Abstract Book

Bay of Biscay

ISOBAY 14

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TOPICS

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5 - Organic and Inorganic Pollution, Ecotoxicology, Eutrophication

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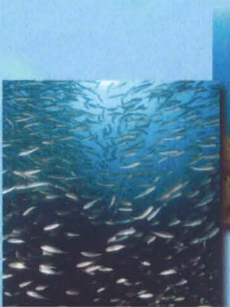

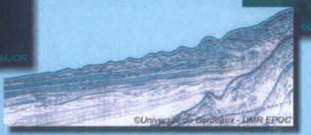

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RECENT CHANGES IN THE DISTRIBUTION AND ABUNDANCE OF MARINE MACROALGAE IN THE NORTH OF THE IBERIAN PENINSULA AND ITS RELATION TO CLIMATE CHANGE

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The Cantabrian coast is an area of special biogeographical interest because the existence of a marked longitudinal gradient, mainly related to the sea surface temperature (SST) and the intensity and frequency of upwellings. Since the late 19th Century, there is scientific evidence on the existence of fluctuating expansion-retraction periods of certain seaweeds, mainly fucoids and laminarians, associated with cooling or warming events. However, since the beginning of the 21st Century, macroalgae have experienced dramatic changes to date unknown. Populations of brown and red algae typical of cold-temperate waters such as *Himanthalia elongata, Fucus vesiculosus, F. serratus, Laminaria hyperborea, L. ochroleuca, Saccorhiza polyschides* and *Chondrus crispus* have undergone significant declines in abundance and even disappeared in many localities. Subtidal stands of *Gelidium corneum* have undergone a decline in biomass and coverage in the warmest part of the thermal gradient (the Basque coast), while populations westward from Cape Peñas (Asturias) are in expansion. In contrast, SST warming may have enhanced the growth of non-native species and algae with warm water affinities such as calcareous algae, *Stypocaulon scoparium*, *Cystoseira tamariscifolia* and *Bifurcaria bifurcata*. In Galicia, western area characterized by colder waters, the response of vegetation is more heterogeneous, varying between locations and habitats. Models of distributions based on future climate scenarios suggest massive declines of several canopy species along the Cantabrian coast. The disappearance or decline of these habitat-forming macrophytes may have severe consequences on the functioning of the ecosystem. Increases in SST, air temperature, irradiance, intensity and frequency of storm waves and transparency of coastal waters, in combination with a reduction of upwelling frequency and intensity could be factors involved in those changes detected in macroalgae distribution. In addition, in some cases, the resilience of some macroalgae, can be compromised by human pressures (i.e. waste discharges, exploitation), accelerating their decline.

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INFLUENCE OF ZOSTERA MEADOWS ON HARD-SHELLED MEIOFAUNA OF THE SEDIMENT OF A TIDAL LAGOON (ARCACHON BASIN, FRANCE)

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Seagrasses influence the physical, chemical and biological environments in coastal areas, acting as ecological engineers (*sensus* Wright and Jones 2006). It has been suggested that seagrasses, by root excretion of organic compounds and oxygen, may have considerable impact on redox conditions and faunal distribution in the sediment. The intertidal flats of Arcachon basin are highly covered by seagrass meadows of *Zostera noltei*. The seasonal dynamics of these meadows enhance the lateral heterogeneity of the sediment by influencing sedimentation, input of organic carbon, oxygen and nutrients uptake from the lagoon.

The present study shows results from new techniques which were applied to understand the relationship between the root system of seagrass and hard-shelled meiofauna (foraminifera) during winter and summer periods. Although foraminifera are abundant micro-organisms inhabiting such seagrass meadows, little is known about this group compared to others (e.g. algae, mollusks, fishes) (Ribes et al., 2000). Methodologically, we used a highly discriminative technique of living specimens staining to describe foraminiferal density and diversity (i.e. CTG fluorogenic probe) and we analyzed geochemical parameters (e.g. pH, O_2, Fe (II), PO_4, NH_4^+,...) in the pore water in order to characterize the foraminiferal microhabitats in the sedimentary column.

Three dominant species of foraminifera are present. One agglutinated species (Eggerella scabra) exhibit a clear deep-infaunal microhabitat. When Z. noltei is present, foraminifera live more extensive in depth in seagrass meadows probably due to oxygen and organic matter inputs from root webs. The two calcareous species inhabit mainly the few first millimeters of sediment. The two calcareous species show strong dissolution of the shells in summer.

These results show a clear impact on the seagrass on foraminiferal distributions link to variation of geochemical parameters. The most interesting observation is the occurrence of high densities of E. scabra in the anoxic part of the sediment. Such observation pleads to the existence of an anaerobic metabolism other than denitrification since no nitrate was measured within the sediment.