An observation-based global monthly gridded sea surface pCO₂ product from 1998 through 2011 and its monthly climatology

by P. Landschützer, N. Gruber, D.C.E. Bakker, U. Schuster

1Institute of Biogeochemistry and Pollutant Dynamics, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland
2Centre for Ocean and Atmospheric Sciences, School of Environmental Sciences, University of East Anglia, Norwich Research Park, Norwich, UK
3College of Life and Environmental Sciences, Hatherley Laboratories, University of Exeter, Exeter, UK

Abstract

The observation-based pCO₂ fields were created using a 2-step neural network technique. In a first step, the global ocean is divided into 16 biogeochemical provinces using a self organizing map. In a second step, the non-linear relationship between variables known to drive the surface ocean carbon system and gridded observations from the SOCATv2 dataset (Bakker et al. 2014) is reconstructed using a feed-forward neural network within each province separately. The final product is then produced by projecting these driving variables, i.e., surface temperature, chlorophyll, mixed layer depth, and atmospheric CO₂ onto oceanic pCO₂ using these non-linear relationships. This results in monthly pCO₂ fields at 1°x1° resolution covering the entire globe with the exception of the Arctic Ocean and few marginal seas. The air-sea CO₂ flux is then computed using a standard bulk formula. More details can be found in Landschützer et al. 2013 and Landschützer et al. 2014.

This product is free to be used. Please cite this data set as:

Please cite the method as: