pattern concentrically based around the mound summit, similar to Wilson's ring model. In a wider context, the heterogeneity of facies, and their distribution across the reef show that interpretations from CWC reef samples do not represent the entire mound surface and should be accompanied by appropriate imagery of the reef.

11:00 AM

Laurence De Clippele, Heriot-Watt University

Using novel acoustic and visual mapping tools to predict the small-scale spatial distribution of live biogenic reef framework in cold-water coral habitats

In the Atlantic many reef and mound complexes are engineered by the coral *Lophelia pertusa*. Predictive models and maps of cold-water coral habitats have been developed to understand the factors that control the distribution of these ecosystem engineers across a range of approaches and of spatial scales. In this study, we predict coral presence at the inshore Mingulay Reef Complex (W Scotland) using the new ArcGIS-based "BGS Seabed Mapping Toolbox" developed for this study, together with random forest modelling. By using this toolbox almost 600 *Lophelia* reef 'minimounds' were semi-automatically delineated from bathymetry data with 2 m resolution, and their characteristics were quantified and captured. Coral presence data were derived from high-definition remotely operated vehicle records of visual (video) and acoustic microbathymetry. With a resolution of 0.35 x 0.35 m the microbathymetry covers the centre of the study area and its high resolution allowed the individual live coral colonies to be located acoustically for the first time. Random forest classification identified: Maximum Water Depth, Maximum Rugosity, Bathymetric Positioning Index, Orientation and Maximum Current Speed as the environmental variables that contributed most to the prediction of live coral presence. Our approach produces predictive maps of live corals across the reef mounds that will be especially valuable for future long-term monitoring surveys, included those needed to understand the impacts of global climatic change. This is the first study using an ROV-based microbathymetric grid and the newly developed "BGS Seabed Mapping Toolbox" to explore the environmental variables that control coral growth on minimounds.

11:15 AM

Katleen Robert, National Oceanography Centre, University of Southampton

Hanging gardens: Vertical walls from images to fine-scale 3D reconstructions

As a result of their heterogeneous nature, deep-sea cliffs are particularly suitable habitats for cold-water corals (CWCs) and associated species. In addition, such steep terrains provide natural protection from human activities such as trawling. As such, it is important to understand their ecology, but traditional multibeam systems (MBS) cannot adequately replicate the 3D structure of these habitats at fine enough resolutions. In this study, we combined sideways ROV MBS data and videos to examine steep terrain from Rockall Bank (SORBEH expedition, Irish Marine Institute) and Whittard Canyon (CODEMAP2015 cruise, ERC Starting Grant no 258482), Northeast Atlantic. Point clouds were extracted from MBS data, but, to obtain even higher resolutions, photogrammetry techniques were applied to create 3D representations of video transects. With these, it was possible to interact in 3D with extensive sections of video, and once georeferenced, very accurate positioning of individual organisms became possible. The reconstructed terrain models enabled individual colonies to be resolved and associated terrain variables to be derived on scales similar to those experienced by megabenthic individuals. These terrain variables were able to identify differences in the environmental conditions selected by CWC and a few associated species. Moreover, both ROV and photogrammetry derived terrain variables could successfully explain biological spatial patterns in CWC presence as well as megabenthic abundance and diversity. These new technologies are allowing us, for the first time, to map the physical 3D structure of previously inaccessible habitats in all their complexity.