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Early marine lithification on the western slopes of Great Bahama Bank, Bahamas

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The Bahamian archipelago does not presently receive any siliciclastic input, except under the form of windblown dust. Consequently, Bahamas form a pure carbonate system. The Bahama platforms are interpreted as a passive margin, and the sedimentation is mainly controlled by changes in relative sea level and biogenic production with no major influence from regional tectonics. Great Bahama Bank (GBB) is the largest carbonate bank of the Bahamian archipelago showing an average water depth lesser than 10 m. Off-bank transport and water column production are the main sediment inputs on the western slope of the Great Bahama Bank.

This work is focused on three marine cores (CARKS-08, CARKS-11 and CARKS-12), high-resolution bathymetric and very-high resolution seismic data (Chirp) collected during the CARAMBAR cruise (2010) along the western slopes (leeward side) of the GBB. The sedimentary analyses include spectrophotocolorimetry, grain-size measurements, indurated thin sections, X-ray diffraction (XRD) and identification of bioclasts. The stratigraphic analysis is based on planktonic foraminifera, twenty 14C radiocarbon ages, and 210Pb in excess.

Our preliminary results highlight the morphology of the sedimentary slope incised by several gullies. The sediment of the three cores consists of carbonate foraminifer oozes with a mudstone to wackestone texture interbedded with 50 cm thick beds of partially lithified carbonate sand with a wackestone texture. These partially lithified sediment beds mainly consist of foraminifera with a reduced carbonate mud fraction and agglomerate particles. XRD analyses show an increase of high and low-Mg calcite in those partially lithified beds and high aragonite content in the soft mudstone to wackestone beds.

Gullies are observed on the upper slope (3°), between approximately 410 and 610 m water depth. They are more incised in their central part, around 500 m water depth. The first partially lithified bed has been correlated in the three cores thanks to planktonic foraminifer assemblages and corresponds to the Last Glacial Maximum corresponding to period of significant reduction of off-bank transport.