

## **Seismic Lithology and Depositional Facies:**

### **A Link between Rock and Seismic**

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Amplitude variation with offset (AVO) is a seismic attribute containing valuable lithology information. Although AVO analysis can provide three-dimensional lithology information, the technique has not been sufficiently utilized in many geologic interpretations owing to the difficulty in handling pre-stack seismic data. Moreover, most previous AVO analyses have solely focused on detecting gas sands. This study suggests a convenient method to extract a seismic lithology attribute using an AVO crossplot method.

A crucial step for AVO analysis is to understand relationships between AVO attributes and rock properties. Missing petrophysical data can be estimated by proper empirical relationships. However, a uniform rock property assumption disregarding lithology variation has to be avoided in order to predict an accurate AVO response. Synthetic seismic modeling enables us to predict AVO crossplot responses depending on variations in each rock property. A seismic lithology attribute cube is created by muting the unimportant lithology AVO crossplot trend and highlighting the preferred lithology crossplot trend.

Based on the seismic lithology attribute, this study attempted to interpret depositional facies. Depositional features are easily recognized on seismic horizon slices. Combining seismic lithology and proportional horizonslicing methods enhances interpreting depositional facies architecture and stratigraphic sequence. Seismic lithology is especially useful for interpreting the depositional facies that do not have distinct channelized features. Moreover, high-frequency stratigraphic sequences are identified by seismic lithology maps by interpreting successive horizon slices.