

Basin Characteristics, Tectonic History, and Grain Size are Main Influences in the Transport and Deposition of Turbidity Currents

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ABSTRACT

Several factors determine the depositional characteristics of turbidite deposits. Important ones are the source area, as well as grain size and mineralogy, at the time that sediment bypasses the shelf break. Transport volume, frequency, and basin gradient(s) can vary considerably between flows, which influences the areal extent, thickness, and location of succeeding layers. Many basins, especially those influenced by salt diapirs, are constantly in motion, causing their deep sand-rich zones to be tilted tectonically through time. Fine-grained sediments tend to form oblong deposits with the majority of the sand deposited in the distal outer fans (bypassing system). Coarse-grained sediment forms wider deposits that show a grain-fining in the downdip direction (prograding system).

Later tectonics may contort the original basin shapes. Searching for hydrocarbons in these deposits should not be based solely on seismic interpretations, but should also utilize a combination of new seismic processing methods and other geological studies. The studies should include the source-to-sink concept, mineralogy, and grain size. A compilation of detailed seismic layering and lateral changes of sediment types should be produced. Structural studies should infer the original shape and size of the basin, as well as changes during and after deposition, temperature histories, and pressures.

Although this method seems difficult and complex where experts work together, in reality less time is required than one might expect. Practically all companies conduct these different studies piece-meal through time. Completing these initial steps increases the chances of successfully discovering hydrocarbons and also provides for understanding the total depositional environment (vital for predicting production).