APPLICATIONS OF REMOTE SENSING TECHNIQUES FOR MAPPING *POSIDONIA OCEANICA* MEADOWS.

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Monitoring marine benthic communities is generally considered to be an essential activity to increase understanding and hence the correct management of coastal areas.
Posidonia Oceanica is a marine phanerogam characterizing an ultimate succession stage (*climax*) on sandy bottoms in the Mediterranean Sea. *Posidonia Oceanica* meadows provide the most important and productive ecosystem in the Mediterranean Basin, playing a wide variety of roles in the ecological balance of coastal waters. In particular, *Posidonia Oceanica* ecosystems:

1. contribute significantly to water oxygenation through photosynthetic activity;
2. give shelter for many marine animals;
3. produce a large quantity of biomass towards neighbouring ecosystems;
4. stabilize sandy shores and sea beds by dampening wave action and subsequent sediment accumulation;
5. mould the coastline and protects sandy beaches from erosion.

Therefore they are an important element in improving the water quality of coastal waters [1], [2].

Remote sensing techniques offer one solution to the problem of surveying the extent and development of benthic communities by offering synoptic information over large spatial scales. A large variety of approaches may be used to map seagrasses. The selection of sensor imagery and a classification method is related to the features of investigated area, the lower limit of the communities (maximal depth), the degree of precision required and the cost-effectiveness in relation to time spent (Pasqualini et al, 2005 [3]).

Producing thematic maps of seagrass communities is a multistep process. First, satellite images have to be calibrated, masked from land and cloud, corrected from atmospheric, sea surface glint and depth effects. The second step is the classification phase where dataset training, its control and a classification method have to be applied. Subsequently, in the post-classification phase, there are the Sieve and Clumpness steps useful to improve the accuracy of the result.

In this study, *Posidonia Oceanica* meadows maps of Taranto Gulf, Ionian Sea, in 2002, are produced from different remote sensing sensors' data and with different classification methods (Unsupervised, K-means or ISODATA; Supervised, Maximum Likelihood, Malhanobis, neural networks; Mapping Spectral Methods).

Taranto Gulf is located in the southern part of Italy, on the Ionian Sea, and it represents one of the areas of greatest hydrogeological interest in the region of Puglia.
It is composed of two parts: the Mar Grande and the Mar Piccolo. The Mar Grande covers an area of 35 km^2 with a maximum depth of about 35 m and an average depth of about 15 m. It communicates with the Ionian Sea through two openings: a southern inlet (approximately 1 km wide) and a north western inlet

(approximately 100 meters wide). The Mar Piccolo has a total surface area of 20.72 km^2 and it is structured in two shelves, called ‘First Seno’ and `Second Seno'. The maximum depth is about 15 m for the First Seno and about 10 m for the Second Seno. The average depth of the two subsystems is about 5 m [4].

A comparison with ground truth measurements in the Ionian Sea shows the advantages and the limits of each approach, according to a reliability scale suggested by Pasqualini V. et al. in 1997, [5].

References

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