

The 'Bristle Cones' of the ocean: a new palaeo-oceanographic archive found in the solitary deepwater coral *Desmophyllum cristagalli* from Ophan Knoll

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The use of foraminifera in ocean sediments to date apparent salinity and/or temperature changes recorded in stable isotopes may be limited to a precision of about 1000 years because of the effects of bioturbation which tend to blur the signal. The HUDSON 78-020 cruise, while rock dredging at 1628 m (uncorrected) on one of the bedrock mounds on top of Orphan Knoll 550 km northeast of Newfoundland, had a serendipitous recovery of a large collection of dead, Mn-coated, pieces of the solitary ahermatypic coral *Desmophyllum cristagalli*. The collection lay in the Atlantic Geoscience Centre catacombs for eleven years and was unexamined until 1989. The individual specimens in the collection are in remarkably fine condition despite having laid on the ocean floor for, in some cases, tens of thousands of years. Initial ¹⁴C dating, sponsored by Geomarine Associates, INSTAAR, two museums, and the Atlantic Geoscience Centre led to the realization that the collection represented the cross-section of a 'graveyard'. The corals are 29,270, 11,525 and 50 y B.P. (¹⁴C ages) with U/Th ages recently reported from McMaster University of 4000 to > 70,000 y B.P. One large pseudocolony appears to have lived from 12,370 to 11,130 y B.P. (¹⁴C age) from Atlantic Geoscience Centre data, and this spans the beginning of the Younger Dryas glacial event. The McMaster work shows that the top of

this colony records a dramatic change in $\delta^{18}\text{O}$ of > 2 permil, and this was interpreted by J.E. Smith to suggest a rapid shift in the thermohaline circulation at the start of the Younger Dryas over about a fifty-year period. Work is progressing at AGC and MUN to compare the foram isotope stratigraphy from Orphan Knoll cores to the coral data.

Deep-ocean, solitary corals have to some extent been curiosities of the abyss and have a very limited following. However, these corals, which are less susceptible to the effects of bioturbation, sediment transport and variable sedimentation rates, represent a new and potentially extremely valuable archive of palaeo-oceanographic data that can be brought to bear on modern environmental problems through to palaeoclimatic reconstructions. These corals also offer an opportunity to couple ¹⁴C and absolute U-series dates to extend the current dendrochronology calibration of the ¹⁴C timescale. Over 165 of the coral samples in the collection at AGC remain undated. The Russians have reported deepwater 'coral thickets' off the Grand Banks which are believed to be large 'graveyards' of living colonies of *Lophelia prolifera*; these too may represent part of the new coral archive. A recent attempt to reoccupy one of these Russian localities came up empty-handed.