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Near bed hydrodynamic conditions of carbonate mounds in the Northeast Atlantic Ocean

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Cold water carbonate mounds, covered with live cold water corals are found in several areas on the continental margin of the Northeast Atlantic Ocean. Three mound areas were visited during cruises with R.V." Pelagia" between 2000 and 2004; two cold water carbonate mound areas on the SW and SE Rockall Trough margins and a mudvolcano area in the Gulf of Cadiz. At the SW Rockall Trough Margin large mound clusters of several kilometres long and wide and located between 600 and 900m water depth have been observed on seismic profiles. At the SE Rockall Trough mainly single mounds are found between 600 and 1200m water depth. In the Gulf of Cadiz single living coral colonies and coral debris has been found on the flanks of a mound near the Penduick escarpment and at the Faro and Hesperides mudvolcanoes. In all areas cold water corals are present on top of the mounds, but the areas differ strongly in geological setting, as well as in sedimentology and hydrography. Measurements and observations show that currents in mound areas have a major influence on the shape of the mounds and on the presence of living cold water corals. To investigate the water mass properties free falling BOBO landers equipped with ADCP, CTD, OBS and a sediment trap were deployed and (24 hour (jojo)) CTD stations were carried out near and at the mounds. At the SW RT margin a diurnal current caused by internal waves has been observed with current speeds up to 45cm/s. With increasing current speed the temperature and optical backscatter are increasing as well. A zone of high turbidity is found at the seasurface, the seafloor and between 700 and 800m water depth, coinciding with the depth of the tops of the carbonate mounds. The Gulf of Cadiz can be roughly divided in two areas. The northern area shows a stable water column with outflow of MOW below 800m depth. In the south the water column shows the presence of an internal wave with an 6-hour cycle that induces considerable changes in temper-

ature (0.5 degree), salinity (0.05) and current velocity (peaks up to 15cm/s). Another striking difference is found in the optical backscatter of the water column: where in the northern Gulf of Cadiz high surface production is present, the southern area shows an intense INL around 250m water depth. At the SW and SE RT margins a dense cover of live corals is observed, while in the Gulf of Cadiz only single colonies are found on the mounds, indicating that watermass properties on the SW RT are most favourable for coral growth. High current velocities around the mounds (45cm/s) in combination with high surface production provide favourable conditions for coral growth. Increasing current speed coincides with an increase of optical backscatter, which possibly indicate the transport of particles to the mounds with the tidal current, increasing the food supply over the mounds. High current velocities also will prevent the corals from sedimentation.

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