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Application of continuous measurements of FerryBoxes to oxygen fluxes in the North Sea

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The monitoring of marine environments in coastal seas is still a challenge when continuous and reliable observations are needed. The use of ships of opportunity (SoO) is cost-effective and can provide continuous and reliable measurements of near-surface parameters. They are protected from damage by waves and biofouling can be easier handled. So they serve as a valuable tool for further research on coastal seas. In context of acidification and eutrophication of the oceans, research is needed for the evaluation of quantitative values regarding the cycles of oxygen and carbon.
In this study we present data analyses of FerryBox transects in the North Sea covering a time period of several years. Onboard the FerryBox systems, oxygen optodes provide continuous measurements of dissolved oxygen concentrations. Together with temperature and salinity observations as well as wind field information, the air-sea exchange of oxygen has been calculated. Only the FerryBox systems on ships of opportunity provide continuous measurements over a longer timescale along transects in coastal oceans. Depending on the ship routes, the time interval at one point is about 1-2 days, so weekly differences are usable for the estimation of oxygen fluxes. Going further, the oxygen flux serves as a proxy of net primary production, so also carbon fluxes can be estimated. Details of the analyses procedure as well as results will be presented.
However, this kind of analysis needs precise dissolved oxygen measurements as changes in oxygen concentration are small. So calibration of oxygen optodes is crucial and the errors concerning the estimated oxygen fluxes will be discussed.