



Cold-water coral mound initiation and early development - results of benthic foraminiferal assemblages and grain-size analysis

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Cold-water corals reefs and carbonate mound provinces in the Porcupine Seabight and the Rockall Trough of the north Atlantic are known since their first discovery in the 1990s (Hovland et al., 1994; Henriët et al., 1998; De Mol et al., 2002). These cold-water coral ecosystems build up several 100-m high mound structures. The controlling mechanisms of initial mound growth and development are still under debate but recent mound development is dependent on sedimentary, oceanographic and climatic processes (De Mol et al., 2002; Freiwald et al., 2002; Rüggeberg et al., 2005, 2007; Dorschel et al., 2005). However, explanations of the origin and evolution of the Porcupine mounds revolve around two scenarios that may be expressed as either competing or complementary hypotheses:

- (1) oceanographic and paleo-environmental conditions control mound initiation and growth, and
- (2) hydrocarbon seepage initiates microbial-induced carbonate formation and indirectly fuels coral growth (endogenous control) (Hovland et al., 1998; Henriët et al., 2001).

Integrated Ocean Drilling Program (IODP) Expedition 307 was performed to obtain evidence to better understand the origin and evolution of the deepwater carbonate mounds in Porcupine Seabight. Challenger Mound, a carbonate mound structure covered with fossil cold-water coral rubble, was the focal point of scientific drilling during

IODP 307. Our study of benthic foraminiferal assemblages and grain-size distribution on the first five meters of mound initiation also indicates an environmental control of their distribution and variability. No indication of hydrocarbon seepage or microbial-induced carbonate formation has been found, which supports the first hypothesis that cold-water coral distribution and growth is controlled by oceanographic and paleo-environmental conditions. Recent findings of Dullo et al. (EGU2008-A-02458) underline that oceanographic/physical boundary conditions are a prerequisite for living cold-water coral occurrences. This underpins that environmental and oceanographic factors are controlling mound initiation, at least until more information on mound bases exist.

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