

Heterometric sediment and benthic micro-habitat: In situ and experimental approaches.

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The eastern Bay of Seine and its estuary are characterized by complex sediment structures with high temporal, spatial and vertical heterogeneities. As the result of different hydrodynamics forcing, estuary is a particular area with fine sediment accumulation since the last decades. This complex system involves particular relationships between benthic species and the environment. Dominant species show particular traits of life: benthic-pelagic reproductive cycle, burrowing, tubicolous, surface and subsurface species. Moreover, species behaviours are different according to the sediment properties: grain size, stratification, texture, silt and clay contents... Although benthic macrofauna and sediment relationship is often describe as the major factor structuring benthic communities, no spatial and temporal relationships has been highlighted in this area. So, our study is focused on the relationship between species and sediment at the individual scale and on micro-habitats. The aim of the study is to define the macrofauna vertical distribution to understand how the sediment structure acts on organisms and the organism behaviour in a heterometric sediment context, i.e. how organisms act in return on the sediment structure. An in situ approach is used to answer these questions with four campaigns on board on the Oceanographic Vessel 'Le Côtes de la Manche'. A total of 43 cores (16 cm diameter, 35 cm high) in three typical sediment facies are sampled. Cores are analysed with Computer-Aided Tomography scan (Cyceron Laboratory, Caen) to 3D visualize organisms and to determine volumetric space occupation by biogenic structures. The same cores are transversally cut to check the species out and to analyse sediment parameters (grain size, organic matter and other chemical components on XRF device). Results show that most of the organism are closed to the surface sediment but also that some species, even small size individuals, are found deeper in the sediment-column until 9 cm depth. This approach gives nondestructive 3D picture on the organism position in sediment and provides information on the manner how sediment structure acts on organisms and in return how organisms disturb sediment structure.