Geophysical Research Abstracts
Vol. 19, EGU2017-10268, 2017
EGU General Assembly 2017

Impact of the temporal variation of oxygen contents in the water column on the biogeochemistry of the benthic zone

Sylvain Rigaud (1), Bruno Deflandre (2), Christian Grenz (3), Lara Pozzato (3), Florian Cesbron (3), Samuel Meulé (4), Patricia Bonin (3), Valérie Michotey (3), Pascal Mirleau (5), Fatma Mirleau (3), Joel Knoery (6), Frédéric Zuberer (3), Dorian Guillemain (3), Sébatien Marguerite (4), Nicolas Mayot (7), Vincent Faure (7), Raphael Grisel (7), and Olivier Radakovitch (4)

(1) Univ. Nîmes, EA 7352 CHROME, Nîmes, France, (2) EPOC, UMR CNRS 5805, University of Bordeaux, Pessac, France, (3) MIO, UMR 7294, Aix-Marseille Univ., CNRS IRD, Marseille, France, (4) CEREGE, UM34, Aix-Marseille Univ., CNRS, IRD, Coll. France, Aix en Provence, France, (5) IMBE, UMR 7263, Aix-Marseille Univ., CNRS, IRD, Marseille, France, (6) IFREMER, LBCM, Centre Atlantique de Nantes, Nantes, France, (7) GIPREB, Syndicat Mixte, Berre-l'Etang, France

The desoxygenation of the water column in coastal areas, refered as coastal hypoxia, is currently a growing phenomenon still particularly complex to predict. This is mainly due to the fact that the biogeochemical response of the benthic ecosystem to the variation of the oxygen contents in the water column remains poorly understood. Dissolved oxygen concentration is a key parameter controling the benthic micro- and macro-community as well as the biogeochemical reactions occuring in the surface sediment. More particularly, the variation over variable time scales (from hour to years) of the oxygen deficit may induce different pathways for biogeochemical processes such as the oxydation of freshly deposited organic matter and nutrients and metals recycling. This results in variable chemical fluxes at the sediment-water interface, that may in turn, support the eutrophication and desoxygenation of the aquatic system.

Our study focus on the Berre lagoon, an eutrophicated mediterranean lagoon impacted by hypoxia events in the water column. Three stations, closely located but impacted by contrasted temporal variation of oxygen deficit in the water column were selected: one station with rare oxygen deficit and with functionnal macrofauna community, one station with almost permanent oxygen deficit and no macrofauna community and one intermediate station with seasonnal oxygen deficit and degraded macrofauna community. Each station was surveyed once during a same field survey while the intermediate station was surveyed seasonnaly. For each campaign, we report vertical profiles of the main chemical components (oxygen, nutrients, metals) along the water-column/sediment continuum, with an increased vertical resolution in the benthic zone using a multi-tool approach (high vertical resolution suprabenthic water sampler and microsensors profiler). In addition, total chemical fluxes at the sediment-water interface was obtained using benthic chambers. This dataset was used to evaluate the influence, of the oxygen concentrations (and its short and long-term variations) in the water column on the nature and location of the main biogeochemical reactions occuring in the benthic zone and the resulting fluxes at the sediment-water interface.