Facies analysis, Sequence stratigraphy and Depositional Environments of the Late Barremian-Early Aptian succession (Tirgan Formatiom) in the Western Kopet Dagh (NE Iran)

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The carbonates of the Tirgan Formation are one of the most important petroleum reservoirs in the west of Kopet Dagh. The objectives of this study are facies analysis, depositional environments, sequence stratigraphy and paleogeography of the sedimentary sequences in order to recognize sea-level change and tectonic controls on the sedimentation system. For this study, six outcrop sections have been measured in terms of sedimentology and stratigarphy, then compared to an exploration well (Qt-2).

Detailed field and petrographical investigation carried out in the Tirgan Formation led to recognition a numbers of sedimentary facies and environments tidal-flat(mudstone to peloid packstone), lagoon (bioclast wackestone/packstone), barrier (ooid/bioclast grains to boundstone) and slope facies (pelagic/benthic wackestone, interbedding with calciturbidites).

According to the field observations (i, e., stacking pattern, special surfaces, bedding geometries), microfacies analysis and foraminiferal determinations, two 3rd order sedimentary sequence are recognized.

The first sequence (Late Barremian) starts with tidal flat and lagoonal facies (mudstone with fenestral fabric and bioclast wackestone) and ends with tidal flat facies (mudstone and poloidal wackestone/packstone) in the south and grades to the lagoonal facies in the north of study area. .

The second sequence (Early Aptian) begins with lagoonal facies (bioclast Wackestone) in the south sections and grades to the slope facies (plagic/benthic wackestone) in the northwest and ends with Lagoonal facies (bioclast wackestone) in the south and open marine facies in the north and represents drowning at the top of sequence. The thickness of these sequences varies along S-N cross section. The thickest part lies in the northern part (over 800m) and to the south and west it becomes considerably thinner (less than 200m).

The Tirgan Formation shows a first transgressive phase in Lower Cretaceous in Kopet Dagh. Extension of the Caspian Sea and W-E faults activities affect in lateral variations in facies and subsidence rates.

Key words: *Tirgan, Kopet Dagh, Late Barremian-Early Aptian, Northeastern Iran, Facies, sequence stratigraphy*