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The carbonate Holocene wedge of northern Little Bahama Bank: between platform and deep domain

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Modern carbonate systems represent good analogs of ancient carbonate environments and allow connection between sediment facies and depositional processes. In modern carbonate environments, the tropical factory is mainly located on the shallow carbonate platform and platform margin. On the northern Little Bahamas Bank margins (LBB; Bahamas), the platform edge shows frequently a succession of cays or is interrupted by tidal passes. Coarse grained oolithic and bioclastic ebb and flood tidal deltas form on the seaward and landward part of the tidal passes, respectively. The area between the platform edge (20 mbsl, meter below sea level) and 300 mbsl is called the “uppermost slope”. On the uppermost slope, the tidal valleys are connected to the tidal deltas by small tidal channels incising the Pleistocene lowstand marginal deposits. The shallowest part of the uppermost slope is characterized by a succession of terraces and escarpments. Deeper than the steeper escarpment (marginal escarpment), i.e. at water depth varying between 170-190 mbsl and 360 mbsl, the seafloor is dominated by a homogeneous, fine-grained, soft sediment wedge with thickness varying between 0 and 35 m and called the Holocene wedge. On the deeper uppermost slope area, this wedge represents the main depocenter of fine-grained bank-derived sediments since the last bank flooding.
CARAMBAR 1.5 cruise (2014) allowed to collect more than 150 km^2 of bathymetry data and 1120 km of high-resolution seismic profiles on the uppermost slope. Twelve gravity cores sampled this wedge. This new data set allows to identify both the processes that can supply this wedge and its evolution based on content analyses and 19 radiocarbon ages.
According to the wedge morphology, particle size and content exported from LBB margins, deposition on wedge occurs mostly during episodes of winter cold fronts. Laminated sequences found on a small depression may correspond to hurricanes export. However, this process is not retained as main process that supply the wedge. Tides probably favor cold fronts and hurricanes export, not by mobilizing but by moving sediment seaward. The morphology of the platform edge locally allows a better sorting and export of sediments according to the presence of tidal outlets, where only coarse-grained material is settled.
The wedge initiation started at 13.6 $\pm$ 3.5 kyr cal BP, following the meltwater pulse 1A. It has been supplied by shallow environment-derived particles produced on four narrow terraces between 60 and 20 mbsl, after MWP1A, MWP1B and mwp1c. The main period of wedge growth started around 6.5 $\pm$ 0.9 kyr cal BP, when sea level reached the platform margins. The maximum flooding period around 4 kyr cal BP is characterized by the highest contents of aragonite needles, exported from the platform.