Structure of the megabenthic communities of the " Grande Vasière " of the northern Bay of Biscay: a system adapted to chronic disruptions by bottom trawling?

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Abstract

Bottom trawling is a widespread fishing activity, worldwide. Countless studies have reported its adverse effects on the benthic environment, including sharp declines of the benthic biodiversity and changes in the species composition. Reiss et al. (2009) argued that, beyond a certain threshold of trawling intensity, benthic communities might reach a new state of equilibrium so that an additional source of disruption would have no supplementary impacts. Nevertheless, this hypothesis has not been verified because most of the studies have been performed in low to moderately trawled areas. The " Grande Vasière " (GV) of the Bay of Biscay is fished for more than 90 years for Norway lobster (*Nephrops norvegicus*) and hake (*Merluccius merluccius*). It currently exhibits a remarkably high trawling intensity compared to the other European fisheries. Despite this, the benthic communities and their structuring factors remained poorly known. Our study aimed at felling this gap of knowledge. We first described the environmental characteristics (outputs of the Mars 3d model) and the distribution of the trawling intensity (data from the Vessel Monitoring System) within the GV. Then, on the basis of a three-years halieutic survey, we drawn the first map of the megabenthic communities structure (> 10mm) at the GV scale. Finally, the correlations between the megabenthic communities structure and the environmental characteristics along with the trawling intensity have been investigated. Fishing appeared to be a poor predictor of the megabenthic communities structure and our results contrasted with those of several studies performed in moderately trawled areas. Our conclusions comfort the hypothesis of Reiss et al. (2009): we suggested that decades of intensive trawling have irremediably

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removed the vulnerable organisms, such as seapens, and that the megabenthic communities have been adapted to chronic disruptions. So, an increase of the trawling intensity has no more detectable effects.