Late Quaternary Forced-Regressive Wave-Dominated Shelf-Margin Deltas, Northern Gulf of Mexico

Lozano, Felipe A.[1]; Marfurt, Kurt J.[2]; Bhattacharya, Janok [1] (1) University of Houston, Houston, TX. (2) University of Oklahoma, Norman, OK.

Three dimensional seismic data along with modern seismic geometric attributes allow analyzing the evolution of a wave-dominated shelf-margin delta offshore Louisiana, northern Gulf of Mexico.

The shelf-margin delta prograded within an upper slope salt-withdrawal minibasin during the last falling and lowstand stages of sea-level (25 - 10 Ky).

Dip-oriented seismic profiles show the presence of prograding clinoforms that are interpreted as being formed during a sea-level fall (forced regression) based on the negative basinward-stepping shelf edge trajectories. The forced regression is followed by a lowstand stage of sea-level that was recognized by the flat to positive shelf edge clinoform trajectories.

Plan view images of attributes extracted along picked clinoform surfaces revealed the presence of shelf strike-oriented linear features that are directly linked to a slope channel system.

The geomorphologic expression of the linear features allows us to interpret them as wave-dominated deltaic shorefaces that prograded over the shelf edge during a forced-regression of sea-level feeding as a linear-source dozens of tributary slope channels. The slope channel system is characterized by several tributary channels of about 100 meters wide that converge into a main channel at the axis of the minibasin. The main channel continues downslope and is linked to a further minibasin.

Although wave-dominated deltas formed at the shelf edge are considered to be more related to flat and positive shelf edge trajectories, the data presented in this study shows that wave-dominated deltas can be related to negative shelf edge trajectories formed during forced regressive stages of sea-level.

In these cases, wave-dominated shelf margin deltaic shorefaces can be considered an important element that can supply sediment from the shelf to the slope and deep-water environments.