

# **Seismic Geomorphology and Seismic Stratigraphy – Extracting Geologic Insights from 3D Seismic Data**

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## **Objectives**

This course is designed to enhance interpretation skill sets with regard to geologic interpretation of seismic data. The overall objective is to present seismic interpretation methods and workflows for reducing risk with regard to prediction of lithology, reservoir compartmentalization, and stratigraphic trapping potential in exploration and production. In addition, correct identification of depositional settings provides necessary context to standard geophysical analyses. Specifically, the participant will be shown:

- workflows designed to facilitate extraction of stratigraphic insights from 3D seismic data
- techniques for 3D seismic geomorphologic/stratigraphic analyses
- numerous examples of various depositional systems in various depositional settings (i.e., fluvial, marginal marine, deep-water, shallow-water carbonates) – recognition of those patterns of geological significance is critical to successful application of these workflows
- discussion, with examples, of pitfalls in interpretation

## **Content**

The application of seismic geomorphology and seismic stratigraphy to exploration and field development is a natural consequence of the advent of high-quality and increasingly more affordable and widespread 3D seismic data currently available. Integrating analyses of plan view (geomorphologic) and section view (stratigraphic) images can significantly enhance predictions of the spatial and temporal distribution of subsurface lithology (reservoir, source, and seal), compartmentalization, and stratigraphic trapping capabilities, as well as enhanced understanding of process sedimentology and sequence stratigraphy.

Participants in the course will be exposed to seismic geomorphologic/stratigraphic workflows, which involve 1) initial reconnaissance through 3D volumes with various slicing techniques using a variety of different seismic attribute volumes including full stack reflection amplitudes, near and far stacked amplitude volumes, and coherence volumes, in conjunction with opacity rendering, 2) focus on features of geologic interest and further investigate through a combination of detailed slicing, interval attributes, horizon picking and amplitude extraction, horizon illumination, etc., and 3) comprehensive integration of seismic geomorphologic analyses with seismic stratigraphic

analyses, whereby the plan view is integrated with the section view to ensure a consistent interpretation.

Course lectures will involve both PowerPoint presentations as well as interactive demonstrations illustrating the interpretation of 3D seismic data. A wide variety of depositional settings will be shown, ranging from non-marine to marginal marine, shelf and deep water, and will include both clastic as well as carbonate depositional environments. Concepts as well as applications pertaining to seismic-based analyses of depositional systems will be covered in detail.