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A New Stratigraphic Model Based on New and Constrained Biostratigraphic Data for the Dariyan Formation, SW Iran.

#### Abstract

A regional stratigraphic model is herein represented for sedimentary sequence of the Dariyan Formation in southwest Iran using new and well constrained benthic and planktonic foraminiferal data. The obtained biostratigraphic information based mainly upon the larger benthic and planktonic foraminifera led to a revised age dating, new biozonal scheme and new regional stratigraphic model for the Aptian sedimentary sequence in Zagros basin. This new stratigraphical insight is resulted in better understanding of relationships between the units as well as better analyzing of the Early Cretaceous petroleum system in the area investigated.

#### Introduction

The Dariyan sedimentary sequence consists of dominantly shallow marine carbonate succession with intervening of argillaceous limestone and marls ranging in age from Early to Late Aptian. The sequence has a widespread distribution along High and Central Zagros with an increasing thickness toward east/southeast. It is characterized by shallow water limestones containing larger benthic foraminifera in its lower and upper parts (lower and upper Units) and by deep marine thin bedded argillaceous limestones including radiolaria and planktonic foraminifera in its middle part (middle unit). With increasing demands for hydrocarbon exploration activities an understanding of stratigraphic relationship and geometry of the lower cretaceous strata regarding their role as reservoir facies potential developed during last decade. This study attempts to decipher the stratigraphic geometry within the formation with a high resolution biostratigraphic approach. The results led to provide a stratigraphic framework for the Aptian strata that could be used for further sequence stratigraphic studies.

#### Stratigraphy

As noted above the Aptian sequence of the Dariyan Formation is classically subdivided into lower, middle and upper units in the area studied. The lower unit is dated as lower part of the Lower Aptian. The middle unit has a relatively complex stratigraphic architecture including a progradational geometry. Available biostratigraphic data from the overlying and underlying sequences confirm a diachroneity within the unit. Therefore the middle unit consisting of upper Lower Aptian strata also includes younger sediments toward west. Similarly the upper unit enriched by orbitolinids includes older strata eastwardly. Based on biostratigraphic data resulted in this study, the upper unit has an age range of uppermost Lower Aptian to Upper Aptian. Hence the Lower/Upper Aptian boundary gradually shifts from the shallow marine inner platform sediments of the upper unit into the deep marine outer platform strata of the middle unit toward west of the basin.

## Conclusions

The following conclusions are drawn in this study.

- (1) The middle unit of the Dariyan Formation has a complex architectural geometry with an increasing thickness from east toward west of the basin.
- (2) Based upon the results of this study, new biostratigraphic subdivisions are proposed for the Aptian of Central and High Zagros in east/west direction along a transect from Shiraz to Gachsaran.
- (3) The stratigraphic architecture of the Aptian sequence is controlled by sea level fluctuations and regional tectonic control.
- (4) The results also enabled us to correlate the Aptian sediments in south of Iran with global time framework.

