

**STRUCTURAL INTERPRETATION USING SEISMIC DATA OF SINJHORO AREA,
LOWER INDUS BASIN, PAKISTAN**

Urooj Shakir¹, Majid Ali¹, Muyyassar Hussain², and Muhammad Khubaib Abzar¹

¹Department of Earth and Environmental Sciences, Bahria University, Islamabad.

²Lmk Resources, Islamabad.

mhuroojshakir@gmail.com

Abstract

The southern Indus basin is a part of complex structural and stratigraphical history. Located at western margin of Indian plate, this passive basin received sediment from two sources, Aravali mobile belt and in modern time from Himalayan mobile belt respectively, that is why it so prolific in hydrocarbon potential. The research is carried out on sample data of seismic and wells of Sinjhoro area, located in Southern Indus Basin. Tectonically, study area is bounded in the east by Indian Shield, in the west by Kirthar Foldbelt, in the south by Karachi Trough and in the north by Mari-Bugti Inner Folded zone. Horsts and graben structures are dominant in the area, which were originated as a result of rifting between India and Seychelles in Late Cretaceous. Chiltan Limestone of Jurassic age The Jurassic age Chiltan Limestone underlies the more deltaic to shallow marine sequence of Sembar and Lower Goru Formation of cretaceous age with an unconformity. Stratigraphic correlation indicates south to westward dipping of the Formations in the area owing to slope deposition of sediments. The preview of research involves the velocity modeling on the base of interval velocity variation with respect to time and attribute analysis of zone of interests. The seismic data incorporated comprised of migrated sections of four dip lines 2001-SNJ-03, 2001-SNJ-14, 2001-SNJ-15, 2001-SNJ-16 and one strike line 2001-SNJ-24. Well tops data of Hakeem Daho-01, Barhun-01 and Chak 63-01 is used for the stratigraphic well correlation in the study area. The sample seismic data used for identification of tectonostratigraphic traps and entire play system couple with well tops of sample data. Four prominent reflectors named Khadro, Parh, Lower Goru and Chiltan are marked at the seismic sections. Horst and Graben are identified and marked on these seismic sections which formed due to extensional tectonics. The Two-way time contour maps of the marked lithologies Khadro, Lower Goru and Chiltan have been prepared to determine the spatial variation of time. Interval velocity models are generated to observe the variation of velocities with time in the subsurface. Entrapment of low velocities ranging from 1600 m/s to 1800 m/s and 2500 m/s to 2750 m/s depicts the probable zones of hydrocarbon in Lower Goru Formation. The Basal Sands of Lower Goru Formation is the primary reservoir in this area. These sands are proven producer in wells Barhun-01 and Chak 63-01. The stratigraphic correlation of wells indicates that Formation thin out toward west because of slope deposition. Average porosities for these sands are ~11% in the prospect area. For further validation of the interpretation, certain attributes like Frequency and Phase have been run at the level of reservoir. The high frequency value in attribute analysis is showing gas accumulations in Lower Goru Formation. On the basis of these results, reservoir zones are determined in the Basal sands and Massive sands of Lower Goru Formation with good hydrocarbon potential.

Key words: Horst and Graben, TWT, Contour Map, Interval velocity models, Attributes