



North Atlantic sea surface pCO₂ and air-sea flux trends and uncertainties

U. Schuster (1), and CARBOOCEAN-TEAM

(1) University of East Anglia, Norwich, UK, NR4 7TJ (U.Schuster@uea.ac.uk / Fax: +44 1603 591327 / Phone: +44 1603 593763)

Sea surface pCO₂ measurements in the North Atlantic from the early-1990s to 2006, obtained from voluntary observing ships, research vessels, and time-series stations, show that in the tropical regions, sea surface pCO₂ has closely followed the increasing trend in atmospheric pCO₂. In contrast, further north, sea surface pCO₂ has increased faster than pCO₂ in the atmosphere. The inter-decadal North Atlantic sink has therefore decreased from the early-1990s to 2006, particularly at higher latitudes, as has the annual mean sea-air flux. The North Atlantic sink also exhibits substantial inter-annual variability, with the sink being estimated to have increased again from 2002 onwards, albeit not to mid-1990s levels.

Since the initiation of the CARBOOCEAN network of routine measurements onboard voluntary observing ships in 2005, the spatial and temporal resolution of sea surface pCO₂ observations has greatly increased. North Atlantic sea surface pCO₂ maps for 2005 have been created with an uncertainty of less than 10 % using a number of techniques, including neural networks and multi-linear regression. Such improved estimates can be used to advance ocean and inverse models, reducing the uncertainty of the long-term ocean sink estimates.