

## **Morphology, depositional patterns and sedimentary processes along the northwestern Great Bahama Bank slope**

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The Carambar Cruise, carried out aboard the R/V Le Suroît in November 2010, allowed for the first time to image the physiography of the northwestern Great Bahama Bank (GBB) slope and the adjacent Florida Straits basin using high-resolution tools such as a Kongsberg EM302 multibeam echo-sounder system (bathymetry and acoustic imagery), a 3.5 kHz profiler (Chirp frequency modulation) and a Kullenberg corer.

The 5000 km<sup>2</sup> survey revealed several unexpected large- and small-scale morphologies. These include erosional furrows, a gully system, sediment waves and slope instabilities at various scales, including failure scars, an escarpment and large mass transport complexes that extend over 20 km down to the basin (water depth = 1000 m). The toe of the slope is irregularly covered with deep-water carbonate mounds.

A detailed study of EM302 acoustic facies and Chirp echo-facies analysis revealed a complex distribution of carbonate deposits during the Quaternary. It also highlights the present-day sedimentary dynamics along the slope controlled by two main parameters: (1) the platform morphology and (2) the contour current activity. Three areas of deposition have been clearly individualized along the margin of the GBB depending on the nature of the seismic facies and the nature and spatial extent of sedimentary features:

(1) A northern area with an open platform characterized by a thick carbonate sediment wedge that allows an important off-bank material export from the inner platform. It is inferred to be Holocene in age. This is consistent with the observation that the prism covers a very irregular Pleistocene surface is marked by erosional furrows perpendicular to the platform. This strong sediment export (200 cm / ka) suggests a correlation with the dominant easterly trade winds direction.

(2) A median area with a rimmed platform where the off-bank export is very limited by islands, reefs and tidal emerged bars, characterized by a short and steep margin.

(3) A southern area, with the slope connected to the platform, marked by the presence of gully system, plunge pools and sediment waves on the upper slope. These structures reflect the strong activity of density cascading currents that take place throughout the year. In this area, density cascading constitutes the main process of sediment export towards the basin during the Holocene.