



CARIOCA CO₂ partial pressure data in Southern Ocean: influence of mesoscale dynamics on air-sea CO₂ fluxes

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Seven CARIOCA lagrangian drifters were deployed in the Subantarctic Zone of the Indian, Pacific and Atlantic Ocean successively in January 2002 and 2003, in March-April 2004 and in January 2005. Hourly ocean CO₂ partial pressure, pCO₂, sea surface temperature, SST, salinity, SSS, fluorescence, surface wind speed, atmospheric pressure and air temperature data were recorded during 50 months. Continuous time series of measurements made during all seasons indicate that pCO₂ in sea water is undersaturated with respect to the atmospheric value and consequently the subantarctic province of the Southern Ocean acts as a sink for atmospheric CO₂.

A large part of the pCO₂ variability appears at short (day to week) time and space (a few kilometres) scale. We analyze the origin of this variability by looking at the measured physical and biological parameters, SST, SSS and fluorescence. The variations of the total carbon content, Ct, are derived from pCO₂ and alkalinity estimated from SSS measurements. Analysis of Ct variations compared to SST-SSS diagrams allows discriminating between variations of pCO₂ related to mixing of different water masses and those related to local warming. Satellite measurements of SST and sea level anomalies are used to interpret the observed time and space variability displayed in the Carioca measurements. The influence of mesoscale eddies on the distribution of the sea surface properties as measured by the drifters is investigated. We will focus on the analysis of the 2 buoys deployed in March April 2004 as they record the longest time series (17 months each) and as they sample very contrasted situations.