Geophysical Research Abstracts,
Vol. 11, EGU2009-5796, 2009
EGU General Assembly 2009

Changes in the North Atlantic Oscillation influence CO2 uptake in the North Atlantic over the past two decades

H. Thomas (1), A. E. F. Prowe (1,4), I. D. Lima (2), S. C. Doney (2), R. Wanninkhof (3), R. J. Greatbatch (1,4), U. Schuster (5), and A. Corbiere (6)

(1) Dalhousie University, Department of Oceanography, Halifax, NS, Canada (helmuth.thomas@dal.ca, +1 902 494-3877), (2) Marine Chemistry and Geochemistry Department, Woods Hole Oceanographic Institution, Woods Hole, MA, USA, (3) Ocean Chemistry Division, Atlantic Oceanographic and Meteorological Laboratory, NOAA, Miami, Florida, USA, (4) IFM-GEOMAR, Leibniz-Institut für Meereswissenschaften, D-24105 Kiel Germany, (5) School of Environmental Sciences, University of East Anglia, Norwich, UK, (6) Laboratoire dÓceanographie et du Climat: Experimentation et Approches Numeriques, IPSL, Universite Pierre et Marie Curie, Paris, France

Observational studies report a surprisingly rapid decline of the CO2 uptake in the temperate North Atlantic Ocean during the last decade. We analyze these changes using numerical model simulations for the period 1979-2004, with interannually varying atmospheric forcing. The reorganization in ocean circulation is a major driver of these CO2 system changes. North Atlantic Oscillation (NAO) climate patterns are overlain by transient events such as the Great Salinity Anomaly. Our analysis indicates that the recent rapid shifts in CO2 flux are decadal perturbations superimposed on the secular trends and highlights the need for long-term ocean carbon observations and modeling to fully resolve interannual variability, which can obscure detection of the long-term changes associated with anthropogenic CO2 uptake and climate change.