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# Structural interpretation of carbonate mounts in Indus offshore, Pakistan using geological and geophysical data integration

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The present study deals with the structural interpretation of two major carbonate mounts M2 and M1 covering more than 200 sq. kms areas. The 2D seismic data consisting of a total of eight seismic lines of up to the time column 10-12 second acquired in deep offshore Indus fan system at water depth ranging from 1700 m to 3100 m in year 2000, has been utilized for the purpose (Fig.1). M2 structure was selected as the primary target to be drilled. An exploratory Well is located in the south of Karachi, in the Arabian Sea (northern tip of the Indian Ocean), across the Sommath Ridge at water depth 2712 m. Velocity analysis, High Density Velocity, and pressure evaluation, based on the available data and cross checked with analogues indicate a rather hydrostatic regime. Down to 3,700 m and 3,900 m the pressure is predicted hydrostatic.

The interpretation of the seismic, corroborated to the High Density Velocity, use of the previous regional study and knowledge of delta systems provide a general description of the sediments corresponding to the seal above the G2 structure. The analogues and previous work done on other delta apparatus help to confirm the tentative lithological facies attribution to the seismofacies and petroleum system. The series of reflectors were marked on seismic section, called Base Detritics, defines a buildup. This build-up is further divided in three units from bottom to top: The first unit is volcanic, the second unit is made up of volcanoclastics, and the last unit comprises the carbonate buildup. These sub-units correspond to the main back-steps of the platform.

Analogy to various carbonate buildups and previous work done on other isolated carbonate platforms of Tertiary age, after identification of the leeward versus windward side of the buildup on the seismic data, allows describing tentative lithological facies with respect to the seismofacies. Stress was put on the potential hazard identified as a specific chaotic seismofacies that can be related to karst event before drowning.

On the geological and geophysical analysis of the exploratory well, it is suggested that the M1 structure is suitable to drill and confirm the presence of hydrocarbon in the carbonate buildups. The limitation in the present work is the usage of the seismic grid of 5x5 km for a structure size of 15x18 km. This grid does not allow an accurate and reliable mapping of the seismic facies. A thickness resolution of the seismic data between 25 to 50 m due to the frequency spectrum centered on 40 Hz is quite acceptable for overall definition.

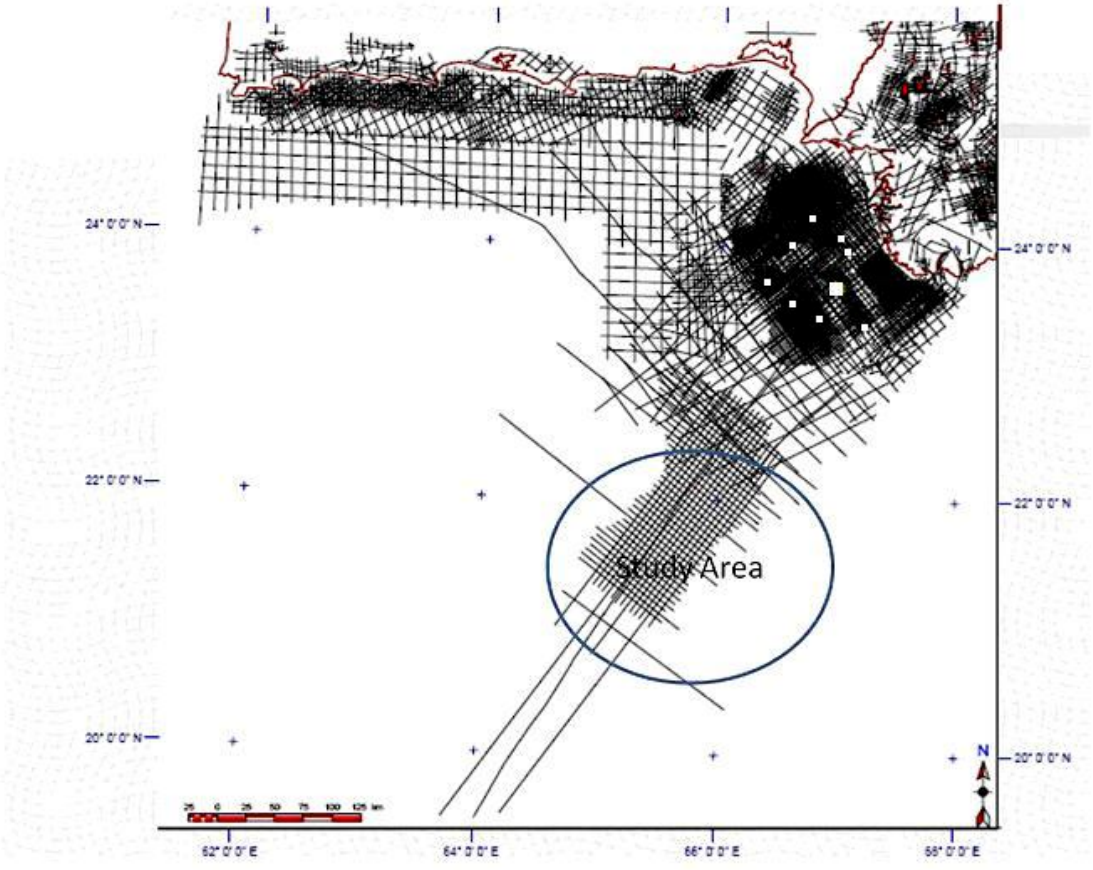


Fig.1. Base map of the study area showing the locations of the seismic data used in present work. White squares are the locations of Wells.