

Processing and Interpretation of Seismic Data from the Papua New Guinea Highlands – an Integrated Methodology

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Acquisition, processing and interpretation of seismic data in the PNG highlands is difficult. Physical factors include the rugose topography, limited access due to dense jungle coverage, the presence over much of the prospective area of thick karstified limestone in the near surface, adverse weather conditions even during so-called “good” weather windows, and the steep dips and complex subsurface structures associated with a foldbelt environment. Other difficulties such as tribal boundaries and helicopter operations, although important, do not generally impact on the quality of the acquired seismic data and are thus not considered a “seismic problem”, but the combination of these factors lead to seismic data which is expensive to acquire and often of “poor” quality with a low signal-to-noise ratio.

The focus of this paper is to show how Oil Search deals with these “seismic problems” primarily when processing and interpreting the acquired seismic data. An integrated methodology is employed that integrates the seismic data with other physical data at all stages of the seismic workflow. The non-seismic data includes surface-bedding dips and azimuths measured along each seismic traverse, Strontium age-dating to determine the thickness of surface limestone units, and well-derived information (velocities, subsurface dips, etc.). Innovative techniques have been developed in processing to allow this integration and also to enhance the seismic data as much as possible without imposing a predefined subsurface image on the data. Techniques discussed included “Enhanced” stack processing, “GeoDisp” seismic display, “DipBar” migration and depth migration of the final data. Comparisons of this approach with previous processing will be shown.