Oxygen deficiency impacts on burying habitats for lesser sandeel, Ammodytes tobianus, in the inner Danish waters

Starting in the 1980s, the inner Danish waters have yearly been exposed to seasonal oxygen deficiency (hypoxia). Through spatial–temporal interpolation of monitoring data (1998–2005), we investigated oxygen deficiency impacts on suitable burying habitats for lesser sandeel (Ammodytes tobianus). Furthermore, the consequences of a predicted 4 °C temperature increase within this century were investigated. Maps of bottom oxygen deficiency (oxygen saturation ≤ Scrit of sandeel) were overlaid on maps of sediment composition. Throughout the study period (1998–2005), about 8% of the suitable sediments were affected by oxygen deficiency during an average year and 23% in the most severe year. Regional differences underlay the interannual variations. The extent of oxygen deficiency in enclosed regions varied from 20% to 33% of the suitable seabed being affected, whereas in open-water regions oxygen deficiency problems were limited during average years. However, large areas of the open-water seabed experienced oxygen deficiency during severe years. In such years, under a 4.0 °C temperature increase scenario, the extent of oxygen deficiency on open-water suitable patches was predicted to increase from 25% to about 40%.

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