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Quaternary molluscan assemblages of cold-water coral mounds: a new perspective on deep-sea ecosystem dynamics in the western Mediterranean

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Cold-water corals (CWC) act as ecosystem engineers and thus contribute to biodiversity on continental margins worldwide. CWC mounds – built over geologic time by the interplay of biological, sedimentological, and oceanographic processes – create ecological niches for a variety of macrobenthic marine taxa (e.g. molluscs, sponges, bryozoans). The growth of CWC mounds is discontinuous over time due to changes in environmental and ecological conditions, such as food supply, water temperature, and dissolved oxygen concentration. While surficial distribution patterns of living and recently-dead mound macrobenthic communities have been described, their temporal ecological relationship with coral growth and mound formation is yet largely unexplored. Therefore, this project aims to determine what effects stagnations in CWC growth (i.e. repeated periods of ecosystem “turn off”) have on the local biodiversity and community structure of other CWC mound taxa, and thus what influences CWC mound development may have on regional biodiversity and biogeography in the deep sea over geologic time. Focusing on a single taxonomic group with high preservation potential, this study 1) quantitatively assesses temporal ecological trends of coral mound molluscan assemblages (bivalves and gastropods), and 2) statistically correlates those data with coral growth and palaeoceanographic records. Preliminary results from two CWC mound gravity cores through Brittlestar Ridge I in the Alboran Sea, western Mediterranean (~13.2 – 2.9 ka) indicate that throughout both cores the molluscan assemblages are typically quantitatively dominated by sessile benthic filter-feeding bivalves, particularly *Heteranomia squamula* and *Hiatella arctica*. Although bivalves are more abundant and diverse than gastropods in both cores, these taxonomic groups yield generally similar downcore dynamics in abundance and diversity. Comparisons of total molluscan assemblages (bivalves and gastropods combined) suggest that the older assemblages – those associated with the Bølling-Allerød interstadial (13.5-12.8 ka) and Early Holocene (11.3-9.8 ka) – are more similar to one another than to younger assemblages in the cores. Rotational vector fitting analyses indicate that these older assemblages are significantly related to higher productivity and different hydrodynamics (and sediment input), which are factors that have also been linked to CWC growth in the region. Altogether, our paleoecological reconstructions so far reaffirms the connectivity of benthic communities with local oceanographic conditions and adjacent taxa. Additional ecological assessments will further refine our understanding of the relationships between CWC growth and

benthic communities, and in turn the temporal drivers and dynamics of CWC mound biodiversity.