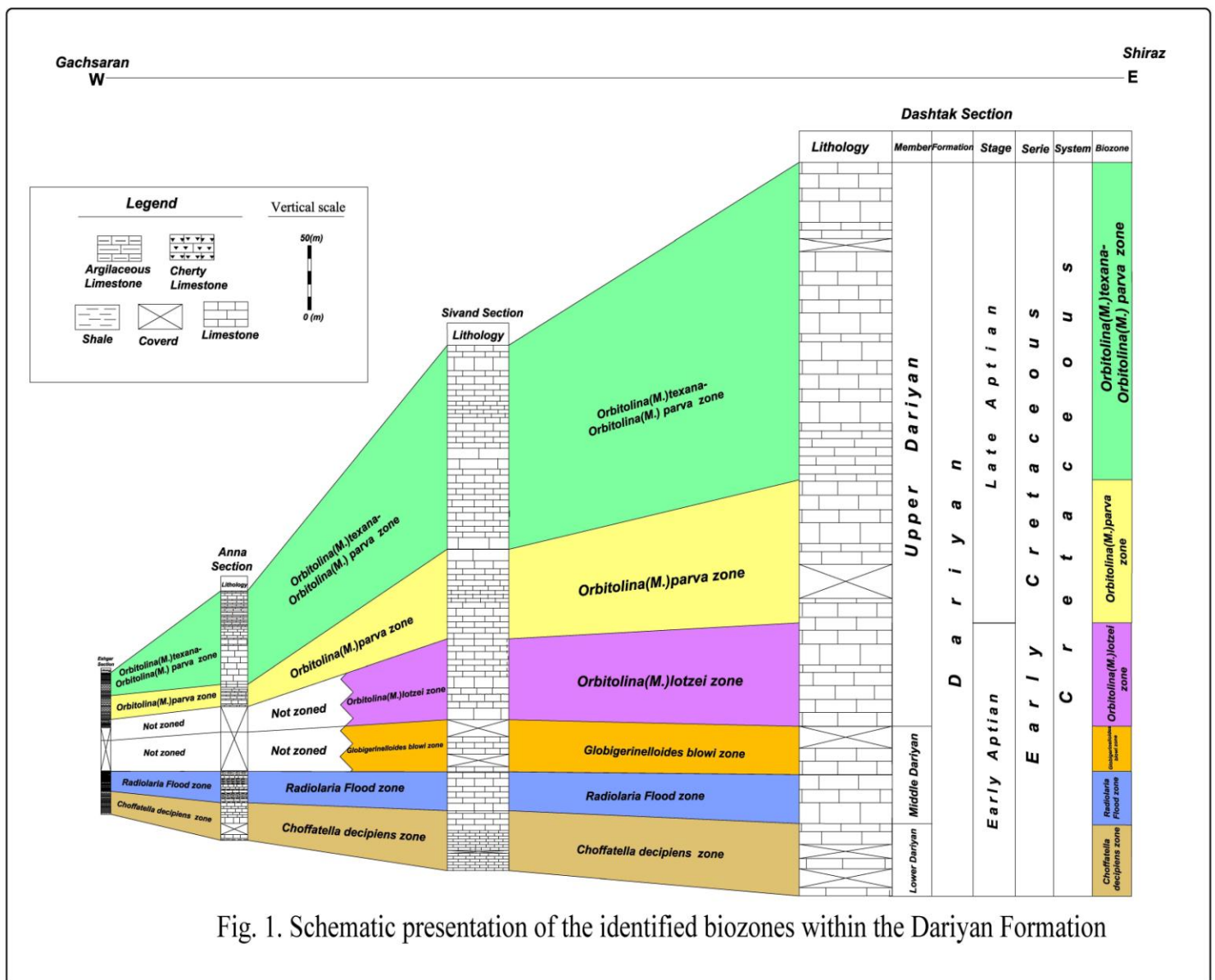


Fig. 1. Schematic presentation of the identified biozones within the Dariyan Formation

