Quantitative Reservoir Characterization of PM3 Block, Malay Basin

Yanpeng Mi, A. Ruiter, and R. Quinn
International Operation East, Talisman Energy Inc., Calgary, AB, Canada.

Talisman Energy Operates and produces oil and gas from fields in the PM3 block in the Malay Basin with Partners Petronas Carigali and PetroVietnam. The stratigraphy of the fields is dominated by fluvial channel systems from the age as early as early Miocene to Pleistocene. In this period, the sea level fluctuated rapidly, causing intermittent deposition of marine shale and subsequent exposure to allow river systems to form. The fields are typically structural plays that formed by 3-way dip closure with up-dip fault seal. Tectonically the fields are associated with the basin inversion started from early Miocene.

These sand channel fairways are often clearly defined on 3D seismic data. Edge-related seismic attributes can often clearly define the channel edges. The difficulty in exploring for and developing these channel systems is in predicating the channel fill type, sand thickness and fluid content (oil gas or water). Other lithofacies such as low density carbonaceous shale and coal-rich flooding plain deposit can easily be mistaken as gas sand if only the post-stack amplitude attribute is used.

Identifying the best channel attributes to predict the channel composition has been an on going challenge. AVO analysis theoretically holds great promise, but accurate AVO analyses require more carefully processed 3D data than is the industry norm. Seismic resolution is often limited with tuning thickness around 18 meters. Seismic anisotropy may strongly affect the data and will likely overwhelm the fluid affect, which leads to false AVO responses.