

Sediment profile imaging: an added value for Belgian marine research?

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Sediment profile imaging (SPI) provides an *in situ* view of the sediment-water interface and subsurface sediments. Typically as much as 15 to 20cm from the sediment surface is photographed, providing both quantitative and qualitative data on the biological, chemical and physical character of the sediments (Germano *et al.*, 2011). This sampling technique minimizes disturbance of the seabed. Therefore, it is an effective method to study biodiversity as well as biological (e.g. animal burrows) and physical (e.g. sediment layering) features. In Belgian waters, this information is classically examined by grab or core sampling. Despite the fact that the SPI technique is a common research technique, we had only recently the opportunity to explore its usefulness at two areas in the Belgian marine waters.

In the first study area, we used this technique for determining the biological and sedimentological characteristics of the Wandelaar area (West side of Zeebrugge harbour) in the light of the designation of an appropriate area for dredge disposal. Despite the high turbidity (and very low visibility) within this area, we were able to take *in situ* photographs of the benthic ecosystem. In the second study area, the sand extraction pit at the Buiten Ratel sandbank, we examined if the SPI photographs revealed marks on the seabed of the sand extraction process.

By using this SPI technique, we were able to give a detailed qualitative sediment description (including the layering), the indication of occurrence of some biological features (burrows, bedforms, bivalves, epifauna) and a quantitative assessment of the a-RPD layer (apparent Redox Discontinuity Layer) and surface boundary roughness at several spots within those areas. At the Buiten Ratel area, the photographs revealed evidence of the sand extraction by the presence of a layer of fine sand on top of the seabed as a result of the overflow during sand extraction. With the grab sampling technique, we were not able to measure the presence of this layer because the fines were probably washed out during sampling. For the study at the Wandelaar area, we were able to use this SPI information, in complement with some grab sample information, to determine the habitat potential and biological value of the area. Hence, we were able to assign an appropriate area for dredge disposal whilst minimizing possible ecological conflicts, all this in a time-efficient manner.

Consequently, the SPI technique can be an added value for marine research in Belgian waters and this for a variety of topics: (1) quick-scan method for sedimentological and biological characteristics within an area; (2) impact assessment of sand extraction and dredge disposal; (3) assessing biogeochemical processes (a-RPD, oxygen fluxes, ...); (4) ground truthing of multi-beam and side scan features (bedforms, fields of tube worms, sand ripples,...).

References

Germano J.D., D.C. Rhoads, R.M. Valente, D.A. Carey and M. Solan. 2011. The use of Sediment Profile Imaging (SPI) for environmental impact assessments and monitoring studies: lessons learned from the past four decades. *Oceanography and Marine Biology: an Annual Review* 49:235-298.