

Enhancing Reef Carbonate Identification in the Salawati Basin: Insights from 3D Seismic Data Acquisition in Klamassosa, 2017, Revealing Small-Scale Reefs Beyond the Reach of Existing 2D Seismic Lines

Ahmad D. Fatahillah¹, Triputra A. Pribadi¹, Ferdy Ferdy¹, Enik P. Lestari¹, Ikhwan M. Harun¹, Mohammad R. Adhyatma¹

¹Pertamina EP

Abstract

The 2017 acquisition of 3D seismic data in Klamassosa has significantly advanced reef carbonate identification and characterization within the Salawati Basin. Addressing lateral distribution concerns, the 3D data revealed small-scale reefs not captured by traditional 2D seismic lines. Successful velocity modeling techniques mitigated uncertainties in carbonate build-up geometry, enhancing our understanding of complex geological features. This improvement in accuracy and resolution facilitated successful exploration wells including MSK-1 (2022) and KMM-1 (2023).

Additionally, the acquired 3D seismic data supports advanced seismic analyses, including seismic inversion and seismic AVO, proving invaluable for characterizing lateral properties in data-limited areas. This approach has demonstrated success in the Salawati Basin, which has faced a shortage of well data due to insufficient exploration activity over the past 15 years. The implementation of acoustic impedance inversion in MSK and KMM structures by using crossplot analysis revealed a contrast between porous and tight formations, aiding in the delineation of porous zones within the carbonate reef.

In conclusion, the integration of 3D seismic data in the Salawati Basin, coupled with recent discoveries, has not only uncovered new prospects but also reduced uncertainties in lateral coverage, surpassing limitations associated with previous 2D seismic data.