Geophysical Research Abstracts
Vol. 16, EGU2014-6324, 2014
EGU General Assembly 2014

Postglacial transgressive stratigraphy of the Durban continental shelf, South Africa

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This paper examines the geomorphology and seismic stratigraphy of the high-energy KwaZulu-Natal shelf offshore Durban, South Africa. Particular attention is paid to a laterally persistent (30 km) Holocene submerged shoreline located at 60 m water depth. Five major seismic units are identified (Units 1-5). Unit 1 comprises a series of infilled incised valleys that formed during the sea level lowering towards the Last Glacial Maximum. Unit 2 comprises a calcarenite core that forms the -60 m postglacial barrier complex. Unit 3 comprises lake-lagoon depressions in the back-barrier that formed simultaneously with the barrier system. These are backed to landward by several relict parabolic dunes preserved in Unit 2. Several relict weathering features (Unit 4) are associated with the barrier and reflect similar processes observed in contemporary aeolianite/beachrock outcrops on the adjacent coastline. These are draped by a thin veneer of post-transgressive Holocene sediment that caps the shelf stratigraphy (Unit 5).

The development of the barrier and associated features occurred during a period of stillstand or slowstand associated with the Younger Dryas Cold Period (∼12.7-11.6 Ka BP). Shoreline preservation in such a high-energy environment is considered unlikely as a result of the intense ravinement processes experienced during shoreline translation, coupled with the relatively low gradient setting of the KwaZulu-Natal shelf. The preservation of both the 100 m and 60 m shorelines was fostered by overstepping of the paleo-landscape, whereby preservation was promoted by a particularly rapid phase of relative sea-level rise associated with meltwater pulse 1B. This was further aided by early subtropical diagenesis during stillstand.