



Stable isotope chemistry of deep water coral species and associated fauna from carbonate mound areas at the Rockall Trough margin; paleo-oceanographic implications

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Living and fossil corals, mollusks and water samples from the watercolumn directly above were collected with boxcores and pistoncores from cold water carbonate mounds between 600 and 1000m water depth at the SE and SW Rockall Trough margins.

The corals live in water with a temperature ranging between 7 and 10.5°C. Oxygen and carbon isotopes from seawater and skeletal calcium carbonate indicate that various organisms do not precipitate CaCO₃ in equilibrium with seawater. The isotopic composition of the seawater does not differ markedly between the SE and SW Rockall Trough margin and has an average $\delta^{18}\text{O}$ value of 0.6‰. Growth lines of corals show in thin sections as alternating dark and light bands parallel to the outer wall of the corals. The growth lines of three different colonial coral species have been microsampled to obtain high-resolution time series of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ and of trace elements. The most abundant coral genera *Lophelia pertusa* and *Madrepora oculata* fractionate markedly, as was already observed in previous studies. However the species *Stylaster sp.* shows cyclic variability, possibly representing annual cycles, and seems to be in equilibrium with the ambient seawater. Bulk $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ measurements of the bivalve *Barbatia nodulosa* show isotopic values in the same range as *Stylaster sp.* and can be used to calculate paleotemperatures.

Branches of fossil corals and mollusks have been collected from pistoncores to compare the isotopic values of living species and their fossil equivalents. Fossil corals or mollusks apparently can provide high-resolution details of past and present (paleo)environmental variability in short time intervals.

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