Community effort since 2007

On behalf of SOCAT sponsors:

Maciej Telszewski - IOCCP Project Director

Surface Ocean CO_2 Atlas (SOCAT): Release of Version 2 and Science Highlights

Surface Ocean CO_2 Atlas (SOCAT): Release of Version 2 and Science Highlights

Co-chairs: Dorothee Bakker, Maciej Telszewski

12:15 **Sponsors: IOCCP** (Maciej Telszewski)

12:20 **Release of SOCAT version 2** (Benjamin Pfeil)

12:30 **SOCAT automation and vision** (Dorothee Bakker)

12:40 ***A Neural Network Approach to Estimate the Global Carbon Sink based on SOCATv1.5 from 1998-2007***
(Peter Landschützer, et al.)

12:50 ***Global sea-air CO_2 flux variability from an ocean mixed - layer scheme driven by SOCAT pCO_2 observations***
(Christian Rödenbeck, et al.)

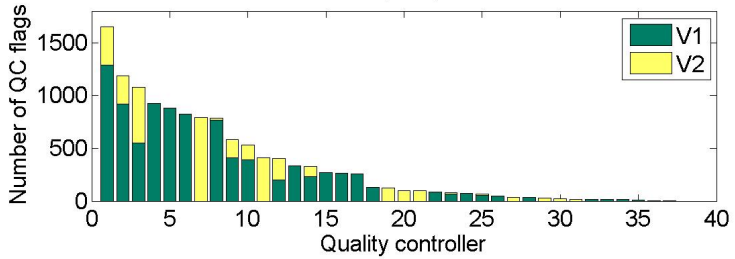
13:00 **Discussion: How to move SOCAT forward?** (Dorothee Bakker)

13:15 End of session

Community effort since 2007

- ~ 10 million surface ocean fCO_2, 2660 cruises, 1968 to 2011 in uniform format with transparent and fully documented community quality control flags
- Synthesis product, gridded product, **interactive data viewers**;

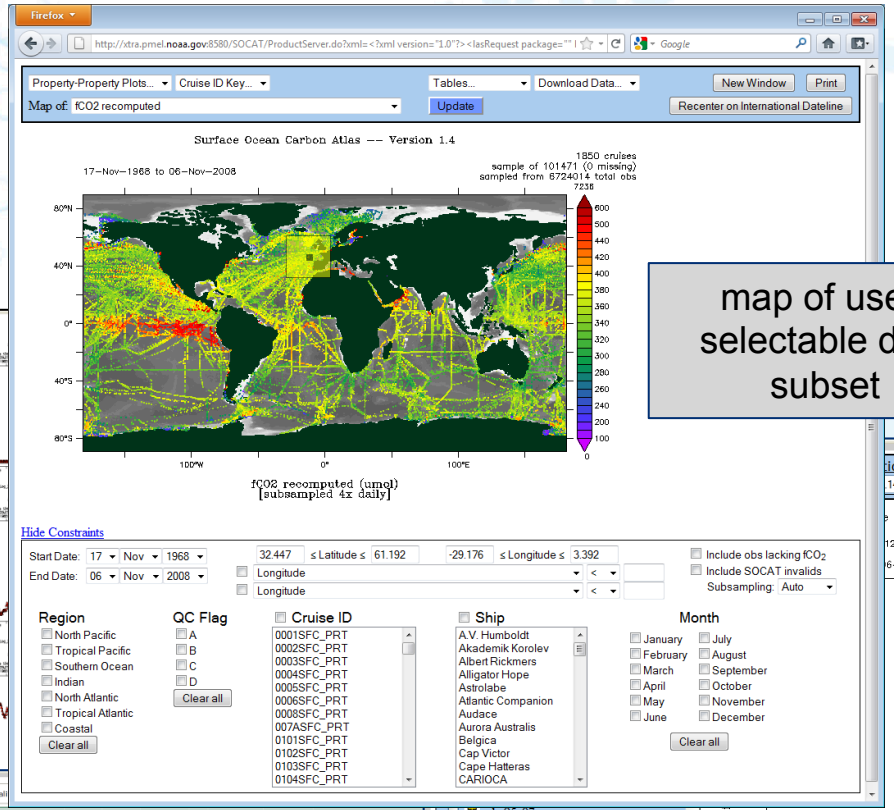
- >100 contributors and data providers;
- Multiple funding sources, but no long-term funding;
- 10 meetings over 6 years, numerous Skype telecons



