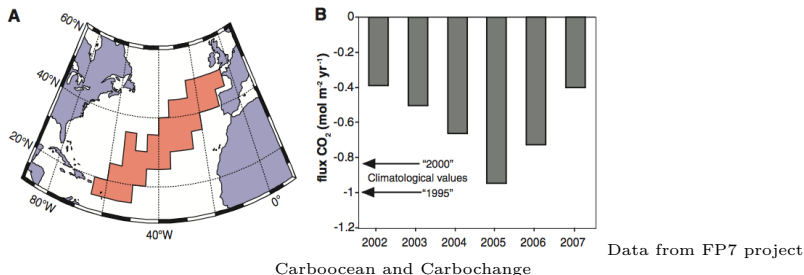
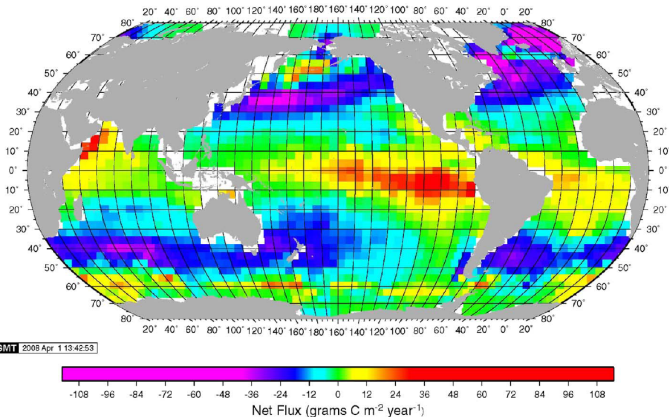


- SOLAS Goal: *To achieve quantitative understanding of the key biogeochemical-physical interactions and feedbacks between the ocean and the atmosphere, and how this coupled system affects and is affected by climate and environmental change*

- Annual sea-air fluxes of CO₂ calculated from data on a shipping route between the United Kingdom and the Caribbean.



- Annual average fluxes show a reduction in the uptake of the North Atlantic - questions remains if this is a trend?



Air-sea CO₂ flux F :

$$F = ks\Delta pCO_2$$

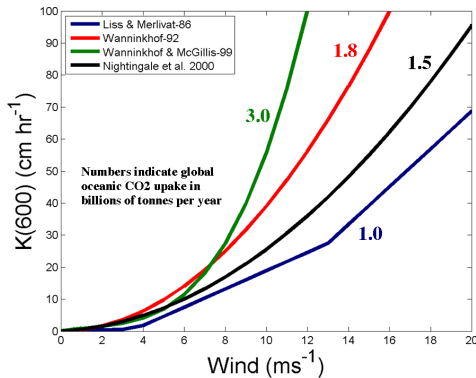
k = transfer velocity

s = solubility

ΔpCO_2 = partial pressure difference between ocean and atmosphere

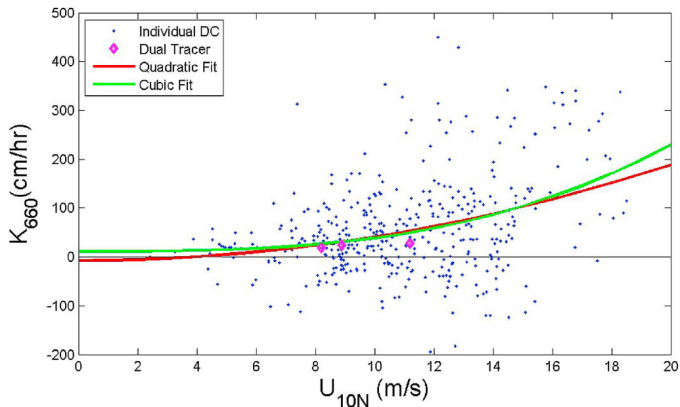
- Current estimates is that the oceanic uptake flux including anthropogenic CO₂ is $2.0 \pm 1.0 \text{ Pg-C yr}^{-1}$
- The goal is to resolve air sea CO₂ fluxes to 0.2 Pg-C yr^{-1}

$$F = k \cdot s \cdot \Delta p CO_2$$



From Feely et al. (2001)

- Transfer velocity k is usually parameterized with wind speed e.g. $k \propto u^a S_c^{-b}$
- Parameterisations of k differ by about 50% for winds of 7 ms^{-1} and by 100% at 15 ms^{-1}
- Direct measurements of fluxes will lead to improved models



From Edson et al. (2011)

- Eddy covariance k values have many more data points but much higher scatter

www.socat.info
Public data
products



Welcome to SOCAT

A Collection of Underway Ocean CO₂ Observations Quality Controlled by the
Science Community



SOCAT Data Products:

[Cruise Data Viewer](#)

[Gridded Data Viewer](#)

[Table of Cruises](#)

[Data Download](#)

[Publications/Presentations](#)

[SOCAT Credits](#)



SOCAT Documentation:

[About](#)

[News](#)

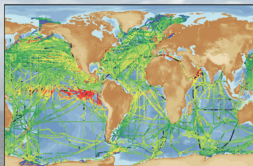
[Meetings](#)

[Data Use Policy](#)

SOCAT Help:

[Videos](#)

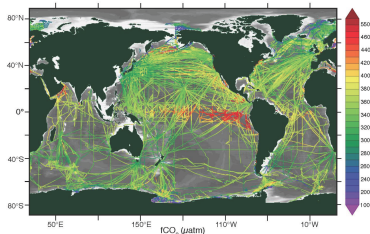
[Frequently Asked Questions](#)



Please contact submit@socat.info to report problems.

This page is hosted by [Benjamin Pfeil](#), University of Bergen/Bjerknes Centre for Climate Research/SKD, Bergen (Norway)
This page has been designed by Heather Koyuk, University of Washington/JSAO, Seattle (USA)

Courtesy Dorothee Bakker, UEA



- Surface ocean fCO₂ in uniform format with quality control;
 - Version 1: 6.3 million fCO₂, 1851 cruises, 1968 to 2007
 - Version 2: 10.1 million fCO₂, 2660 cruises, 1968 to 2011
 - Regular updates for the global oceans and coastal seas;
 - Transparent, fully documented;
- V1: Bakker et al. Eos 93(12), 2012; Sabine et al. ESSD in press; Pfeil et al. ESSD accepted; V2: Bakker et al. ESSD in preparation.

- The Surface Ocean - Lower Atmosphere Study (SOLAS) is a multidisciplinary and global-scale research programme.
- SOLAS integrates the efforts of marine biogeochemists, physical oceanographers, atmospheric chemists, meteorologists and climatologists, covering scales from the microbial to global
- For air-sea fluxes SOLAS should focus mainly on greenhouse gases and aerosols (with water, heat, and momentum)