ACOUSTIC SEABED CLASSIFICATION AND MAPPING OF SEAGRASS *POSIDONIA OCEANICA* (L.) DEL. MEADOW

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Abstract

The purpose of our work was to using echo-sounders and acoustic seabed classification identify and map *Posidonia* meadows on the south-west part of St. Nicola island (Montenegrian coast). We used the QTC VIEW system to capture the full waveform acoustic data and than using software QTC IMPACT we identified the best features combinations to distinguish groups of echoes representing different seabed (*Posidonia* meadow, send, rock etc.). For each recorded echo we tagged coordinates from GPS so we have necessary information's for positioning of classified seabed.

Keywords: Posidonia, echo-sounders, mapping, Adriatic sea

Introduction

The seagrass *Posidonia oceanica* (L.) Del. is considered to play the most important role in the coastal Mediterranean region. Unfortunatly because of many natural and human-induced events world-wide decline in seagrasses has been reported. The purpose of our work was to identifay and map *P. oceanica* meadows using digital seabed classification on the sout-west part of St. Nicola island (Montenegrian coast) in order to with periodic mapping and monitoring, protect and preserve these important marine resources.

Material and methods

It is well known that the seabed echoes contain much more information than necessary for simply determining depth. The signal, an acoustic reflection which includes backscatter, bottom reverberation and spectral returns has a direct relationship with and is a function of the character of the seabed. So acoustic seabed classification is the organization of the sea floor and direct subsurface into seabed types or classes, based on characteristics of an acoustic response (1). For this purpose we used the QTC VIEW system and than using software QTC IMPACT we indetified groups of echoes representing different seabed types (*P. oceanica* meadow, send, rock, etc.).

The QTC VIEW instrument interfaces directly to conventional echo sounders. The system is connected, in parallel, between the sounder and monitors the transmitted pulse and the seabed acoustic returns in a manner which not interfere with the normal operation of the echo sonder (2). The QTC View than digitizes and pre-processes the echo after which the resultant data are analyzed by multiple algorithms. A 3-D clustering process generates discrete classes representing the acoustic diversity of the data (3). Similar echoes are grouped into classes and user relates the acoustic class to the physical characteristics of the seabed through the calibration process that is diving in this case. For each recorded echo we tagged coordinates from GPS so we have necessary informations for positioning of classified seabed.

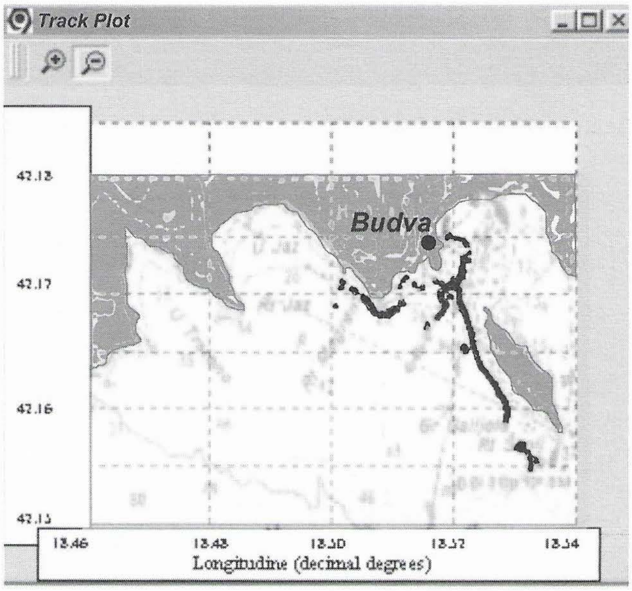

Fig. 1. Track Plot showing only positions of *Posidonia* meadows.

After survey and processing with software on display we have clusters containing similar acoustic signatures in Q-space, than a track plot showing locations of the six classes that we determined, a bathymetry plot showing how the classes are distribuited by depth and statistical confidence of the class assignments.

Conclusion

In purpose of mapping *P. oceanica* meadows, with QTC acoustic system we located *P. oceanica* meadows so that divers easely can find positions of interest for furder investigation (Fig. 1). These are first maps of seagrass meadows in this area so they will be of grate inportance for further monitoring.

When compared with traditional seabed geological mapping techniques, acoustic seabed classification QTC is capable of providing accurate, repeatable and nondestructive seabed classification information. Although aerial photographs represent one of the most efficient methods in terms of its cost, rapidity and reliability, the image processing technique have been used only for the surface layer (from 0 to 20m) (4.), so quality of QTC classification technique is that we can use it in the whole area of the Posidonia meadows.

References

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