Geophysical Research Abstracts, Vol. 9, 08419, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08419

Growth-rate of atmospheric CO_2 and $\delta^{13}C$ measured along oceanic routes between Italy and Antarctica

L. Langone (1), C. Ori (1), R. Lenaz (1), A. Longinelli (2), G. Giovanelli (3), F. Ravegnani (3), F. Giglio (1)

(1) ISMAR-CNR, Sede di Bologna - Geologia Marina, Italy, (2) Università di Parma, Dip. Scienze della Terra, Italy, (3) ISAC-CNR, Bologna, Italy (leonardo.langone@ismar.cnr.it / Fax + 39 051-6398940 / Tel +39 051-6398870)

At present, the ocean acts as an important sink for the anthropogenic CO_2 taking up about 30-40% of the CO_2 released by humans and model predictions suggest that the oceanic uptake will continue to play a key role to mitigate the CO_2 excess also in the next future. Nevertheless, this positive effect will vanish at the time scale of the mixing cycle of deep ocean water.

The present-day knowledge of the carbon cycle in the ocean and in terrestrial ecosystems does not yet provide a complete understanding of the interaction between the different components of the Earth system and the relationships between the carbon cycle and other biogeochemical and climatic processes.

In order to enlarge the available dataset, concentrations of atmospheric CO_2 were continuously measured in poorly known oceanic and polar areas, usually disregarded by routine monitoring. Direct measurements of atmospheric CO_2concentrations were carried out during the last decade at biannual frequency along oceanic routes from Italy to Antarctica.

Interannual growth-rates of atmospheric CO_2 concentration calculated at different latitudinal belts showed wide spatial and temporal variations (0.2 – 5.7 ppm y^{-1}), specially in the Northern emisphere. In contrast, in the Southern Ocean the CO_2 growth-rate was quite constantly around 1.7 ppm y^{-1}.

A negative trend of the carbon isotope composition of atmospheric $CO_2$was observed in several expeditions between 52˚S and 64˚S across the Antarctic Convergence area

with no appreciable change in the atmospheric CO_2 concentration. The hypothesis of a biochemical origin of these light carbon isotope values is discussed.