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Drilling the Tore seamount- Archive of a natural oceanic sediment trap

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Located 300 km off West Iberia in the open NE Atlantic Ocean, the Tore seamount emerges from the 5.5 km surrounding abyssal plains to a summit rim at 2.2 km, which has an elliptical crater-like shape with a central depression 100 km in diameter. The ~5.5 km depth of the Tore internal basin is connected to the surrounding deep ocean basin by a single narrow gateway down to 4.3 km depth. This basin is exceptional because it is 1) a giant sediment-trap for vertical fluxes, with sediments unaffected by deep currents and erosion, containing a record of enhanced biogenic subtropical productivity during deglaciations, which can be examined mechanistically, 2) a natural laboratory to examine carbonate dissolution at 5.5 km water depth constrained by NADW deep ventilation during glacials, and 3) an excellent location to test sediment processes distant from continental margins and understand triggering mechanisms of downslope flows in the open, deep ocean. Not many cores have been recovered in the area at such 5.5 km depth and unite this singular environment. At the larger scale of North Atlantic circulation and productivity, the semi-isolated Tore seamount is a most valuable site to assess crucial scientific hypotheses related to thermohaline circulation, carbon cycling and climate variability. These challenging questions are framed in the IODP Initial Science Plan illuminating Earth's Past, Present and Future, 2013-2023, theme Climate and Ocean Change.

Our APL applies for drilling one site in the middle of the Tore seamount at 5.5 km depth, to retrieve a complete Quaternary sedimentary sequence (180 m long). This carbonate rich archive will be compared with records available in the Northeast Atlantic and to be recovered during Expedition #771-Full2 (Hodell et al.).

We present results from a 24 long giant Calypso core taken in the APL-site proposed which covers 430 thousand years and 5 glacial-interglacial cycles (Spanish project "TORE5deglaciations", CTM2017-84113-R, 2018-2020).