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Session: 8

A Seismic Inversion Method for Fluvial Reservoirs in South East Asia

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Seismic amplitude inversion has proven to be a useful method to help characterize hydrocarbon reservoirs in South East Asia. The seismic inversion method often inverts band-limited seismic data and combines the result with a low frequency model to provide a final full-band impedance result. A common problem is that the spatial distribution of well data is often insufficient to adequately define the spatial variations of low frequency components that are missing from seismic data. This problem is especially pronounced in thinly bedded successions containing sedimentary deposits that have rapid lateral facies variations.

Fluvial reservoirs that are commonly exploited for oil and gas in many basins in South East Asia are a classic example of this problem. In these cases, a low spatial frequency of well data is often combined with a high spatial variation of the actual impedance properties of the fluvial deposits. In traditional inversion workflows, the spatial interpolation of well data used to define the low frequency model often results in false and widespread low frequency artefacts in the final inversion results.

An alternative method is proposed which relies on information within the seismic bandwidth (ie relative properties) to help predict the low frequency model. This is achieved by modelling the depth trends present in full band well data in combination with an initial inversion of the band-limited seismic data. This initial inversion result is then used to provide the low frequency component for a second seismic inversion. The method avoids the generation of the low spatial frequency artefacts and is directly applicable to many South East Asian reservoir successions. Several examples are shown in which this method produces valid and useful results.

Speaker's Biography

Mark Sams is An expert with 30 years of academia and industry experience in the fields of rock physics and seismic reservoir characterisation, as well as deterministic and geostatistical inversion. Mark has carried out hundreds of rock physics and inversion projects throughout the Asia Pacific and Middle East regions. He has taught and mentored throughout these regions and has published widely, in addition to presenting at major conferences for EAGE, SEG, SPE and AAPG.