Avo sismofacies untuk identifikasi hidrokarbon studi kasus : shallow gas zone lapangan "X" Cekungan Kutei = Avo sismofacies for hydrocarbon identification case study : shallow gas zone field "X" Kutei Basin

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Abstrak

[Lapangan “X” merupakan lapangan gas terbesar di delta mahakam dengan luas area permukaan yang mancapai 1350km2 dan total akumulasi gas terproduksi mencapai 8 tcf sejak tahun 1990 hingga saat ini. Penurunan produksi yang cukup tajam melatarbelakangi
pengembangan gas di zona dangkal (shallow gas). Sedimen pada zona dangkal ini tersusun oleh endapan deltaik berumur Miosen Atas – Pliosen dengan batupasir sebagai batuan reservoar utama. Keberadaan fluida gas pada batupasir akan berdampak pada penurunan kecepatan gelombang
P dan densitas batuan sehingga memberikan kontras impendansi akustik yang kuat terhadap lapisan shale. Kontras impedansi akustik ini terlihat sebagai anomali amplitudo (brightspot) pada seismik. Adanya kenaikan nilai amplitudo seiring dengan bertambah besarnya sudut datang menjadi hal yang menarik dalam interpretasi shallow gas ini.
Tujuan dari penelitian ini adalah untuk mendeteksi keberadaan shallow gas di lapangan “X” menggunakan atribut AVO Sismofacies dengan 2 sumur yang dijadikan referensi untuk pemodelan synthetic AVO. Penulis menggunakan 2 sumur lainnya sebagai kalibrasi terhadap anomali AVO dari Sismofacies cube yang dihasilkan.
Metode AVO sismofacies ini tidak menggunakan parameter intercept (A) dan gradient (B) untuk kalkulasi AVO melainkan menggunakan dua data substack yaitu Near dan Far stack. Crossplot antara Near dan Far pada zona water bearing sand dan shale diambil untuk mendapatkan background trend sehingga anomali yang berada diluar trend tersebut dapat diinterpretasikan sebagai gas sand.
Hasil dari analisis AVO Sismofacies ini cukup baik dan menunjukkan kesesuaian dengan interpretasi gas di beberapa sumur dan efek Coal berkurang jika dibandingkan Far stack. Meskipun demikian interpretasi AVO ini sebaiknya diintergrasikan dengan analisis dari atribut seismik lainnya untuk memperkuat interpretasi;Field “X” is a giant gas field in mahakam delta which cover 1350km2 of the area with total
cummulative gas production has reached 8 tcf since 1990 to recently. A significant decreasing of gas production has led to produce gas accumulation in shallow zone as an effort to fight againts this decline. Shallow zone is a deltaic sediments which deposited during Upper Miocen to Pliocene with dominant reservoir is sandstone.
The presence of gas in sandstone has an impact on decreasing of velocity P as well as density which giving a contrast of acoustic impedance to the overlaying shale. Contrast of impedance can be observes in seismic as an amplitude anomaly or so called a brightspot. An increase of amplitude along the offset become more interesting in shallow gas interpretation.
The aim of this study is to detect shallow gas accumulation di field “X” by using AVO

Sismofacies attribute with 2 wells as references to model respons of AVO. The result of AVO sismofacies will be a cube and the interpreation will be calibrated with 2 existing wells containing proven gas bearing sands.

AVO Sismofacies method will introduce Near and Far substack to be used in the calculation instead of using common AVO paramter intecepth (A) and gradient (B). A crossplot between substacks will create a background trend from water bearing zone and shale hence any outliers can, then,be interpreted as gas anomaly.

AVO Sismofacies result is encouraging and some of AVO anomaly has been well calibrated with existing wells. Coal effect which led to misintepretaion in shallow gas sand is diminished compared to Far stack. Despite of this result, this anomaly interpretation need to be intergrated with anothers seismic attribute to gain the level of confidence for shallow gas interpretation., Field “X” is a giant gas field in mahakam delta which cover 1350km2 of the area with total cummulative gas production has reached 8 tcf since 1990 to recently. A significant decreasing of gas production has led to produce gas accumulation in shallow zone as an effort to fight againts this decline. Shallow zone is a deltaic sediments which deposited during Upper Miocen to Pliocene with dominant reservoir is sandstone.

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