Proxy development in cold-water corals: Experimental calibrations and application to the Mediterranean Sea

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In paleoceanography, there is growing interest in cold-water corals as high-resolution, powerful archives of multiple variables and conditions of oceans in the past. A number of potential paleo-proxies have been explored, and so far only several field-calibrations in a few species have been developed. In this presentation we will show details and outcomes of a long-term experiment being run at the ICM (Barcelona), where live specimens (~130) of *Desmophyllum dianthus* collected from Comau Fjord (Chile) have been kept under controlled and manipulated variables (temperature, pH, phosphate, barium, cadmium) and feeding frequency for more than two years. With this setup, in combination with geochemical analysis of the coral skeletons using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICP-MS), we aim to calibrate specific elemental ratios including P/Ca, Ba/Ca, Cd/Ca, B/Ca, U/Ca and Mg/Li as proxies of nutrient dynamics, pH, carbonate ion concentration and temperature, respectively. Data obtained so far from this experiment will be presented, and comparisons between experimental and field calibrations will be drawn and discussed. In parallel, we have been working lately with fossil *D. dianthus* corals (whole specimens and fragments) collected embedded in deep sea sediment cores from the southeast Alboran Sea, in the cold-water coral mounds from the Melilla Province (Western Mediterranean Sea). Geochemical data from these specimens encompassing the elemental ratios experimentally calibrated with the long-term experiment, in addition to U/Th dating, will be interpreted in the context of molecular biomarkers records in the same and nearby sediment cores, covering the last glacial to interglacial cycle.