

Sequence Stratigraphy and Sedimentology of Wave-Dominated Continental Shelf Margins

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ABSTRACT

A fall in relative sea level may result in the fluvial incision of the continental shelf. Depending on the magnitude of the sea level fall, part of or the whole shelf may be exposed resulting in erosion and sedimentation at the shelf margin. A partial fall may result in the erosion and incision of the upper coastal prism and shelf bypass in the form of a single channel thickness. The rate and duration of subsequent transgressions and highstands determines the resultant sedimentary record. Sea level rise results in the reworking of coastal and shelf sediments and often in the formation of backstepping barriers. These barriers represent shorelines, modified by the effects of waves, tidal and shelf currents. These physical effects form identifiable surfaces such as tidal and wave ravinement surfaces produced during transgression.

The continental shelf of southeast Queensland has been described as a tectonically stable, wave-dominated, sediment deficient margin. The low gradient of the continental shelf (1°) means that clastic sedimentation is limited to the coastal prism and inner shelf while calcareous material occurs on the outer shelf. Gradients in excess of 1° cause clastic sedimentation further offshore. Seismic reflection profiling and cores from the RV Franklin FR15/98 cruise provide a useful database to further understand shelf processes in wave-dominated shelf settings. The aim of this study is to develop a model of evolution of the southeast Queensland shelf that could be useful as an analog for hydrocarbon exploration in similar ancient settings. The study also may shed light on the Quaternary coastal evolution as a product of climate change.