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The chemical characteristics of bottom-water and its influence on cold-water corals

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Physical and chemical parameters were measured in five different regions of the Northeast Atlantic and the Mediterranean with known occurrences of cold water coral reefs and mounds. In this study we analyzed 284 bottom water samples regarding $^{13}\text{C}/^{18}\text{O}$ DIC, ^{18}O , and DIC. The hydrochemical data reveal characteristic patterns and differences for cold-water coral sites with living coral communities and on-going reef and mound growth at the Irish and Norwegian sites while the Mediterranean, Gulf of Cadiz, and locations off Mauritania show only patchy coral growth on mounds and various substrates. The analysis of $^{13}\text{C}/^{18}\text{O}$ reveals distinct clusters for the various regions and the respective bottom water masses bathing the corals. The analysis of relationships between salinity, temperature, ^{18}O , and especially between $^{13}\text{C}/^{18}\text{O}$ DIC and DIC shows that DIC is a parameter with high sensitivity to the mixing of bottom water masses and varies distinctively between sites with dead and living reefs/mounds. Preliminary results suggest that DIC and $^{13}\text{C}/^{18}\text{O}$ DIC can provide additional insights into the mixing of bottom water masses. Additionally, we are currently analyzing pH- and alkalinity data sets, as well as the amount of turbidity and its relationship to cold-water coral mounds at the Rockall and Porcupine Bank, West off Ireland.