OBJECT BASED IMAGE ANALYSIS OF SIDESCAN SONAR DATA FOR MAPPING SEDIMENTOLOGICAL PATTERNS IN SUBMARINE CANYONS

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Sedimentological patterns and processes are some of the key aspects to the understanding of biodiversity in submarine canyons. Therefore it is crucial to have detailed sedimentological information to produce reliable habitat maps for submarine canyons. However, sediment data grids are often difficult to produce due to a lack of information, resulting from the limited spatial coverage of sediment cores and the high terrain variability in submarine canyons. This study intends to propose a methodology to map out the sedimentological distribution in submarine canyons using sidescan sonar imagery and video interpretation. A combined multibeam and sidescan sonar survey of Whittard Canyon was carried out as part of the EU FP7 project HERMIONE, and the UK OCEANS2025/MAREMAP programme. Within the project CODEMAP, it is now used to create sedimentological data grids for Whittard Canyon using object based image analysis (OBIA) and supervised fuzzy classification. The object based image analysis is used to partition the sidescan sonar data into segments, which are clusters of adjacent pixels that represent meaningful objects on seafloor. These segments are then classified into sediment types, whereby the algorithm is trained using sediments data from video interpretation. The results are evaluated by traditional digitization, based on visual assessment of the sidescan imagery and sediment cores. The segmentation from OBIA allows sedimentological parameters to be estimated from image segments representing meaningful objects and not from individual pixel values, which can be misleading especially for a strongly textured data such as sidescan sonar imagery. The resulting sedimentological map produced contains highly valuable information to be included as an input to produce a habitat map of submarine canyons.