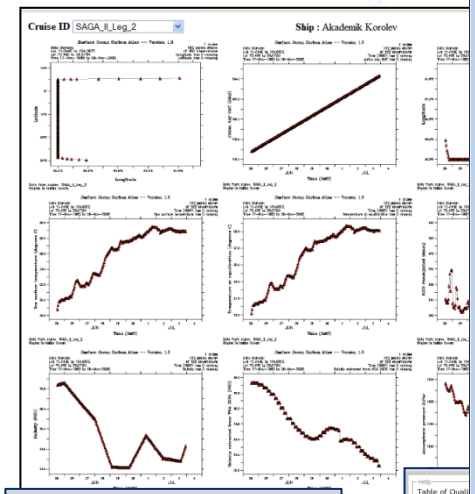
- Submit data & metadata to CDIAC in IOCCP recommended formats (http://cdiac.ornl.gov/oceans/submit.html);
- Join SOCAT QC team!
- **Please, cite and acknowledge SOCAT, data providers and contributors.**

Cruise Data Viewer

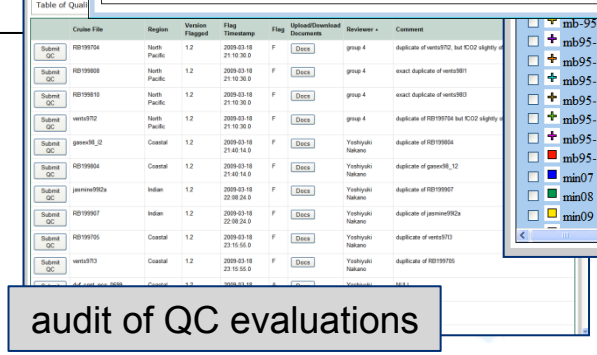
SOCAT
SURFACE OCEAN CO_2 ATLAS



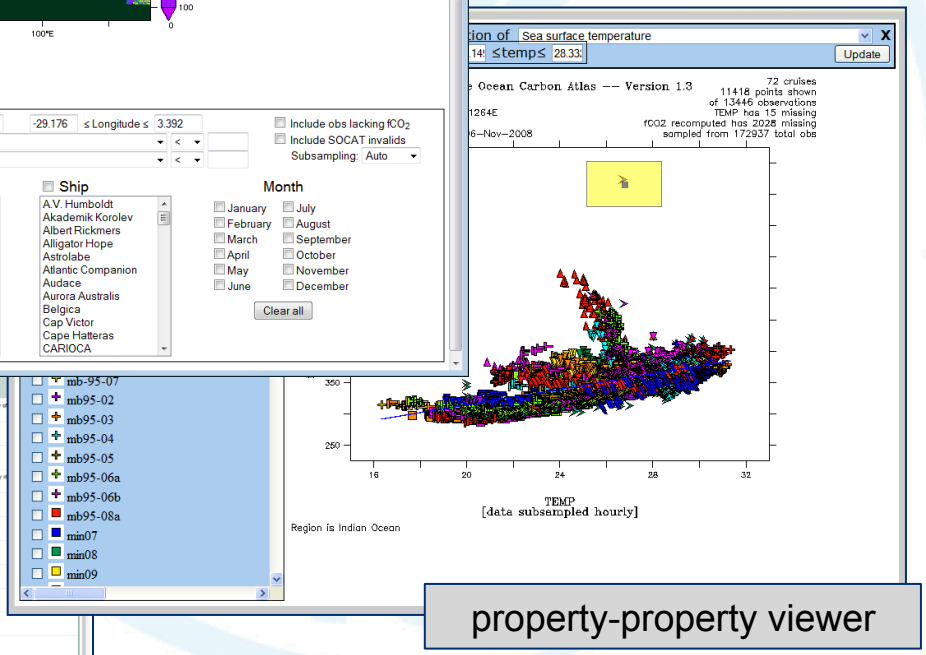
map of user-selectable data subset



individual cruise overview plot



audit of QC evaluations



property-property viewer

Community effort since 2007

Earth Syst. Sci. Data, 5, 125–143, 2013
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doi:10.5194/essd-5-125-2013

Open Access Earth System Science Data

A uniform, quality controlled Surface Ocean CO_2 Atlas (SOCAT)

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Revised: 6 February 2013 – Accepted: 20 February 2013 – Published: 4 April 2013

Abstract. A well-documented, publicly available, global data set of surface ocean carbon dioxide (CO_2) parameters has been called for by international groups for nearly two decades. The Surface Ocean CO_2 Atlas (SOCAT) project was initiated by the international marine carbon science community in 2007 with the aim of providing a comprehensive, publicly available, regularly updated, global data set of marine surface CO_2, which had been subject to quality control (QC). Many additional CO_2 data, not yet made public via the Carbon Dioxide Information Analysis Center (CDIAC), were retrieved from data originators, public websites and other data centres. All data were put in a uniform format following a strict protocol. Quality control was carried out according to clearly defined criteria. Regional specialists performed the quality control, using state-of-the-art web-based tools, specially developed for accomplishing this global team effort. SOCAT version 1.5 was made public in September 2011 and holds 6.3 million quality controlled surface CO_2 data points from the global oceans and coastal seas, spanning four decades (1968–2007). Three types of data products are available: individual cruise files, a merged complete data set and gridded products. With the rapid expansion of marine CO_2 data collection and the importance of quantifying net global oceanic CO_2 uptake and its changes, sustained data synthesis and data access are priorities.

