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## **Characterizing Carbonate Reservoirs through Sequence Stratigraphy and Seismic Attributes Analysis: An Example from the Miocene Carbonate of Central Luconia Province, Offshore Sarawak**

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### **Abstract**

The growth architecture, faulting and karstifications of the Miocene carbonate build-up in Central Luconia Province, offshore Sarawak, Malaysia were studied using an integrated 3D seismic and calibrated with core and well-logs. A high resolution well-to-seismic tie was obtained through the application of climate stratigraphic approach. This calibrated 3D seismic data were then analyzed using sequence stratigraphy and seismic attributes analyses. The RMS (Root Mean Square) attribute displays the best build-up morphology image that distinctively disseminates zones withinbuildup and interbuildup areas. Spectacular arrays of facies heterogeneities across the buildup were also observed. The facies range from back reef lagoonal and reef front to off-reef facies. The calibrated seismic facies analysis reveals the association of the reservoirs with the mounded reefal and progradational facies. Evidence for porosity and permeability enhancements through karstification was also observed. The extraction of seismic attributes at different stratigraphic levels of the buildup shows progressive growth architecture of the build-up from Early Miocene to Late Miocene. The carbonates were accumulated in two major sequences. The initial growth corresponded to a major sea level rise in the Early to Middle Miocene. The build-up was then subaerially and repeatedly exposed, and finally drowns during a major sea level rise at the beginning of the Pliocene. Generally, three main factors controlled the growth and the architecture of the buildups; tectonics, relative sea level changes and also the paleowind direction.