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Unraveling depositional signals throughout a cold-water coral carbonate mound : implications for the environmental controls on Challenger Mound development (IODP Exp.307).

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Cold-water coral carbonate mounds are complex geo-biological systems, originating from the yet to be fully understood interplay of climatic, hydrodynamic, sedimentological, as well as biological contributors. As changes in the hydrodynamic and sedimentary regime are assumed to be amongst the main controls on mound evolution, reconstruction of the hydrodynamic and palaeoclimatic environment on-mound contributes to the fundamental understanding of the development of these intriguing, Quaternary features.

Challenger Mound, one of the large cold-water coral carbonate mounds along the eastern Porcupine Seabight continental margin (NE Atlantic, SW off Ireland), was successfully drilled during IODP Expedition 307, providing the first complete recovery of a continuous sedimentary sequence through a carbonate mound.

In this study high-resolution particle size analysis of the lithic sediment component is used as primary proxy for reconstructing the hydrodynamic conditions during Challenger Mound development.

So far, this dataset and its subsequent end-member modelling results [Weltje, G.J.

(1997). End-member Modelling of Compositional Data: Numerical-Statistical Algorithms for Solving the Explicit Mixing Problem. *Mathematical Geology* 29 (4), 503-549.] indicate repeated shifts in compositional variability and hydrodynamic conditions during sediment deposition on Challenger Mound, from lower-energetic conditions to higher-energetic environments and visa versa. This implicates environmental variation over interglacial-glacial timescales, ongoing throughout the whole mound development period. In conjunction with other available data, this dataset furthermore provides insight in local current regimes and sediment dynamics, the specific role of cold-water corals in these complex geo-biological systems and the differentiation of different sediment contributors to the coral mound system.