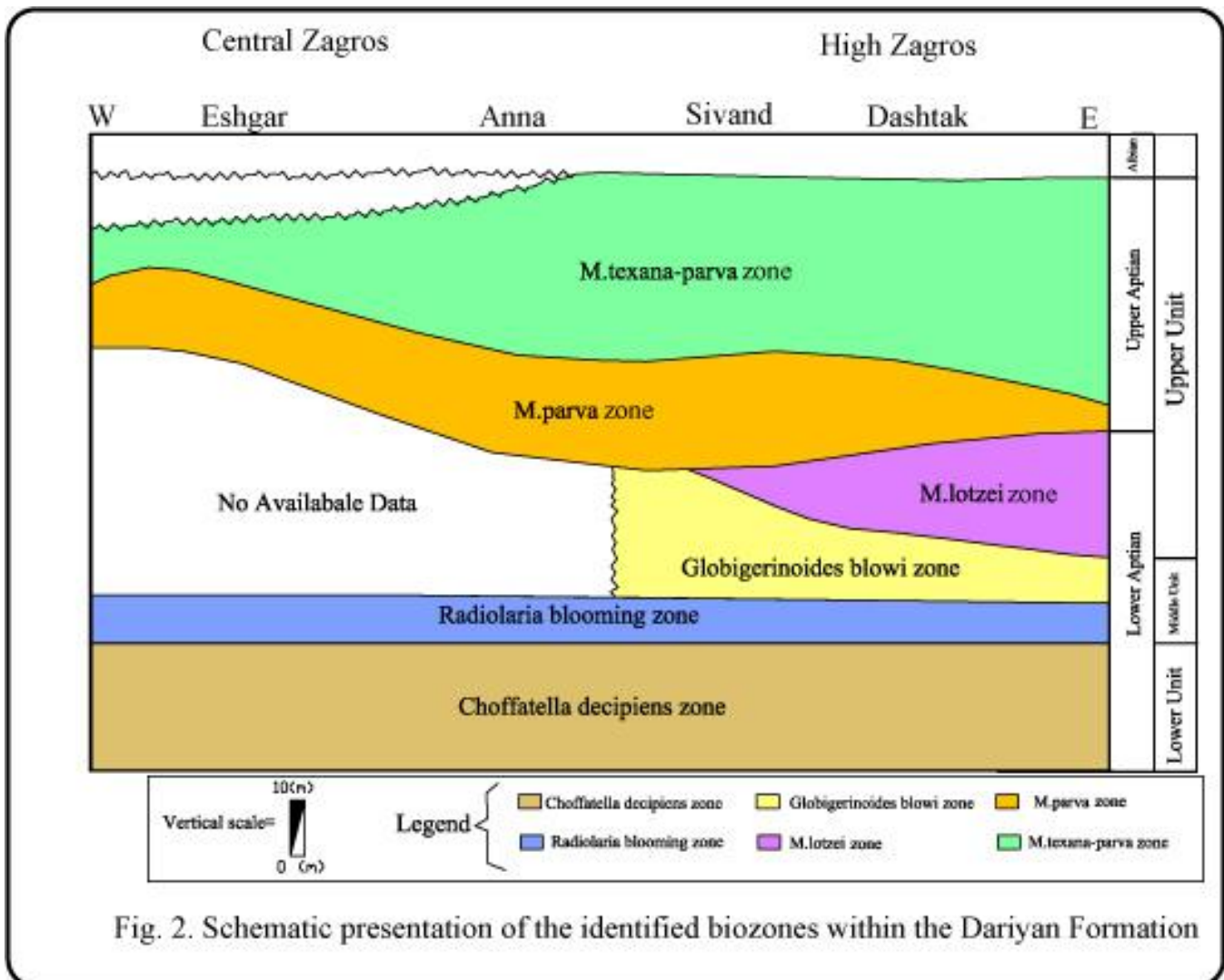


Fig. 2. Schematic presentation of the identified biozones within the Dariyan Formation

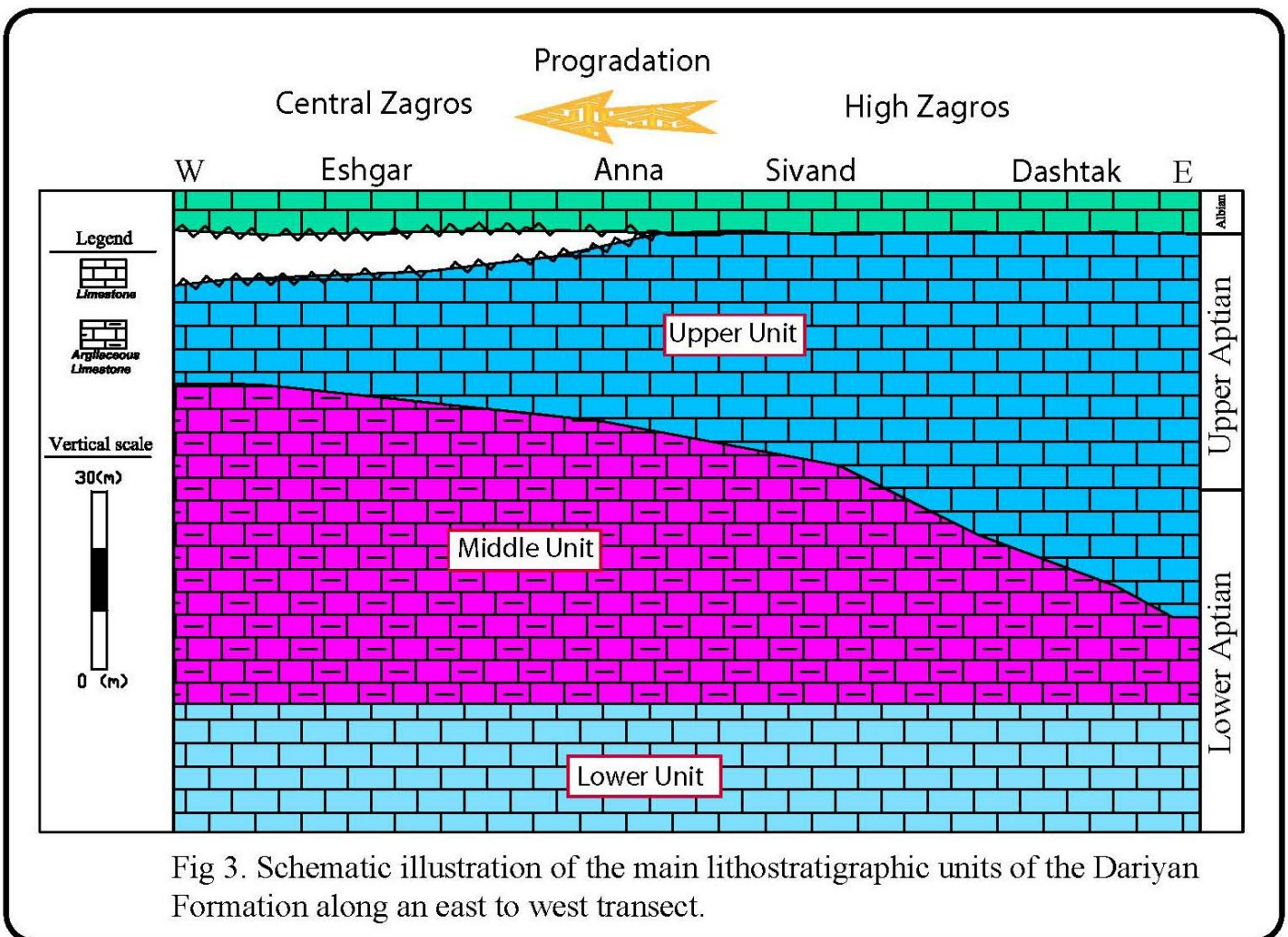


Fig 3. Schematic illustration of the main lithostratigraphic units of the Dariyan Formation along an east to west transect.