



## From piston coring to IODP-drilling in recent carbonate mounds, Porcupine Seabight (SW of Ireland)

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The carbonate mound build-up phenomenon, driven by microbial automicrite formation, has been recognized as a prominent process throughout the Palaeozoic. This process was generally believed to be extinct since the end of the Mesozoic. Fossil mounds are important reservoirs of oil and gas in a number of hydrocarbon provinces. In recent years, industrial efforts to explore deeper water environments have yielded increasing evidence of the existence of extended modern mound provinces, rich in deep-water corals, sponges and other colonial invertebrates, along various continental margins of the world. ODP Leg 182 has shed light on the environmental controls on bryozoan mounds off South Australia.

In the Atlantic, mound provinces have been reported off SW Brazil, Angola, Mauritania, Rockall Trough, Norway, but the most intensively studied site is no doubt Porcupine Basin, SW of Ireland, which in recent years has been the focus of over 20 cruises, mobilizing the flagships of oceanography.

Three different types of mound provinces have been identified in Porcupine Seabight: the 'Hovland mounds', the 'Magellan mounds' and the 'Belgica mounds'. Intensive piston coring (R/V Marion Dufresne 2001) respectively taken on and off Challenger mound (a mound covered with dead coral fragments of mainly *Lophelia pertusa* and *Madrepora oculata* in the Belgica mound province), Thérèse mound (a mound with live coral cover in the Belgica mound province) and mound Perseverance (a nearly buried mound in the Magellan mound province) revealed a part of the history in the build-up of these mounds. This pre-IODP coring exercise implied a systematic on-mound / off-mound comparison which has already yielded exciting results, in particular in comparing the mode in which environmental signatures are being recorded,

in comparing densities of corals and in comparing relative rates of sedimentation. The flanking sediments contain mixed sedimentary signatures, of both contouritic and turbiditic origin. The cores acquired from R/V Marion-Dufresne have documented the full paleoceanographic record down to MIS 4-5. The MD01-2450 Calypso core (length 11 m) taken off-mound close to Challenger mound moreover features intriguing, rhythmic deposits of sulphidic nature.

Different hypotheses are formulated concerning mound build-up. However, all the theories remain speculative as long as there is no deep drilling survey in these coral-bearing mounds. A full record from Challenger mound and from the sediments draping Challenger mound will be offered in April 2005 during the IODP Leg 307 "Modern carbonate Mounds: Porcupine Drilling", probably providing an answer on some major questions concerning these recent carbonate mounds: the age of their base, the internal structure of the mounds, the main processes of mound formation, their initial history and the paleo-environment of the start-up setting and a high-resolution paleo-environmental record through whole the mound.