Geophysical Research Abstracts
Vol. 13, EGU2011-720, 2011
EGU General Assembly 2011

Simulation of anthropogenic CO2 uptake in the Mediterranean sea with the NEMO-MED12 model; Impact on water masses acidification.

Julien Palmiéri (1,2,3), Jean-Claude Dutay (1,2), Jonathan Beuvier (3,4,5), Karine Béranger (3), James Orr (1,2)

(1) IPSL-LSCE, Laboratoire des Sciences du Climat et de l'Environnement, Gif-sur-Yvette, France , (2) UVSQ, Versailles-St Quentin, France, (3) UME, ENSTAT-ParisTech, Palaiseau, France, (4) Mercator Ocean, Toulouse, France, (5) Météo-France, Toulouse, France

The Mediterranean basin is under a very strong and increasing anthropogenic pressure. It is also a hot spot of the climate change. At global scale, atmospheric concentration of carbon dioxide (CO2) increased from about 280ppm, in pre-industrial period, to almost 390ppm at present. A significant amount of the CO2 released in the atmosphere is dissolved in the ocean. This anthropogenic CO2 uptake results in an acidification of water masses, with possible consequences on calcification, and hence on phytoplankton. We focus here on the acidification of water masses at the regional scale of the Mediterranean basin.
The impact of anthropogenic CO2 uptake is investigated using a Mediterranean version of the NEMO model: MED12, an eddy-resolving model of the Mediterranean Sea, developed in the context of SiMED and MORCE-MED projects.
First, the general circulation obtained with MED12 was validated by simulating CFC invasion, and confronting it to observations covering the recent period 1990-2000. Then a 210-year simulation of anthropogenic CO2 uptake was performed, using a perturbation approach over the period 1800-2010. In this case, anthropogenic CO2 is only simulated as a passive tracer, just considering it as a perturbation of the natural signal [Sarmiento and Orr, 1992]. The simulation is then compared to existing estimations estimated with the transit time distribution method [Waugh et al. 2004], calculated by Schneider et al. [in press].