



Multicomponent seismic attributes for Structural and Stratigraphic interpretation of the oil-sand reservoirs

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Summary

Understanding the heterogeneity of oil-sands reservoirs starts with proper estimation and visualization of the structural and stratigraphic seismic attributes which represent the framework that will be later populated with rock and fluids properties.

Structural and stratigraphic seismic attributes derived from multicomponent (three-component) seismic data are analysed and compared. We present the semblance and spectral decomposition of the PP and of the PS seismic data. Surprisingly, we see different details of the subsurface depending on which component is used for the attributes.

This is because each type of reflection (PP and/or PS) is controlled by different elastic properties of the medium, some associated with the rock matrix, and some associated with the bitumen present in the rock. This different reflectivity behavior can cause some stratigraphy to be imaged by one wave mode better than the other, depending on the stratigraphic sequences and on the petrophysical variations at their interfaces (Hardage et al., 2003).

By combining seismic attributes derived from PP and PS seismic data, we managed to reveal new aspects of the stratigraphic architecture and better understand the reservoir in the area under study.