Imaging Techniques In Seismic Geomorphology

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ABSTRACT

Pattern recognition has long been a key to our understanding of geologic landforms and depositional regimes. Channels, dunes, reefs, debris flows, and karst regions all exhibit various geomorphic patterns that provide insight into their origins. In fact, much of the success or failure associated with a geologic investigation depends on our ability to identify and classify various depositional and/or erosional patterns. For the geophysicist interested in reconstructing ancient landforms hidden within his or her 3D seismic amplitude data, there are many challenges that need to be addressed in order to accurately image the associated patterns. To begin with, the frequency content of traditional seismic data may not be appropriate for resolving certain geologic features. Subtle lithologic changes are not always apparent to the interpreter using traditional seismic data. And variably dipping seismic reflectors can often obscure the original depositional patterns required for in-depth analysis. The purpose of this discussion is to highlight and discuss various imaging techniques in seismic geomorphology. Many different seismic attributes and spectral decomposition techniques are often able to enhance and bring out subtle features and/or lithologic changes that are still hidden within a traditional seismic amplitude display. Flattening and various slicing techniques can be used to help unravel complexities related to non-uniform horizons. Volume co-rendering of differing attributes can provide additional insights as compared to a single attribute. And finally, voxel body picking allows the interpreter to focus in on a specific range of attribute values which are useful in defining geobodies.