

Impact of macrofaunal activities on the biogeochemical cycling in anthropogenically disturbed sediments

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Marine coastal areas are important as they provide a wealth of goods and services to humanity. These goods and services result from many ecological processes, many of them occurring in the sediment. Therefore, it is a major challenge to understand and predict how human activities will affect the link between benthic communities and benthic mineralization processes. In this study, we investigate how activities of macrofaunal organisms (bio-irrigation and bioturbation) contribute to benthic biogeochemical cycling in a range of natural sediments, and sediments affected by human activities.

We conducted closed-core incubations of sediments sampled along a gradient from fine to coarse sediments, including sediments subjected to anthropogenic fining. Sediment-water exchange of nutrients and oxygen were followed by sampling the overlying water every 2 hours. Bio- and physical irrigation was quantified by following the decreasing concentration of a bromide tracer in the overlying water. At the end of the incubation, the sediment was sieved and the organisms retrieved to calculate the bioturbation potential of the community (BPC). With those data, we will estimate the degradation rate and transformation of organic carbon deposited at the sediment surface, and the nitrification/denitrification rates. Furthermore, we will assess whether the effect of macrofaunal activity on benthic ecosystem functioning varies with natural and human induced changes in sediment properties.

The research plan and the preliminary results will be reported.

Keywords: ecosystem functioning; nutrients fluxes; bio-irrigation; bioturbation; oxygen consumption; macrobenthos