Cape-Fear Project: Eastern North American Margin (ENAM), free gas and gas hydrate occurences

Bodiguel-Dupuis Louis-Marin*[1,2], Celine Grall[1,3], Hugh Daigle[4], Anne Bécel[3], James Gibson[3], Nathan Miller[5], Emma Le Gall[1], Dave Foster[5], Wayne Baldwin[5], Bill Danforth[5], Ali Mohamed[4], and Mason Farnsworth[4]

[1]LIttoral ENvironnement et Sociétés – La Rochelle Université, Centre National de la Recherche Scientifique – France

[2]Institut Universitaire Europeen de la Mer – Institut de Recherche pour le Développement, Institut National des Sciences de l'Univers, Université de Brest, Centre National de la Recherche Scientifique – France

[3]Lamont-Doherty Earth Observatory – États-Unis

[4]University of Texas at Austin [Austin] – États-Unis

[5]United States Geological Survey [Reston] – États-Unis

Résumé

Along the Eastern North American Margin (ENAM), Mass Transport Processes (MTP) transfer major sediment masses from the lower margin towards the ocean basin. One emblematic example of MTP is the Cape Fear submarine landslide (CFSL), offshore North Carolina. The CFSL is a thick (> 1 km) sequence of Mass Transport Complexes that are likely active during the Last Glacial Maximum/ Early Holocene and since the Miocene/Oligocene. The most recent landslide sequence appears retrogressive, and > 20 m scars are observed on the seafloor today.

New data has been freshly acquired on the continental rise and slope near the CFSL on the R/V Marcus G. Langseth in between May 8th and June 10th 2023, in the frame of the collaborative international US-NSF project OCE-2140398. This project involves several international universities and institutions including UT Texas, Columbia University, USGS, the CNRS (LIENSs) and the Weizmann Institute.

We collect ˜ 4000 km of 2D high-resolution multichannel seismic (MCS) data along with bathymetry, Chirp sub bottom echo-sounding profiles, water column data, gravity and electro-magnetic measurements. Together with legacy data and previous geological surveys (carry on in 2014 and 2015). This dataset complements previous legacy data and geophysical observations carry on in this region in 2014 and 2015. This large data is ideal for studying pre-conditioning and triggering mechanisms of MTP in the ENAM Margin, the Atlantic Margins and similar rifted margins around the world.

We here present preliminary post-cruise analyses and correlations of MCS and Chirp sub-bottom profiles data in the region. We will show the mapping of the MTDs, the bottom simulating reflections (BSRs) and free gas occurrences at the sub-surface and near seafloor and further discuss their potential relationships.

*Intervenant

Mots-Clés: Rifted margin, geophysics, seismic, water column, gas, mass transport processes, gas hydrate