An update to the Surface Ocean CO₂ Atlas (SOCAT version 2)


Recommended fCO₂ (μatm)
Surface Ocean CO₂ Atlas, version 2

2007: Many formats, many data not public. No public global fCO₂ data set.

SOCAT: Surface ocean fCO₂ (fugacity of CO₂) in uniform format with quality control;
Version 1: 6.3 million fCO₂, 1851 cruises, 1968 to 2007 (09/2011);
Version 2: 10.1 million fCO₂, 2660 cruises, 1968 to 2011 now public;

Bakker et al. (2012) Eos 93(12); Pfeil et al. (2013) ESSD 5: 125-143;
Recalculated surface ocean fCO₂ in uniform format with quality control;
Transparent, fully documented, regular updates;

Global synthesis product for the global oceans and coastal seas;
Global gridded products without interpolation (1° x 1° global, ¼° x ¼° coastal);

Interactive online viewers (Live Access Server);
Available in various formats, including in Ocean Data View;
Access via http://www.socat.info/
Community effort since 2007

>100 contributors and data providers;
Multiple funding sources, but no long-term funding;
Please, acknowledge SOCAT, data providers and contributors;

9,045 QC flags in V1
3,473 QC flags in V2
Increasing data coverage per decade

www.socat.info

Recommended $fCO_2$ ($\mu$atm)
Surface water fCO$_2$ (µatm)

Movie (1970) 1978 – 2011, annual, gridded 1° x 1°
Data coverage (1970-2011)

Number of unique months with fCO₂ observations per 1° x 1° grid cell (1970-2011)

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Data coverage in coastal regions

Number of cruises with fCO$_2$ data for 2000 to 2009 per 1°x 1° grid cell

US East Coast & Caribbean

W Europe

Japan

Drake Passage, Southern Ocean
Amplitude seasonal $pCO_2$ cycle (µatm)  
(Rödenbeck et al., 2013, OS)

Seasonal Atlantic $CO_2$ air-sea fluxes  
(Schuster et al., 2013, Biogeosciences)

- Process studies;
- Ocean carbon sink and its seasonal, year-to-year, decadal variation;
- Initialisation and validation of ocean carbon cycle models.
- Widely used ($\geq$9 publications, $\geq$3 in preparation).
**Future SOCAT**

V3 Data submission to CDIAC by **December 2013**.

**Alternative sensor recommendations** (White paper by Wanninkhof et al.):
- Flag A: strict cross-over definition;
- Flag C and D: accuracy < 5 µatm;
- Flag E: for alternative sensors, accuracy < 10 µatm (**NEW**);

**Automation system** (Poster 140, Hankin et al.) ready by January 2014;
Some V3 data submission via automation system (invitation only);
Automation system in use for version 4.

**Additional parameters**, e.g. nutrients, pH, DIC, TA:
- No extra parameters until version 4 or later.
- Only include extra parameters, if they can be quality controlled and if sufficient manpower and/or automation is in place to do this QC.
Surface water fCO$_2$ (µatm)
Movie 2006 – 2008, monthly, gridded 1° x 1°

08/2007
Welcome to SOCAT
A Collection of Underway Ocean CO₂ Observations Quality Controlled by
the Science Community

SOCAT Version 2 Data Products:
- Cruise Data Viewer
- Gridded Data Viewer
- Table of Cruises
- Data Download
- Publications/Presentations
- SOCAT Credits
- SOCAT Version 1.5

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).
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