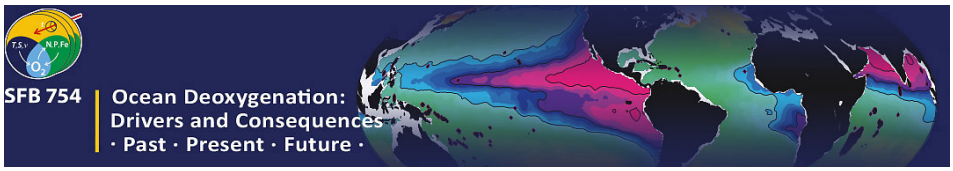

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Coastal hypoxia in the Black Sea: Effects on diagenetic pathways and benthic fluxes

Dissolved oxygen is a fundamental component for marine life involved in the biogeochemical cycling of elements (e.g. N, P, S). The occurrence of hypoxic and anoxic events seems to have broadened in the coastal zones impacted by anthropogenic activities whereas these environments have existed through geological time. The north-western shelf of the Black Sea has been affected by seasonal hypoxia over the last decades. The area has undergone nutrient, organic matter and reactive iron loadings from the discharge of rivers such as the Danube. Oxygen deficiency in the bottom waters induces major changes in biogeochemical processes, giving rise to reactions of anoxic mineralisation of the organic matter.

Within the framework of the BENTHOX project, a study focusing on the early diagenesis has been conducted in the Black Sea. It aims to collect a new dataset of biogeochemical measurements in the sediments including porewaters, to investigate the impact of benthic hypoxia on the diagenetic pathways and to reconstruct the long-term hypoxia history using a multi-proxies approach.

During two cruises (EMBLAS II - May 2016 & August 2017) aboard the R/V Mare Nigrum, sediments, porewaters and bottom waters were sampled on the Ukrainian shelf of the Black Sea. Geochemical analyses have been carried out on the solid phase as well as in the porewaters to determine the speciation of sedimentary sulfur (AVS, pyrite, S°, ΣH2S and dissolved sulfate) and iron (dithionite extractable Fe, total Fe, HCl extractable Fe and dissolved Fe). Indeed, the Fe and S cycles are closely linked which are influenced by the organic matter inputs, the presence of Fe-compounds and the oxygen concentrations in the bottom waters. This study allows a better understanding of the impact of oxygen depletion on the biogeochemical cycling of carbon and nutrients in a shallow coastal area. Moreover, the assessment of benthic fluxes regarding the dissolved nutrients will bring about some information on the response of the sediment biogeochemistry to seasonal hypoxia.

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