

CERAMAH TEKNIK TECHNICAL TALK

Seismic Geomorphology; mitigating lithology prediction risk and providing context for further investigation - Applications and workflows

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Abstract: As high-quality 3D seismic data has become widely available, our ability to predict the subsurface distribution of lithologies has significantly improved. Stratigraphic interpretation of seismic data involves the integration of stratigraphy and geomorphology, with integrated section and plan view images yielding robust interpretations of stratigraphic architecture and associated lithology.

Geologically-meaningful seismic patterns can be recognized in multiple domains, including section views, plan views, 3D perspective views, and animated (i.e., movie) views. Once such patterns have been identified, interpreters can then populate these patterns with appropriate lithologies. Seismically-derived geologic interpretations can have significant impact on exploration and production in the following ways:

Geology: 1) prediction of lithology, 2) prediction of compartmentalization, 3) development of depositional analogs, 4) Enhanced understanding of geologic processes.

Geophysics: 1) provides depositional context for geophysical analyses (e.g., DHI analysis, reservoir properties from seismic). Understanding geologic context can provide a “reality check” when evaluating geophysical data for rock and fluid properties. 2) Quality control for geophysical processing. Evaluating the quality of seismic images, especially in the plan view domain, of known geologic features can help determine the value of a given processing step. Ensuring that meaningful geologic features are not processed out of the data is critical to maximizing the value of seismic data.

Examples will be shown from deep-marine as well as shallow-marine and non-marine environments, illustrating how patterns observed from multiple seismic domains can lead to robust geologic interpretations and predictions of lithology. Critical workflows designed to efficiently “mine” 3D seismic data also will be illustrated.

