Geophysical Research Abstracts
Vol. 12, EGU2010-9369-2, 2010
EGU General Assembly 2010

COLD-WATER CORALS AND HYDROCHEMISTRY - is there a unifying link?

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Physical and chemical parameters were measured in five different regions of the Northeast Atlantic with known occurrences of cold-water coral reefs and mounds and in the Mediterranean, where these corals form living carpets over existing morphologies. In this study we analyzed 282 bottom water samples regarding delta13CDIC, delta18O, and DIC. The hydrochemical data reveal characteristic patterns and differences for cold-water coral sites with living coral communities and ongoing reef and mound growth at the Irish and Norwegian sites. While the localities in the Mediterranean, in the Gulf of Cadiz, and off Mauritania show only patchy coral growth on mound-like reliefs and various substrates.
The analysis of delta13C/delta18O reveals distinct clusters for the different regions and the respective bottom water masses bathing the delta18O, and especially between delta13CDIC and DIC shows that DIC is a parameter with high sensitivity to the mixing of bottom water masses. It varies distinctively between sites with living reefs/mounds and sites with restricted patchy growth or dead corals. Results suggest that DIC and delta13CDIC can provide additional insights into the mixing of bottom water masses.
Prolific cold-water coral growth forming giant biogenic structures plot into a narrow geochemical window characterized by a variation of delta13CDIC between 0.45 and 0.79 per mille being associated with the water mass having a density of sigma-theta of 27.5±0.15 kg m-3.