The Application of Seismic Reservoir Characterization in a Complex Area – A Case Study from Block M3, Myanmar

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Abstract

Awarded to PTTEP in 2004, Block M3 is located at the edge of the Gulf of Moattama, offshore Myanmar. Following a seismic acquisition and exploration drilling campaign, four gas discoveries were made associated with challenging reservoir conditions, as both carbonates and pyroclastic reservoirs were identified as the main plays. Since carbonate and volcanic rocks are highly heterogeneous by nature, constructing a reliable subsurface model in this area has been very challenging. To further reduce uncertainties, a 3D pre-stack deterministic inversion was carried out. A rock physics study showed that the pyroclastic rocks could be classified based on variations in their elastic properties. Based on this information, and to improve the understanding of the geological development of the area, a seismic reservoir characterization study was initiated.

From rock physics study, volcanic rock types could be classified into five different facies using a compressional velocity – density cross plot. According to core analysis, low density and low velocity facies tend to be associated with felsic vitric tuff; while, higher density and velocity facies related to mafic crystalline lava. The rock physics analysis also showed limited ability when applying a similar lithology classification scheme for carbonate rock types in the area, as these were highly heterogeneous with overlapping elastic property trends.