LOCATING HOTSPOTS: MULTI-SCALE ANALYSIS OF BIODIVERSITY WITHIN A SUBMARINE CANYON

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Submarine canyons are complex geomorphological features that have been suggested as potential hotspots for biodiversity. However, few canyons have been mapped at high enough resolution (~10 m pixel size) to investigate questions of scale. In this study, three areas of Whittard Canyon, NE Atlantic, were mapped at fine resolution (1m) using an ROV, while the broader canyon was also mapped at lower resolution (50 m) using a ship-borne multibeam system. The area had also been mapped as part of the Irish National Seabed Survey (INFOMAR) at a third resolution (100 m). Over 100 hours of video were collected along 13 remotely operated vehicle (ROV) video transects at depths ranging from 650 to 4000 m, and used to identify and georeference megabenthic invertebrate species. General additive models (GAMs) were used to build predictive maps for megafaunal biodiversity across a range of scales. The bathymetry-derived environmental descriptors were found to influence biological distributions over a range of scales with variables such as roughness and rugosity providing the most information at finer scales, slope and depth at medium scales and BPI at the broader scales. Vertical walls were found to have the highest diversity of organisms, particularly when colonized by cold-water corals such as *Lophelia pertusa* and *Solenosmilia variabilis*. The spatial biodiversity trends captured remained similar up to 50 m resolution, but coarser resolutions were unable to capture the high habitat heterogeneity and species turnover observed. Based on the maps created, regions of particularly high biodiversity within the canyon were identified and found to represent only a small percentage (~2.5%) of the canyon's surface. The approach developed provides a cost-effective strategy to examine the effect of scale on map creation and facilitate the location of rare biological communities of conservation importance.