



Revisiting the estimation of the North Sea air-sea flux of CO₂ in 2001/02

Maybritt Meyer (1), Johannes Paetsch (1), Beate Geyer (2), and Helmuth Thomas (3)

(1) Institute of Oceanography, University of Hamburg, Germany (johannes.paetsch@uni-hamburg.de), (2) Institute of Coastal Research, Helmholtz-Zentrum Geesthacht, Germany, (3) Department of Oceanography, Dalhousie University, Halifax, Canada

Based on seasonal observations of pCO₂ and 6-hourly wind data derived from ERA-40 reanalysis data Thomas et al. (2004) estimated the annual North Sea net uptake of CO₂ for the years 2001/02. The wind data were provided by the ECMWF with a spatial resolution of 1.125° (ECMWF, 2005). An updated estimate has now been achieved by using the more appropriate wind data set coastDat2 (Geyer, 2014) resulting from atmospheric hourly hindcast for Europe and the North Atlantic using COSMO-CLM version 4.8_clm_11 with spectral nudging from 1948-2015. The model uses a grid point distance of 0.22 degrees with an extension of about 68° W to 82° E, 25.6° N to 81.4° N.

It could be shown that coastDat2 rather than ERA-40 data fit to observed hourly observations at the German Weather Service station Helgoland (54.175° N, 7.892° E). In most cases the coastDat2 values are larger than the ERA-40 values. The comparison of North Sea wide CO₂ uptake yields 1.3 for ERA-40 and 1.8 mol CO₂ m⁻² a⁻¹ for coastDat2 wind fields.

References

Geyer, B., 2014. Earth System Science Data, 6(1): 147-164. Doi:10.5194/essd-6-147-2014.

ECMWF, 2005. <http://www.ecmwf.int>

Thomas, H., Bozec, Y., Elkalay, K., de Baar, H.J.W., 2004. Science, 304: 1005-1008.