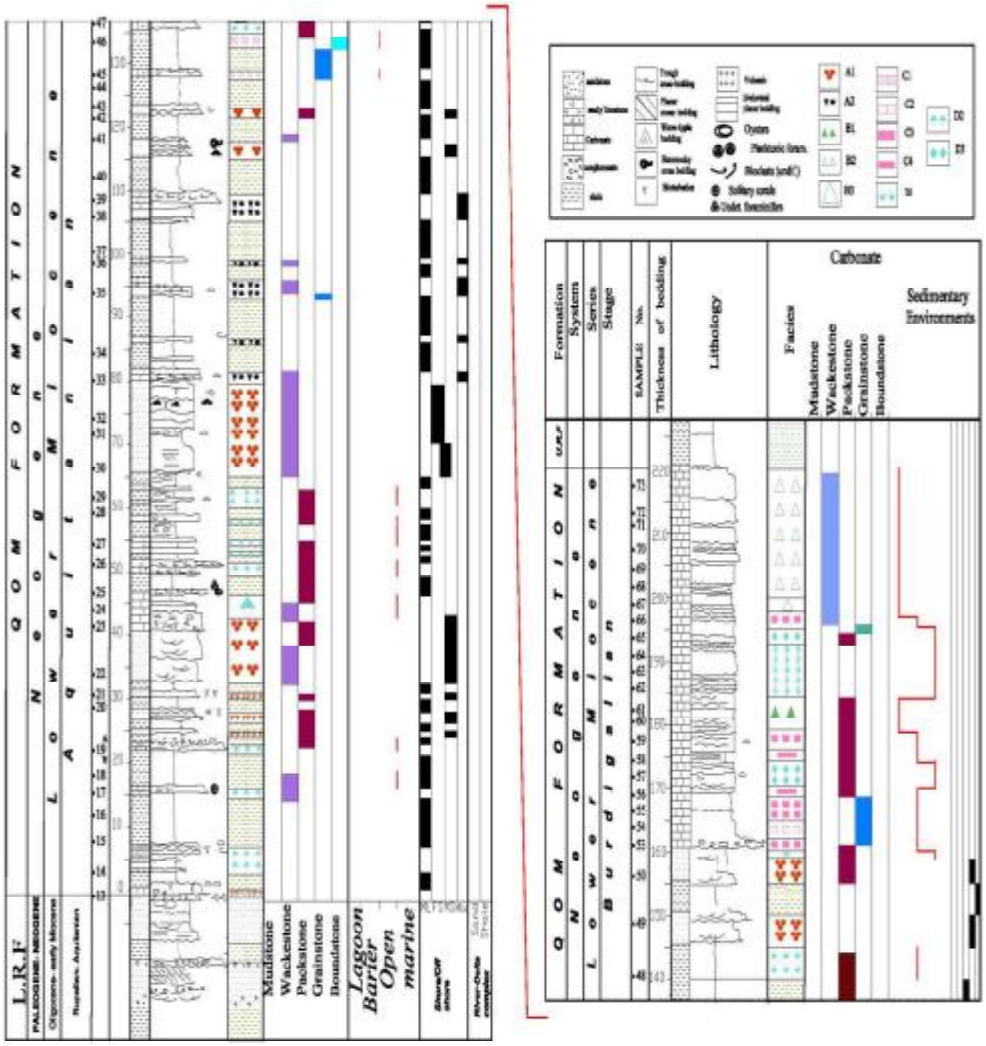

Fig 2- stratigraphic and facies column of the Qom Formation in Vieh section associated with depth variation of sedimentary environments

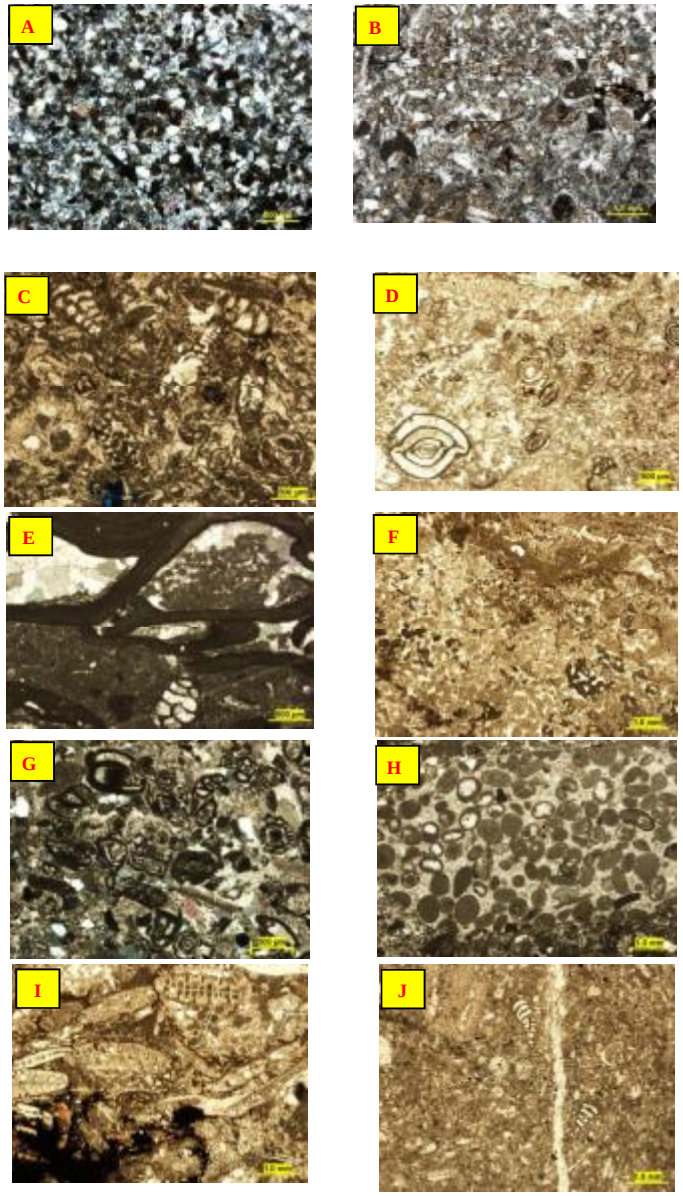

Fig3) A- Fine to medium sandstone: calcite cemented sub mature litharenite. B- Sandy limestone- calcareous sandstone with quartz, benthic foraminifera, red algae and bryozoa. C- geopetal fabric in the bryozoa chamber (on the lower side in the left hand corner) in facies of gastropoda benthic foraminifera bioclast packstone. D- benthic foraminifera bioclast wackestone. E- Red algae bioclast packstone include geopetal fabric among train of algae. F- Boundestone composed from coral and algae, neomorphism caused the bursting of some parts of coral structures. G- Concave-convex contact between milliolid because of weight of tops beds in facies of sandy echinoderm benthic foraminifera bioclast grainstone. H- Ooid intraclast in facies of pelecypood algal bioclast packstone. I- Benthic foraminifera bryozoa packstone, hematization on the lower part. J- Benthic/ planktonic foraminifera bioclast wackestone