Data coverage

Repository-Reference: doi:10.1594/PANGAEA.767698
Available at: www.socat.info
Coverage: 80° N to 79° S and 0–360°
Location Name: Global Ocean
Date/Time Start: 16 November 1968
Date/Time End: 31 December 2007

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Community effort since 2007

Earth Syst. Sci. Data, 5, 145–153, 2013
www.earth-syst-sci-data.net/5/145/2013/
doi:10.5194/essd-5-145-2013

Open Access Earth System Science Data

Surface Ocean CO_2 Atlas (SOCAT) gridded data products

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Abstract. As a response to public demand for a well-documented, quality controlled, publically available, global surface ocean carbon dioxide (CO_2) data set, the international marine carbon science community developed the Surface Ocean CO_2 Atlas (SOCAT). The first SOCAT product is a collection of 6.3 million quality controlled surface CO_2 data from the global oceans and coastal seas, spanning four decades (1968–2007). The SOCAT gridded data presented here is the second data product to come from the SOCAT project. Recognizing that some groups may have trouble working with millions of measurements, the SOCAT gridded product was generated to provide a robust, regularly spaced CO_2 fugacity (fCO_2) product with minimal spatial and temporal interpolation, which should be easier to work with for many applications. Gridded SOCAT is rich with information that has not been fully explored yet (e.g., regional differences in the seasonal cycles), but also contains biases and limitations that the user needs to recognize and address (e.g., local influences on values in some coastal regions).

Data coverage and parameter measured

Repository-Reference:
doi:10.3334/CDIAC/OTG.SOCAT_V1.5_GRID
Available at: SOCAT project page and data access:
http://www.socat.info
Coverage: 80° S to 80° N; 0° E to 180° W
Location Name: Global Ocean
Date/Time Start: February 1970
Date/Time End: December 2007

1 Introduction

Human industrial and agricultural activities have caused the global atmospheric carbon dioxide (CO_2) concentration to increase from about 280 parts per million (ppm) prior to the industrial revolution to a 2011 value of about 390 ppm (Tans and Keeling, 2013). Atmospheric CO_2 concentrations are now higher than experienced on Earth for more than 800 000 yr and are expected to continue increasing in the foreseeable future (Lüthi et al., 2008). The rate of CO_2 release into the atmosphere is also thought to be unprecedented

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DRAFT April 2013

Incorporation of Alternative Sensors for into the SOCAT Database and Adjustments to Dataset Quality Control Flags

Recommendations by:
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Abstract

With the advent of new sensors and platforms to measure surface water carbon dioxide (CO_2) levels, the dataset quality control (QC) criteria are updated in the Surface Ocean CO_2 Atlas (SOCAT) to accommodate surface water fugacity of CO_2 (fCO_{2w}) data from new sensors. The current cruise QC flags and their rationale are described. The new sensors and platforms are briefly presented. Some changes in the criteria for assigning cruise QC flags and a new data quality flag are introduced. The term "cruise QC flag" will be replaced by "dataset QC flag" to reflect the alternate platforms. All dataset QC flags will include a specified accuracy of the data. The criteria for equilibrator pressure measurements are relaxed as they are unnecessary stringent for the accuracy of fCO_2 in surface seawater. The acceptable comparison with other in situ data, defined as a high-quality cross-over, needs to meet specific criteria of maximum distance, differences in fCO_{2w} and sea surface temperature (SST) between two data sets. The scientist submitting the dataset will enter a preliminary dataset flag. Platform type including alternative platforms, such as buoys and self-propelled surface platforms, will be provided in the metadata and be available as a selectable option in the Live Access Server (LAS) for SOCAT. These updates facilitate better separation of data of differing quality and enable incorporation of fCO_{2w} data from alternative platforms and sensors in SOCAT. The revised criteria will be implemented during quality control for all new and updated data sets in version 3 onwards, but not to data sets already in versions 1 or 2. To view recommendations the reader should peruse section 6 and updated criteria for dataset QC flags are in Table 3.

An update to the Surface Ocean CO_2 Atlas (SOCAT)

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