Geophysical Research Abstracts
Vol. 16, EGU2014-15628-2, 2014
EGU General Assembly 2014

Impact of model resolution on biogeochemical tracers concentration in the tropical Atlantic Ocean

Olaf Duteil, Claus Boening, and Andreas Oschlies
GEOMAR, Kiel, Germany (oduteil@geomar.de)

Representing correctly the distribution of biogeochemical tracers in the interior ocean, such as oxygen or phosphate, is hampered by large biases in the representation of circulation in the coarse resolution models. Here we assess the oxygen and phosphate budget in two configurations of a coupled circulation biogeochemical model (NEMO - NPZD), focusing on the Atlantic Ocean. These two configurations have been integrated using realistic atmospheric forcings for the period 1948-2007. While a coarse (0.5°) configuration displays the common bias of too low oxygen associated with too high phosphate concentration, particularly at intermediate depth in the eastern side of the basin, the values are closer to the observations in an eddying (0.1°) configuration. The improvement in the representation of oxygen and phosphate is traced to a stronger transport by a more realistic representation of the equatorial and off-equatorial undercurrents. The biogeochemical fluxes are less sensitive to the current strength as the phytoplankton growth is mainly limited by the available light in the two configurations. This study emphasizes the need of high resolution models to tackle coupled biogeochemical problematics, such as the extension of oxygen minimum zones or variability in the eastern boundary upwelling system productivity.