



Major methodological constraints to the assessment of environmental status based on the condition of benthic communities

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The Marine Strategy Framework Directive (MSFD) was published in 2008 and requires Member States to take the necessary measures to achieve or maintain good environmental status in aquatic ecosystems by the year of 2020. The MSFD indicates 11 qualitative descriptors for environmental status assessment, including seafloor integrity, using the condition of the benthic community as an assessment indicator. Member States will have to define monitoring programs for each of the MSFD descriptors based on those indicators in order to understand which areas are in a Good Environmental Status and what measures need to be implemented to improve the status of areas that fail to achieve that major objective. Coastal and offshore marine waters are not frequently monitored in Portugal and assessment tools have only been developed very recently with the implementation of the Water Framework Directive (WFD). The lack of historical data and knowledge on the constraints of benthic indicators in coastal areas requires the development of specific studies addressing this issue. The major objective of the current study was to develop and test an experimental design to assess impacts of offshore projects. The experimental design consisted on the seasonal and interannual assessment of benthic invertebrate communities in the area of future implementation of the structures (impact) and two potential control areas 2 km from the impact area. Seasonal benthic samples were collected at nine random locations within the impact and control areas in two consecutive years. Metrics included in the Portuguese benthic assessment tool (P-BAT) were calculated since this multimetric tool was proposed for the assessment of the ecological status in Portuguese coastal areas under the WFD. Results indicated a high taxonomic richness in this coastal area and no significant differences were found between impact and control areas, indicating the feasibility of establishing adequate control areas in marine ecosystems. Nevertheless, significant differences were found between different seasons and different years, showing that the coastal benthic communities important temporal variations. Although those variations did not affect the status assessment based on metrics that considered the ratio between sensitive and tolerant taxa, diversity indices showed different classifications between seasons and years. These results indicate the need for a temporal stratification of the monitoring programs. That might be achieved by setting different thresholds for specific seasons or selecting specific monitoring seasons. It might also require a regular assessment of the environmental conditions that support the identification of outlier years, which monitoring results should be carefully considered.