Geophysical Research Abstracts, Vol. 9, 03449, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-03449


# Modeling the sensitivity of air-sea CO2 fluxes to remineralization depth of POC

**B. Schneider** (1), J. Segschneider (2), M. Gehlen (1), L. Bopp (1)

(1) LSCE, Gif sur Yvette, France, (2) Max-Planck-Institut fuer Meteorologie, Hamburg, Germany

The biological pump transfers organic carbon bound into particles (POC) from the sunlit surface layer to the oceans interior. The period for which carbon is removed from air-sea exchange depends on its depth of remineralization, ranging from days for shallow remineralization in well mixed waters to geological time scales for the fraction buried in marine sediments. To test the sensitivity of air-sea CO2 exchange to changes in the remineralization depth of POC two different biogeochemical ocean circulation models (ORCA/PISCES, MPI-OM/HAMOCC5.1) are run with different parametrizations for POC fluxes, forced by constant climatological ocean circulation fields. For the PISCES model different intensities for flux feeding (high/low), as well as a ballast parametrization and an aggregation scheme are used, while in the HAMOCC model POC fluxes are simulated with two different prescribed constant sinking speeds (5m/day and 10m/day) and an aggregation scheme. All model simulations are integrated over 100 years, and the efficiency of POC export is taken as the PE-ratio, which is the ratio of export produciton (POC flux at 100m depth) over the integrated primary production of the top 100m of the water colulmn. The results show that more efficient export of POC (higher PE-ratio) leads to lower surface water pcO2, which leads to higher air-sea CO2 fluxes and higher inventories of dissolved inorganic carbon (DIC).