



The changing dynamics of the subtropical North Atlantic anthropogenic carbon sink

P. Brown (1), U. Schuster (1), A. Watson (1), S. Cunningham (2), E. McDonagh (2)

(1) School of Environmental Sciences, University of East Anglia, Norwich, UK, (2) National Oceanography Centre, Southampton, UK, (p.j.brown@uea.ac.uk / Fax: +44 1603 591327 / Phone: +44 1603 593324)

Model-based assessments of the North Atlantic carbon dioxide sink predict it to grow in magnitude as atmospheric CO₂ concentrations continue to increase. However, carbon measurements from two transatlantic sections in the subtropics North Atlantic do not support this forecast, instead indicating that the North Atlantic carbon sink has decreased. Instead, the majority of CO₂ uptake is thought to occur towards the south before being transported into the North Atlantic as part of the upper limb of the meridional overturning circulation. Data obtained during the occupation of 36°N in 2005 and 24.5°N in 2004 are presented here, with new inventories of natural and anthropogenic carbon being calculated for the subtropics and compared to previous estimates. Carbon transport fields are used to assess the accumulation and storage of both natural and anthropogenic carbon in the region, and to estimate the air-sea CO₂ flux which is compared to estimates derived from surface seawater pCO₂ measurements obtained onboard voluntary observing ships. Together these are the most recent data in the subtropics to give an indication of the variability of the meridional carbon transport, and the changing dynamics of the North Atlantic carbon system.