

Flow units distribution of the Sarvak Formation in a sequence stratigraphic framework: a case study from an oil-field in the Abadan Plain, SW Iran

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Received: 2017/4/24 Accepted: 2018/6/23

Abstract

The late Albian–early Turonian Sarvak Formation is the most important carbonate reservoir of the Abadan Plain, SW Iran. The combination of core description, petrographic analysis and core porosity-permeability data in a giant oil field in the Abadan Plain enabled us to identify flow units in a sequence stratigraphic framework. The data of this study are including of 388 m core samples, 420 microscopic thin sections and 800 porosity-permeability plugs from two key wells. In this respect, stratigraphic modified Lorenz plot (SMLP) method applied for classifying the Sarvak formation into discrete flow units. The SMLP method show close correspondence within the sequence stratigraphic framework by considering the relationship between flow unit distribution and depositional and diagenetic features. From the sequence stratigraphic point of view, two third-order sequences were recognized in the upper part of the formation. The best flow units are correlated with HST system tract of sequence 1 in which the effect of dissolution from Cenomanian-Turonian disconformity has been associated with development of vuggy pore spaces in rudist bearing intervals of the Sarvak Formation. In low reservoir quality units, calcite cementation and compaction are the dominant diagenetic processes, while dissolution is the main agent for enhancing of the reservoir quality in the reservoir units with high quality. The results indicate that the interpretation of flow units in a sequence stratigraphic framework, provide crucial insight on distribution of reservoir zones within the heterogeneous carbonate reservoirs such as the Sarvak Formation.

Keywords: Sarvak Formation, sequence stratigraphy, reservoir characterization, flow units