Can we use exergy index and the microbenthic loop as indicators of perturbations in *Posidonia oceanica* (L.) Delile meadows?

Dorothée PETE\(^1\), Fabian LENARTZ\(^1\), Branko VELIMIROV\(^2\) and Sylvie GOBERT\(^1\)

\(^1\)MARE Centre, University of Liège (ULg), BELGIUM. 
\(^2\)General Microbiology, Medecine University of Vienna, AUSTRIA.  
e-mail: Dorothee.Pete@ulg.ac.be

**Introduction:**

Nowadays, many anthropogenic perturbations threaten the Mediterranean Sea. *Posidonia oceanica*, its endemic phanerogam, is often used as a pollution descriptor but does not react very fast because of its low turnover rate. This research project proposes to use the microbenthic loop (bacteria, organic matter, meiofauna and microphytobenthos) present in this ecosystem to detect perturbations earlier and enter those results in the calculation of the exergy index (Fig.1). This index expresses the distance of an ecosystem, at a given state, from its equilibrium. The higher it is, the closer from its optimum state (climax) the ecosystem is.

**Material and methods:**

Sampling sites are situated in Calvi Bay (Fig. 1), Corsica, France, where sediment cores (Fig. 2A, B, C) were taken to determine biomasses of every parts of the microbenthic loop and to measure environmental parameters. The reference site is STARESO (STAtion de Recherches Sous-marines et Océanographiques).

**Some results:**

In March 2008, the spatial heterogeneity experiment (Fig. 2) has shown an important variability at small scale for every studied parameters. Here are presented results obtained by DIVA (Data Interpolating Variational Analysis), a method adapted by the GHER (MARE Centre, ULg), for bacterial biomass, in the first centimeter of the cores (Fig 3A). There is also a difference between STARESO and the fish farm, taking into account biomasses of bacteria, organic matter and microphytobenthos (Fig. 3B). Those results are promising to prove the utility of the exergy index.

**Concluding remarks:**

Up to now, that study has led to a better understanding of seasonal and bathymetric patterns in the microbenthic loop of *P. oceanica*. The most important result obtained is the existence of an important spatial heterogeneity at small scale in that ecosystem. It must absolutely be taken into account in studies based on the sediment of *P. oceanica* meadows. Next steps will be the processing of meiofauna samples and a complete characterization of sediment parameters.

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