



Environmental controls on carbonate mound development along the European continental margin

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Living cold water corals on top of carbonate mounds are observed in mound provinces at the SW and SE Rockall Trough (RT) margin and in the Gulf of Cadiz. However, the areas differ strongly in geological setting, as well as in sedimentology and hydrography. Measurements of near bed hydrodynamics and watercolumn observations show that currents in mound areas have a major influence on the shape of the mounds, the sediment in the areas and the presence of living cold water corals. To investigate the water mass properties, free falling BOBO landers were deployed and (24 hour) CTD stations and CTD transects were carried out near and at the mounds. At the SW RT Margin mound clusters of several kilometres long with an orientation in the direction of the main current regime, are located between 600 and 900m water depth. Here a diurnal current caused by internal waves is measured with current speeds of up to 45cm/s. With increasing current speed the temperature and optical backscatter increase as well, resulting in considerable temperature variations of up to 3°C. A zone of high turbidity is found at the seasurface and between 700 and 800m water depth, exactly coinciding with the depth of the peaks of the carbonate mounds. At the SE RT Margin mainly single mounds are found between 600 and 1200m water depth. Here the mounds can be related to the presence of a BNL around 600m water depth, which detaches from the seafloor, forming an INL, causing increased turbidity at this depth. Mound morphologies in the Gulf of Cadiz are related to a different tectonic setting, where some of the mound structures actively vent gasses. In the Gulf of Cadiz single living coral colonies and coral debris has been found on the flanks of several small mounds of up to 60m high near the Penduick escarpment. Here the wa-

ter column shows the presence of an internal wave with an 6-hour cycle that induces changes in temperature, salinity and current velocity (peaks of $\sim 15\text{cm/s}$). An intense INL is observed around 300m water depth. While at the SW and SE RT margins a dense cover of live corals has been demonstrated, only isolated living colonies and coral debris covered with mud occur on the mounds visited in the Gulf of Cadiz, indicating that watermass properties and dynamics on the SW RT are at the moment most favourable for coral growth. High current velocities around the mounds prevent the corals from sedimentation, while high productivity on top of Rockall and Porcupine Bank increases the food supply around the mounds.