Geophysical Research Abstracts
Vol. 14, EGU2012-9869, 2012
EGU General Assembly 2012

Internal nutrient loading of ammonium and phosphorus across the benthic boundary layer of the oxic to anoxic Gotland Basin (Baltic Sea)

A. Noffke, S. Sommer, A.W. Dale, V. Bertics, and O. Pfannkuche
Helmholtz-Zentrum für Ozeanforschung Kiel (GEOMAR), Marine Biogeochemistry, Kiel, Germany (anoffke@geomar.de)

The Baltic Sea suffers from eutrophication and associated hypoxia. Oxygen deficient conditions not only reduce habitats for higher organisms but also affect the cycling of redox-sensitive elements. Under conditions of oxygen-deficient bottom waters, ammonium, phosphorus and iron is mobilized from the sediments and contributes via positive feedback mechanisms to sustain high surface water productivity. Whereas nutrients from anthropogenic sources in the Baltic Sea catchment area are retained in coastal areas, nutrient sources and sinks in the open Baltic Sea are largely regulated by internal feedback processes preventing recovery from eutrophication and leading to extensive phytoplankton and cyanobacterial blooms. Despite this significance nutrient release from sediments is still hardly quantified. We present in situ fluxes of N and P in concert with pore water and water column geochemistry that were measured using landers along the oxic to anoxic gradient in the Gotland Basin in June 2010 (Alkor cruise 355). In addition to the deep more persistent anoxic and sulfidic basin, sediments located around the oxycline at 80 to 120 m water depth, which were covered with extended bacterial mats were identified as hitherto unknown major sources for ammonium and phosphorus.