

Acquisition and analysis of benthic photographs

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Abstract

It is proposed that the MedSudMed Project should include the acquisition and analysis of seabed images in Maltese waters and at selected sites elsewhere in the Project area. These images would make a significant contribution to the study of the benthic biology of the region and hence to the spatial distribution of demersal resources and the influence of environmental factors and fishery characteristics.

The analysis of underwater photographs in the study of seabed phenomena is a technique that has been in common use since the 1940s. However, there is a major problem associated with the analysis of seabed photographs: the unknown scale and perspective (effectively, a change in scale across an oblique image). This problem has now been solved at the University of Plymouth with the development of ABISS (Autonomous Benthic Image Scaling System). In this system, the underwater camera is fitted with five diode lasers which project a pattern of five spots onto the seabed. Subsequent analysis of the altered configuration of this pattern on the acquired image, using the associated ABISS software, enables scaling of the whole image. The software programme includes facilities for measuring lengths, areas etc. on the image. It also includes a range of image-enhancement functions for detailed study of image features. A successful PhD research programme involving benthic biological surveys of Plymouth Sound and Loch CreeNan (Scotland) has been completed using ABISS. The ABISS system may be further developed to fit any particular needs of MedSudMed. It is proposed that all acquired images be made available to participants through the Project GIS.

Careful consideration will need to be given to the choice of platform deployed to carry the camera and any other sensors (e.g. TS, transmissometer etc). Suitable possibilities include: remotely operated vehicle, towed sledge, lander and dipping camera, and these will be reviewed at the present consultation. There will be particular problems associated with working in deep water, such as high ambient pressures and the need for long and heavy umbilicals/cables.

It may be extremely useful to utilize the RoxAnn system which, connected to a standard single-beam echosounder, uses the first and second echo returns to discriminate between seabed material types. There are several published papers that describe projects in which these acoustic "material types" (essentially a combination of bottom roughness and bottom hardness) have been related to ecological habitats.

Clearly, the Project area is vast in benthic survey terms and we shall need to design a realistic survey/sampling strategy based upon priority biological questions and fieldwork limitations.

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