

Bio-geochemistry of surface sediment in Mediterranean Sea toward modeling nutrient fluxes at sediment-water interface

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Summary

Surface cores sediments (14 core samples) are sampled during Med Black Cruise in the first Leg, they interest the first centimeters processes. Carbon, Nitrogen and Sulfur geochemistry in sediment shows a clear accumulation of TOC in eastern Mediterranean Sea comparing to western area. The average value of the C/N ratio in western area was between 1 and 8, which is characteristic of marine and coastal regions. The average value of the C/N ratio in the eastern area reaches 22, which characterize continental origin. Phosphorous fractionation was investigated and presents High levels of total phosphorus ($264 \mu\text{g g}^{-1}$) similar to previous measured value in Mediterranean Sea. This phosphorous accumulation is related to mineralization factors and the hydrodynamic process.

The phosphorus in the Mediterranean Sea is mainly abundant in carbonate fraction (Ca-P) and iron bound fraction (Fe-P). The amount of Ca-P and Fe-P in sediment also depends on the physical and chemical parameters of sediment, which shows strong interdependence in the cycling of these elements in the marine environment and currents. An amount of bioavailable phosphorous fraction can be dispersed in the water column under specific biogeochemical conditions. Modeling of P production confirm fluxes variability depending on hydrodynamic conditions, biological and geochemical change (Figure 1).

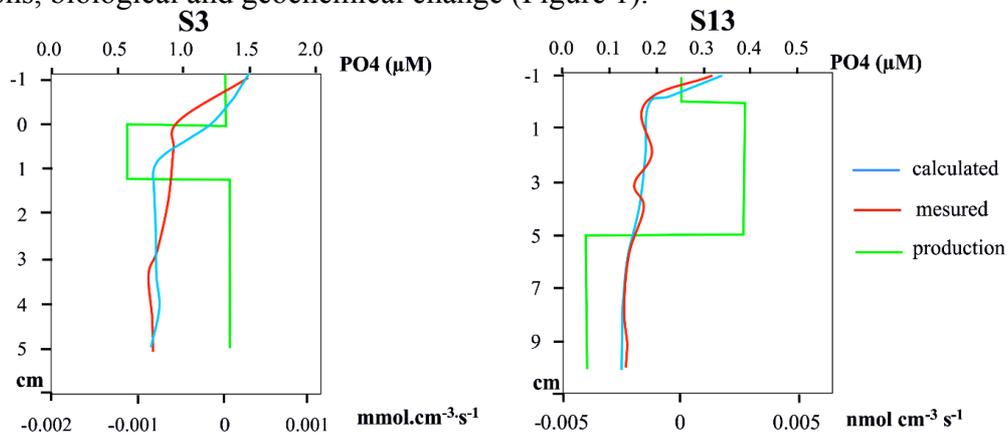


Figure 1: PO_4^- measured concentration in pore water, modeling of concentration and production zone in Atlantic core profile (S3) and Mediterranean core profile (S13). Positive production rates (no consumption) are to be considered, in which case the value 0 is specified. Negative production rates (consumption) are considered (Concentrations are given per volume of pore water, while production rates and irrigation rates are given per volume of sediment). Profile MODEL (Berg et al.1998).

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