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Of sands and corals : the sedimentary environment of the Darwin Mounds, N. Rockall Trough

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The Darwin Mounds, small mounded features colonised by deep-water coral species such as *Lophelia pertusa* and *Madrepora oculata*, are found in the Northern Rockall Trough, at water depths between 900 and 1100 m. They were discovered in 1998 during a TOBI (Towed Ocean Bottom Instrument) 30 kHz sidescan sonar survey, where they appeared as circular to oval high-backscatter features on a generally low-backscatter background. A typical mound can be up to 75 m across and 5 m high, and may have a scoured 'tail' feature of moderate backscatter in the down-current direction. High-resolution sidescan sonar and video imagery confirmed the presence of deep-water corals, and their confinement to the mounds. However, it also illustrated damage caused by deep-water trawling activities. As a result of these findings, the European Commission adopted a regulation in March 2004 to permanently ban bottom trawling from the area, while the UK government has the intention to designate the province as Special Area of Conservation under the Habitats Directive.

The specific setting in which the Darwin Mounds occur, just south of the Wyville Thomson Ridge (WTR), creates a particular oceanographic regime : while most of the Continental Slope Current of the eastern Rockall margin continues its northward course across the WTR, the lower parts (<500 m) of the current are deflected to the south-west. This resulted in the formation of a sediment drift complex in the area, including a broad sheeted drift upon which upstream flank the Darwin Mounds are located. Further to the southwest, on the down-stream flank, a large field of pockmarks has also been discovered. Piston and box cores indicate that the general sedimentary sequence in the area consists of a thin upper layer of Holocene contourite sands overlying glacigenic muds. Cores in the mounds however show several meters of homo-

geneous sands. Masson et al. (2003) therefore proposed that the mounds might have a genetic relationship to the pockmarks, suggesting that the mounds formed as a result of fluid escape and the eruption of sand on the seafloor. Their higher elevation above the seafloor would subsequently have attracted coral colonisation. Alternatively, it is often suggested that small coral mounds can be formed through the baffling of sand by the coral framework.

Detailed grainsize and mineralogical analyses of the piston and box cores reveal the nature of the sands in the area, and show a sorting effect in the down-current (SW-ly) direction throughout the Darwin Mound Province. However, they are less effective in discriminating clearly between the on-mound and off-mound sands, or between the sands of different depths within the mounds themselves. New information from high-resolution TOPAS profiles and from foraminifera studies gives more insight in the mound origin and in the position of the mounds/corals within the contourite system, including the change of current regime related to the last deglaciation.

Masson, D.G. et al., 2003. The origin of deep-water, coral-topped mounds in the northern Rockall Trough, Northeast Atlantic. Mar. Geol., 194: 159-180.