SUBSURFACE GEOMETRY OF POTWAR SUB-BASIN IN RELATION TO STRUCTURATION AND ENTRAPMENT

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Potwar sub-basin is located at the northern margin of the Indian Plate and is characterized by thick InfraCambrian evaporites, relatively thin stratigraphic section from Cambrian to Eocene time and thick Miocene-Pliocene molasse deposits with extremely severe deformation during Himalayan orogeny in Pliocene to Middle Pleistocene. To develop understanding of various structural features, fault types, decollement levels and influence of tectonics, various transects have been developed in a grid fashion, and a regional time structure map at base Miocene level has been generated, which is also more or less conformable for deeper horizons. The Potwar sub-basin is structurally very complex and in some cases surface geological features do not reflect the subsurface structures . At least two decollement levels are identified on seismic, within Neogene molasse and in the Pre-Cambrian Salt Range Formation, causing offset and variation in structural manifestation between different levels above and below decollement. Beneath the Potwar sub-basin lies a low angle thrust within Salt Range Formation, that has carried the entire sedimentary section southward. The structures were formed as a result of fault propagation and salt movement activated by southward thrusting of sedimentary wedge. The structural style in the central, western and the eastern parts of the Salt Range / Potwar Plateau exhibit conspicuous difference, which are attributable to the amount of salt, detachment levels and faults and flexures in the basement. Subsurface picture of the Potwar subbasin demonstrates that structures are regionally bounded by foreland verging thrust faults, which are trending northeast- southwest in its eastern part while in the north-western part their orientation is almost east west.

The Potwar fold region is a prolific area with multiple structural leads. Attempt has been made to relate hydrocarbon entrapment in various areas of Potwar subbasin with distinctive structural domain, which defmes orientation, styles and geographic distribution of structures and migration from the source rock to reservoir via fault plane. For the carbonate reservoirs, there exists a relationship between the occurrence of fractures with the proximity to faults and flexures, which in turn may be related with release or absorption of stresses by neighbouring major fault systems. Authors have also tried to identify sub-thrust play fairway in different parts of the Potwar sub-basin. There are leads of popup, "snake-headed" and salt-cored anticlines, along with leads in imbricate and triangle zones in different parts of this sub-basin.