

Structure, écologie et fonctionnement trophique des habitats grossiers de la Manche : Approche multi-échelle et influence anthropique

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Abstract

The English Channel is an epicontinental sea characterized by a unique geological history and intense hydrodynamics, with 80% of its surface covered by coarse sediments. Early benthic surveys, conducted primarily in the 1960s and 1970s, provided a qualitative identification of the benthic communities and demonstrated that their structuring is largely influenced by sediment characteristics. However, it was only in the early 21st century that large-scale quantitative surveys were conducted, meaning that few studies have objectively examined the strength of the relationship between benthos and sediment. This thesis aims to quantitatively assess the contribution of sediment properties to the structuring and functioning of benthic communities. To achieve this, benthic abundance data collected over the past two decades in the eastern basin of the English Channel were analyzed using various complementary statistical methods across different spatial scales. The results indicate a significant contribution of sediment grain size characteristics to the distribution of benthic communities at the regional scale, with approximately 20% of the observed community variation explained by this factor alone. At a more local scale, the influence of dunes was also observed, leading to strong structural heterogeneity between the troughs and slopes of the dunes. Additionally, continental freshwater inputs, particularly from major rivers such as the Seine River, exert a significant influence on the structure and functioning of benthic communities through the hydrological and sedimentary disturbances they generate. Finally, sediment modifications resulting from anthropogenic activities such as marine aggregate extraction highlight the critical importance of sediment properties in the structuring of benthic communities. These alterations not only underscore the decisive role of sediment characteristics in the distribution and functioning of benthic ecosystems, but also emphasize the need to consider these key parameters when assessing the impacts of such activities