Observations Coordination Group (OCG)

SOCONET

Surface Ocean CO_2 Observing Network

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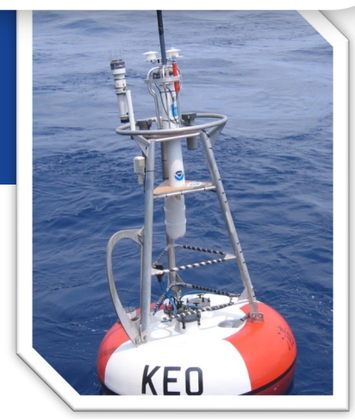


Mission and application

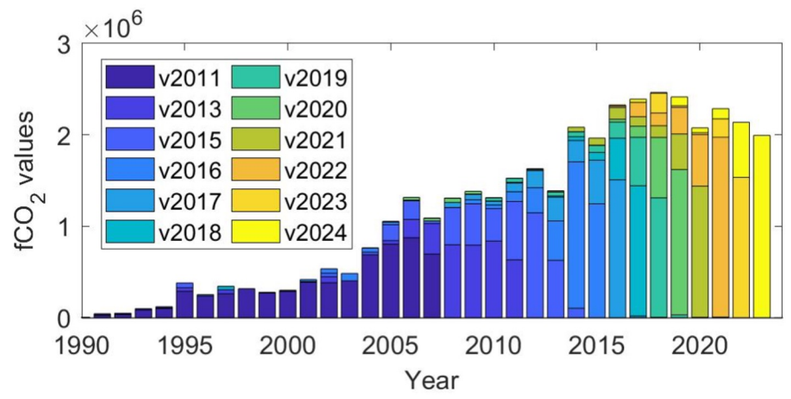
A formalized and coordinated surface ocean CO_2 reference network (SOCONET), integrated within relevant elements of IOC-UNESCO and WMO, is the backbone of monitoring, reporting and verification (MRV) efforts to properly incorporate ocean sinks in global carbon assessments and stocktakes as well as reporting on marine carbon dioxide removal interventions. The climate quality observational data will feed directly into carbon monitoring systems such as the Global Greenhouse Gas Watch, as well as the UNFCCC assessments, WMO's State of the Climate Report and other critical management and policy making tools to aid in accurate and timely measure of surface ocean carbon levels, carbon uptake by the ocean, and changes thereof. Uniquely designed and distributed SOCONET becomes a tightly coordinated activity aimed at creating monthly air-CO_2 flux maps, assess surface ocean health as it pertains to ocean acidification and to quantify ocean mitigation potential to reduce atmospheric CO_2 increases.

Coordination and funding

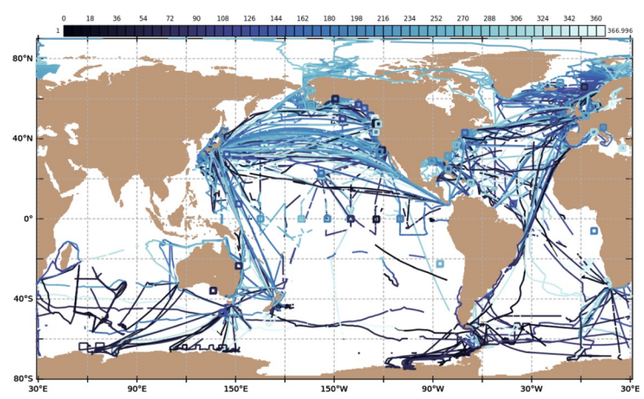
Long-term (48 months) funding support for a full time SOCONET Technical Coordinator at OceanOPS and part-time programmatic coordination at IOCCP for years 2025-2028 was secured by a combination of an EU Horizon Europe project called TRICUSO and US NOAA Global Ocean Monitoring and Observing Programme Office.

Community of practice

Currently SOCONET consists of 116 platforms (59 ships, 55 moorings and 2 USVs) with recurring surface ocean CO_2 measurements based on recently performed community-wide stock-take of all currently active SOCONET assets and their operators. This "participants list" will serve as a basis for formal development and approval of SOCONET governance structures as well as labelling exercise (Reference vs Associated) according to developed data requirements.



Number of fCO2 values per year in SOCAT.



SOCONET data distribution for 2019-2023. Color indicates day of the year.

Data availability (socat.info)

- Synthesis of in situ surface ocean CO_2 measurements
- Public release since 2011, annual from 2015
- 39 million CO_2 values (1957-2023), accuracy < 5 µatm in monthly 1° x 1° gridded products
- 8 million CO_2 sensor data, accuracy 5-10 µatm.
- Decline in open ocean CO2 measurements

Selected challenges and concerns

- Longevity of availability of significant proportion of personnel and infrastructure currently involved as well as funds available for SOCONET operation
- SOCONET capacity building (readiness level improvements across identified volume of sub-optimal operators) requires dedicated effort, which currently is not included in available human resources.
- Work towards aligning the SOCONET data exchange (SOCAT, currently mostly manual) with the WMO Information System 2.0 which provides data discovery and retrieval capabilities to the Global Telecommunication System (GTS). None of the ocean biogeochemistry data is served by WIS yet and a dedicated SOCONET Task Team might have to be established to implement this important milestone.

Selected Plans and Opportunities

- Development of basic requirements for an observing network sampling design, allowing modelling tools (regional, basin-scale and global) to support optimal distribution of network assets. A consultation with a wider modelling community in the form of a 2-stage (online followed by in-person) scoping workshop in 2025 is planned.
- Implement the labelling process based on developed observational requirements and establish procedures to increase the readiness level of stations aimed at increasing the number of Reference Stations.
- Development and publication of a SOCONET Implementation Plan including an active website and adequate social media channels.
- Work on aligning SOCONET with requirements of the WMO GGGW Networks Task Team.