1235504: Evidence of Regional Tectonic Tilting Using Seafloor Morphology, Little Bahama Bank, Bahamas

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Data collected during the second leg of the Carambar cruise (Nov. 2010) show the morphology of the northern part of LBB. In the eastern part, several canyon-like sedimentary systems extend S-N and are deflected eastward in the direction of the basin. These sedimentary systems comprise a tiny valley beginning at 300 m of water depth. These tiny valleys open down on a large amphitheater-shape structure formed by coalescing arcuate slump scars with an elevation of 50 m above seafloor. This amphitheater-shape structure represents a previous location of the head of the system that moved upward through retrogressive erosion. Inside the amphitheater, the seafloor consists of superposed terraces that probably represent buried slump deposits. The western part of the amphitheater is always more incised than the eastern part. The amphitheater narrows abruptly downslope and forms a very short and narrow channel (60-120 m deep, 400-600 m wide and 10 km long) that quickly opens into a fan-like depositional system at about 900-1000 m of water depth. Each depositional system spreads over 20 km. High resolution seismic profiles show that these depositional systems only consist of furrows with no recent and soft deposits. The cores collected there show partly consolidated carbonates. In the western area, a curious submerged structure lays down between 270 and 450 m of water depth. The particularity is that the two outlets are located in the deepest part and no entry appears in the shallowest part. The upslope flank is always the steepest being mostly vertical. This suggests that the structure could be an ancient slump scar partially buried and reactivated by submarine hydrodynamic processes. Three morphological features indicate a tectonic tilt of the northern part of LBB: 1) the presence of islands (cays) only in the eastern part of the LBB; 2) the presence of canyons only in the eastern part of the slope, with an incision depth increasing eastward and, 3) the incision of the western part of the head-forming amphitheaters being deeper than in the eastern part. In addition, high-resolution seismic shows tilted blocks also suggesting recent tectonic activity. This study will provide very accurate models of sediment transport and accumulation on windward/leeward carbonate slopes along isolated large carbonate banks. It will allow relating sedimentary records on carbonate slopes to carbonate production and accumulation on the banks.