

Prospect generation studies of cretaceous sands, Khipro area by integrating seismic and well data

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Abstract

The present research study focuses on the structural modeling, stratigraphic well correlation isopach mapping, porosity variations and reservoir evaluation of cretaceous sands of Khipro area. The area under research is situated in Sanghar District, Lower Indus Basin, Pakistan. Data was provided by the Land Mark Resources (LMKR) comprising of eight seismic lines, base map and well logs of two wells, Naimat Basal 01 and Siraj South 01. According to literature, Khipro area possesses a good hydrocarbon potential and several wells are already producing oil in the area. Geologically it is a part of Thar slope platform in southern sedimentary Basin whose geology and stratigraphic units are well established. The encountered stratigraphy in both the wells ranges from Jurassic to Pliocene- Pleistocene. The structures in the area have surface geological expression as well. The area is mostly under extensional tectonic regime with Horst and Grabben structure. Horst structures are providing trap for hydrocarbons. Basal and massive sands of lower Goru Formation are main zones of interest as they are showing signs of having hydrocarbon potential. Structural modeling through seismic also provides an aid to the surface geology and structure. Stratigraphic correlation shows that the thickness of Upper Goru Formation is decreasing towards North. The thickness of Paleocene to recent formations is more towards North. Time and depth contour maps of Top Lower Goru, Basal Sands and Chiltan Formation show that there are two compartments. The South Southwestern compartment is showing shallow values and the Northeastern compartment is showing higher values. The logs at Sands below Talhar Shale show that it is porous and presence of hydrocarbons is also by crossplots. Thickness of Top Lower Goru and Basal Sands is increasing towards South West. Isopach maps of Basal sands and Lower Goru formations showing the increase in thickness towards south-west indicating the depocenter towards this direction. Porosity and Net to Gross ratio is increasing towards North. Porosity at the level of reservoir in Naimat Basal-01 and Siraj south-01 turned out to be 7% and 12% respectively. 3D modeling of the area is showing the trend of the Jurassic and Cretaceous rocks with highs and lows at various depths. 3D modeling also shows that both the wells, Naimat Basal 01 and Siraj South 01 are drilled on horst structures.