Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04462, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04462
EGU General Assembly 2008

Oxygen and carbon variability in the upper water column: patterns and mechanisms

H. Brix and C. Deutsch

Dept. of Atmospheric and Oceanic Sciences, University of California, Los Angeles, CA (hbrix@ucla.edu / Phone: +1-310-8254526)

Oxygen gas is a valuable tracer in marine physics and biology. Observational data show remarkable variability in subsurface oxygen concentrations in various locations around the globe, especially on decadal time scales. Carbon dioxide has a much larger air-sea equilibration time scale than oxygen gas, but once ventilated into the ocean its concentration is strongly coupled to that of oxygen. This relationship can be exploited to interpret differences and similarities in the temporal and spatial development of oxygen and carbon concentrations. To understand variability in ocean circulation and oceanic carbon uptake rates, to determine to what extent it is natural or anthropogenic, and to understand its relevance for the global carbon cycle, we make use of this carbon and oxygen tracer variability and investigate them with the help of modeling studies. We here analyze variability of oxygen and carbon in the upper water column in a global isopycnal circulation model. We use model runs with climatological and historical surface forcing conditions to investigate the complex spatial and temporal variability patterns. A comparison of water masses in different ocean basins helps us to determine and localize the fundamental mechanisms of oxygen and carbon variability: ventilation, circulation and biological processes.