



The influence of the NAO on oxygen dynamics in the North Sea: (EGU2015)

Johannes Paetsch (1), Helmuth Thomas (2), Fabian Grosse (3), and Markus Kreis (1)

(1) Institute of Oceanography, University of Hamburg, Bundesstraße 53, D-20146 Hamburg, Germany (markus.kreis@zmaw.de), (2) Dalhousie University, 1459 Oxford Street, Halifax, Canada (helmuth.thomas@dal.ca), (3) Scientific Computing, Department of Informatics, University of Hamburg (fabian.grosze@zmaw.de)

The North Sea is a semi-enclosed shelf sea attached to the North-east Atlantic. While the strong Atlantic influence in the north and the anthropogenic effects in the southern coastal zone prevail, hydrodynamic and biogeochemical dynamics in the central North Sea are mainly affected by the meteorology and its local variations.

Summer observations of bottom layer oxygen concentrations in the central North Sea exhibit similar values in 2001, 2005 and 2008 even though the NAO indices of the corresponding preceding winters were different with lowest index in 2001 and highest index in 2008. Model simulations with ECOHAM show that two effects determining the bottom oxygen concentrations are compensating each other in these years: In the months February to September in 2008 bottom temperature was higher than in the other two years with lower NAO indices. On the other hand stronger winds in winter 2007/2008 induced a well-mixed water column which inhibits the late winter / early spring bloom. Due to the reduced primary production, the amount of vertically exported organic matter in the sediment in 2008 was less compared to the other years. Consequently, the oxygen demand for benthic remineralisation was lowest in 2008. In contrast to the observed bottom oxygen concentrations, the Apparent Oxygen Utilisation (AOU) in summer differs in between the different years. Lowest values were found in 2008 with values being about 2 times less than in 2001 and 2005.