

Seismic Geomorphology and Interpretation of Cretaceous Depositional System of Penobscot Prospect, Sable Island, Canada

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Abstract

The Scotian Basin is a classic passive margin located on the northeastern flank of the Appalachian Orogen. Deformation has affected the Cretaceous interval during both extensional and compressional regime. Faults in the Penobscot study area are reverse in nature at depth and normal nature at shallow levels. Polygonal faults are also present in the area. In Cretaceous intervals rollovers, drag anticline, drag syncline, antithetic normal faults, drape, ramp, canyon, slope channel complexes, channel fill, channel levee complexes and stratigraphic edges are interpreted with the help of 3D attributes map. One of the major problems with identifying geomorphic features on seismic data is the resolution and noise of conventional seismic data. Hence, for better resolution dip steered median filter is used to remove noise, acquisition footprints and enhance laterally continuous seismic events by filtering of original seismic data. It is difficult to identify channels and channel levees on seismic data due to different deformation in the Cretaceous interval. By applying the proposed integrated seismic workflow, several geomorphic features are identified. Fault bend folds and normal faulting can act as a trapping mechanism in the area. Results obtained by applying the proposed workflow, it was found that the previously drilled wells in the area were dry because of the antithetic faults compartment which act as seal and hydrocarbon could not migrate into the particular compartment. In addition, these faults were only visible on horizon attribute maps.