Clastic Shelf to Deepwater Sediment Delivery Systems – an Analogue from the Eastern Australian Continental Margin

Lang, Simon[1], Ross Powell[2], Ron Boyd[3], Kevin Ruming[3], Ian Goodwin[3], Tobias H.D. Payenberg[1], Marianne Sandstrom[4] (1) University of Adelaide, Adelaide, Australia (2) Northern Illinois University (3) University of Newcastle, Callaghan, Australia (4) Australian School of Petroleum, Adelaide, Australia

The terminus of a 2000km long, clastic littoral drift system at the eastern Australian continental shelf break offshore from Fraser Island, may provide a useful analogue for deepwater exploration offshore from wave-dominated margins lying along strike from major lowstand sediment accumulations (e.g. West Africa, NW Australia, SE Asia).

Using >4000km2 of multibeam swath mapping and seismic profiling from 20m to 4300m collected on the RV Southern Surveyor research cruise in January 2005, sediment pathways were mapped showing highstand shedding of clean sandy clastics directly to deepwater via narrow canyons and gullies incised into a relict (Pleistocene and Miocene) carbonate platform. On the shelf, seismic reveals a small incised valley feeding a lowstand delta wedge covered by a broad sheet of tidal delta sand bodies. On the slope, seismic reveals canyon/gully clastic fills, inter-canyon/gully slope apron drapes, and a giant debrite field (20km x 15km). The lower slope shows channels and levees leading to the abyssal plain. Deeply incised, shelf margin gullies funnelling shallow shelf sands directly into canyons cut deeply into interbedded slope sediments and underlying sediments. Grab samples from the canyons reveal clean quartz sands that feed an axial canyon parallel to the toe of the slope (>3900m) containing a channel and levee system that feeds a frontal splay complex (>4300m). On the slope, outside the gullies and canyons, is a drape of stratified hemipelagic clays, and very fine-grained quartz-foraminiferal sands, interbedded with pelagic carbonate foraminiferal ooze, glauconitic clays and fine sands. The muddy debrites show a chaotic seismic character. The dataset is a useful analogue for understanding reservoir presence in comparable settings in petroleum basins.