

Seismic Attributes for Differential Compaction Features in Fluvial Channel Complex and Reef Carbonate Buildups: Case Study From Malaysia Basins

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ABSTRACT

‘Differential Compaction’ features have been reported from various basins around the world and are found to give notable seismic expression. These features form as the different sediments (shale or sand or limestone) are compacted differently as per their mineralogical constituents and therefore produce a subtle irregular topography. Differential compaction on seismic can be used to define features of interest, such as identifying subtle carbonate buildups in a shale matrix and also to define channel fill, point bars sand in complex channel belt surrounded by shale matrix flooding plain. The constituent of shale is mainly clay minerals (i.e kaolinite, illite) known as phyllosilicates meanwhile sand constitute of silicate. These sheeted phyllosilicate minerals have a tendency to be compacted more than silica by overburden stress thus will give the seismic expression of differential in compaction. In this paper we will discuss some of the striking differential compaction features from two examples of (1) negative relief, shale-filled channel features with excellent positive relief of sandy point bar build up with a shale matrix (flood plain) in the Malay Basin, and also (2) carbonate reefal buildups in a shale matrix in the Central Luconia Carbonate Province. Using this thorough and “creative” approaches of seismic interpretation together with detailed analysis of various seismic attributes and different color blendings, the ‘unseen’ potential that was left behind can be opened up. Besides from reefal carbonate and channel belt complex, this method also can be applied at other geological setting with differential of elements such as a distal sand of turbidite and slope deposit.