



Cause of turbidity currents in the open deep-ocean

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The Tore Seamount (TS) provides a unique setting to test the cause of trigger of turbidites found in the open deep-ocean environment. The TS is a giant conical “sediment trap” with a 100 km-diameter rim 2.2 km below the ocean surface and 5.5 km water depth depression inside. Morphologically, it emerges from the surrounding abyssal floor and is 300 km distant from the Portuguese continental margin.

Continental margins concentrate many sedimentary processes, which are difficult to uncouple, including gravitational (turbidity and debris-flows) and bottom currents, nepheloid benthic storms, or settling from hemipelagic density cascading. Generation of currents depositing turbidites on the continental margins have been often attributed to mechanisms controlled by high- and low-frequency climate forcing (sea-level, ocean circulation, . . .), or seismicity. The TP offers the opportunity to analyse a record isolated from continental margin-associated processes.

Sediment core MD13-3473 sits in the middle of the TS at 5.5 km water depth. A 400 thousand-years record shows a number of turbidites up to 2 m in thickness, timed - with no coherent pattern – randomly during main deglaciations, interglacial and glacial stages, and during transitions of interstadials and stadials. We assume these turbidites in the interior of the TS have been favorably preserved from erosion and resuspension by bottom currents, contrary to what can happen on continental margins.

Here, we propose alternative triggers of turbidites which originated from the well-constrained internal slope of the TS from 2.2 km water depth to the deep centre.