

Karakterisasi Reservoir Menggunakan 3D Seismik Broadband: Studi Kasus Eksplorasi Batupasir Cretaceous, Cekungan Arafura Utara = 3D Broadband Seismic Reservoir Characterization: Case Study of Exploration Cretaceous Sandstone, North Arafura Basin

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Abstrak

Tesis ini menghadirkan penelitian mengenai kontribusi penerapan Inversi Seismik *post-stack model-based 3D broadband PSDM* dan *atribut seismik 3D broadband PSDM* dengan hanya berdasarkan data seismik, dikarenakan belum adanya informasi sumur pada kedalaman target eksplorasi. Sebuah studi kasus telah dilakukan pada umur kapur akhir – kapur awal yaitu pada interval *batupasir serpih laut dangkal* pada lapangan penelitian di *perairan Arafura, Indonesia Timur*. Hasil tesis menunjukkan bahwa atribut seismik yang dapat digunakan untuk membantu interpretasi struktur adalah: impedansi akustik relatif, cos phase, dan dip (untuk interpretasi fault). Kemudian penggunaan atribut seismik yang dapat mengurangi resiko ketidakberhasilan dalam pengeboran dengan menunjukkan keberadaan indikasi langsung hidrokarbon adalah: *sweetness*, amplitudo rata-rata (rms), frekuensi sesaat dan dekomposisi spektral. Lalu berdasarkan sayatan horizon seismik dari hasil komponen absolute *post-stack model based inversi seismik* dapat membantu memberikan informasi distribusi secara lateral paket sedimentasi dan secara vertikal menunjukkan reservoir berpori dan kualitas bagus berdasarkan properti impedansi akustik bawah permukaan.

The thesis investigates the contribution of applying *3D broadband PSDM post-stack model-based seismic inversion* and *3D broadband PSDM seismic attributes* independently based on seismic data-driven, due to no well information at reservoir exploration target. A case study from the late cretaceous – early cretaceous *shallow marine sand-shale* interval in *Arafura Sea*, *Eastern Indonesia* has been perform in this thesis. The thesis work have showed that the most promising seismic attributes capable to support structural interpretation are: relative acoustic impedance, cos phase, and dip (for fault interpretation). After that application of seismic attributes to low the drilling risk as a direct hydrocarbon indication are attributes; *sweetness*, root mean square (rms) amplitude, instantaneous frequency and spectral decomposition. And then based on the horizon slice of absolute *post-stack model based inversion* results able to provide the lateral distribution sedimentary packages information and vertically denoting their high porous and good quality reservoir based on the subsurface acoustic impedance properties.