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Past and present development of cold-water coral mounds in the Western Mediterranean and Northeast Atlantic

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Although small in size, the approximately ten metre high Moira Mounds (Porcupine Seabight, Northeast Atlantic) are numerous and densely distributed (23 mounds/km^2). These characteristics make them an extreme among cold-water coral (CWC) mounds. This work focuses more precisely on the downslope Moira Mound area, which hosts 143 mounds colonized by living CWCs, and situated between 900 to 1150 m water depth. The investigation of dead and living benthic foraminiferal assemblages from surface samples allowed to describe benthic foraminiferal distribution patterns. The downslope Moira Mounds differ from much larger Irish mounds by the homogeneity of benthic foraminiferal assemblages. The strong differences between living and dead benthic foraminiferal assemblages together with surface sediment grain size distributions further suggest that dead benthic foraminifera are reworked by the strong bottom currents in the area. However, despite these particularities, quantitative analysis of surface benthic foraminiferal assemblages demonstrates that CWC environments in the Northeast Atlantic share a similar composition.

The East Alboran Melilla Coral Province (EMCP) is located 15 km northeast of the Spanish enclave of Melilla (North Africa) and at intermediate depths ranging from 250 to 450 m. This area hosts a series of 3 volcanic ridges, colonized by CWC mounds. Based on a multiproxy study (benthic foraminiferal assemblages, macrofaunal quantification, grain size analysis, sediment geochemistry, foraminifera stable isotope composition and radiometric dating) of two gravity cores recovered from one of these ridges, the short (20 ky) and long-term (300 ky) development of the EMCP is reconstructed. During the last 300 ky, CWC distribution in the area followed global climatic cycles, developing during interglacial periods and declining during glacial periods. Our results suggest that the initiation of coral development is primarily triggered by increased continental run-off, as a result of humid conditions above North Africa, and enhanced mixing between surface and intermediate water masses.

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