LARGE CARBONATE-FED DEEP-SEA TURBIDITE FAN DEVELLOPED AT THE MOUTH OF A GIANT CANYON ALONG THE BAHAMIAN SLOPE

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Leg 2 of CARAMBAR 2 offshore cruise was conducted from December 20th, 2016 to January 2nd, 2017 in the Bahamas archipelago onboard the R/V L'Atalante. The equipments used during this cruise were a Konsberg EM122/EM710 multibeam echo-sounder, a "Chirp" sub bottom profiler, a high-resolution (HR) multichannel seismic system and a Kullenberg coring system. It provides new high-resolution multibeam and backscatter mapping images, high-resolution (HR) and very high-resolution (VHR) seismic in Exuma Valley and Exuma Canyon located at the mouth of Exuma Sound (southeastern Bahamas). The collected data were used to highlight the valley and the canyon morphologies as well as the sediments processes and transfers trough the Exuma system. Exuma Valley is located in the Exuma Sound distal part and is limited by the steep walls and slopes of carbonate platforms including Conception and Cat islands, Rum Cay, and San Salvador in the north, Long and Crooked islands and Samana Cay in the south. It also cross trough the Crooked Island Passage (CIP). This system works as a transition area between Exuma Sound and the deep abyssal basin bordered by the Blake Bahamas Escarpment (BBE) known as San Salvador Abyssal Plain (SSAP). The valley is structured by a gently sloped U-shaped channel (< 1°) which is 144 km long, 3000 m below sea level, and punctuated by many knickpoints. It plunges in the canyon via two major knickpoints with outsized chutes exceeding several hundred of meters in height, which are interpreted as plunge pools. Exuma Canyon is a Ushaped canyon with a length of 44 km incising a drown Mesozoic platform on 1400 m, rivaling the depth of the Colorado Grand Canyon. The two unprecedented giant plunge pools created by hydraulic jumps are more than 200 m deep and are ten times bigger than subaerial plunge pools created by waterfalls like Niagara Falls. Such structures can be also observed in the tributary south branch of the canyon, the Crooked Canyon which joins the main canyon with another knickpoint. The canyon's mouth leads to a deep-sea turbidite fan with channel/levee systems in the San Salvador Abyssal Plain with pockmarks occurrence along the Blake Bahama Escarpment. As the canyon is not structured by a well-defined head, its supply is carried out not only by gravity flow processes from Exuma Sound upstream but also by sedimentary input originates from adjacent platforms. A dense gullies network is developed along the carbonate slopes of the platforms, draining the Exuma Valley. All the 10 m to 50 m high knickpoints encountered along the valley are the results of the merging between the gullies and the channel. These knickpoints attest the activity of the gullies slopes and thus, testify the off-bank transport coming from the carbonate platforms Long Island, Cat Island, Conception Island, Rum Cay and Samana Cay.