Boundaries, heterogeneity, diversity and corals: Applications for the Rockall Bank conservation area, UK

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With only a small portion of the seafloor mapped to similar resolutions as terrestrial habitats, the creation of seabed habitat maps, describing both biotic and abiotic components, is an important step for effective management. In 2007, an area of north western Rockall Bank, UK (~200m in depth) was closed to fisheries and in 2010; it was nominated as a candidate for a 'Special Area of Conservation' due to the presence of deep-water corals. However, the boundaries of the two zones differ. Collection of biological information is spatially limited, but when combined with acoustic mapping techniques, environmental characteristics can potentially be used as proxies for species distribution and biodiversity, providing insights for the design of marine conservation areas. As part of the CODEMAP project, a survey including imagery transects as well as sidescan and multibeam sonars was carried. The acoustic maps were converted into sediment interpretation maps and spatial heterogeneity of the resulting landscape structure was examined with respect to megabenthic invertebrate distribution and biodiversity. We found fine-scale sediment characteristics observed within the imagery and landscape descriptors of sediment interpretation maps to explain 62% of the variation in species diversity (H'). Highest diversity was observed on exposed bedrock as well as within mixed sediment zones. Transects in which rubble fields (and no coral stands; likely the results of previous trawling activities) were observed had the lowest megafaunal biodiversity while large intact coral stands were observed in close proximity to the outside boundary of the conservation area. Our study successfully employed techniques borrowed from landscape ecology to create fine scale complete coverage deep-sea habitat maps over the extents needed to provide spatial information to improve the effectiveness of conservation measures.