JCOMM - OCG

Surface Ocean Carbon (Reference) Network

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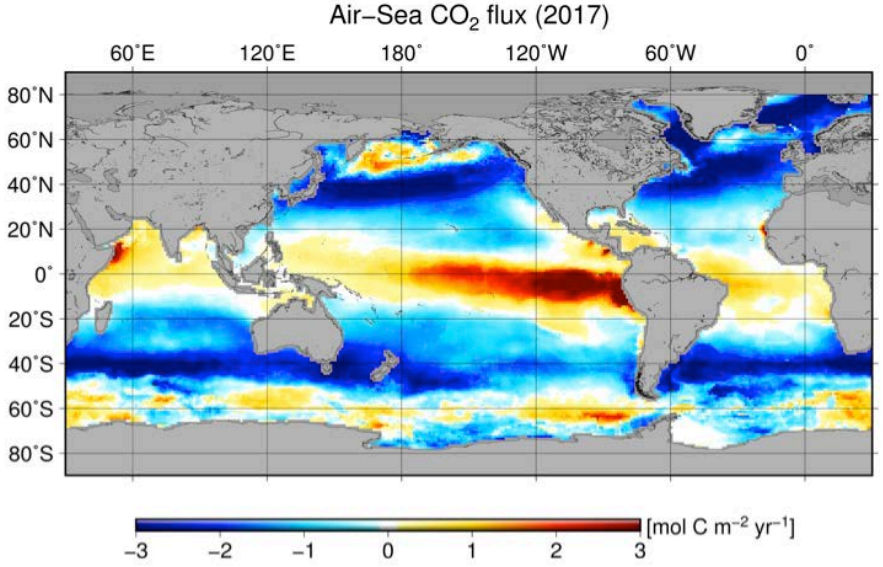
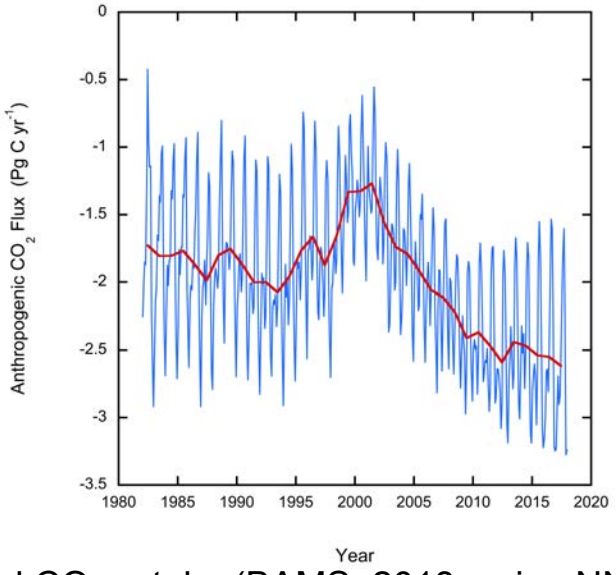
9th Session of the JCOMM Observations Coordination Group

14 - 17th May 2018, Brest, France

Mission

The global surface ocean CO_2 reference network will measure surface water and atmospheric CO_2 at high-accuracy, from which global air-sea CO_2 fluxes and trends in surface water CO_2 levels can be determined. The network partners will work collaboratively to measure the partial pressure of CO_2 (pCO_2) from ships and moorings *of known quality following agreed upon standard operating procedures*, and disseminate data and, to be agreed upon, data products openly and periodically.





Examples of products: Estimate of 2017 air-sea CO_2 fluxes, and Global CO_2 uptake (BAMS, 2018, using NN-SOM Rödenbeck et al., 2014 . The network will reduce and quantify uncertainty in these products.

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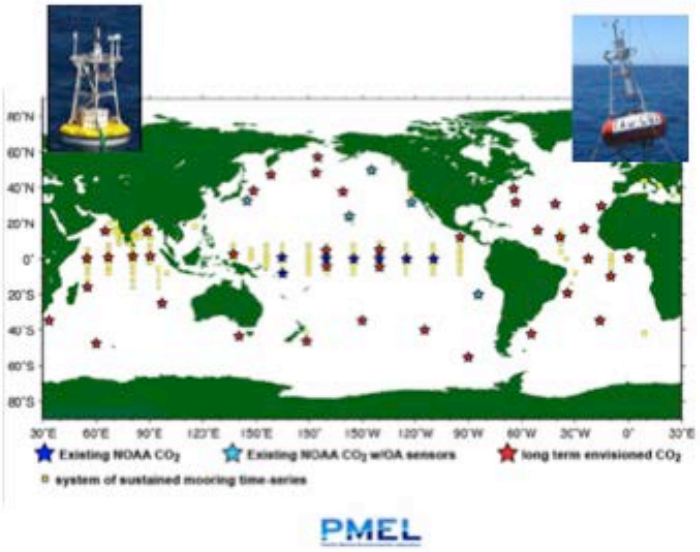
Current status surface CO_2 measurements: two separate projects based on platform (Example, NOAA)

A Surface Ocean CO_2 Observing Network

Objectives and goals of the ship-of-opportunity and mooring CO_2 projects



Programmatic Summary

- Followed well-documented management, infrastructure and scientific principles
- Successfully implemented phase 1 of the implementation plan
- Did so with significant persistence, ingenuity and adaptability to evolving scientific foci and challenges
- Relied heavily on partnerships, collaborations, and leveraging
- Provided scientific leadership, input, and guidance in the development of a global surface water observing system with many players

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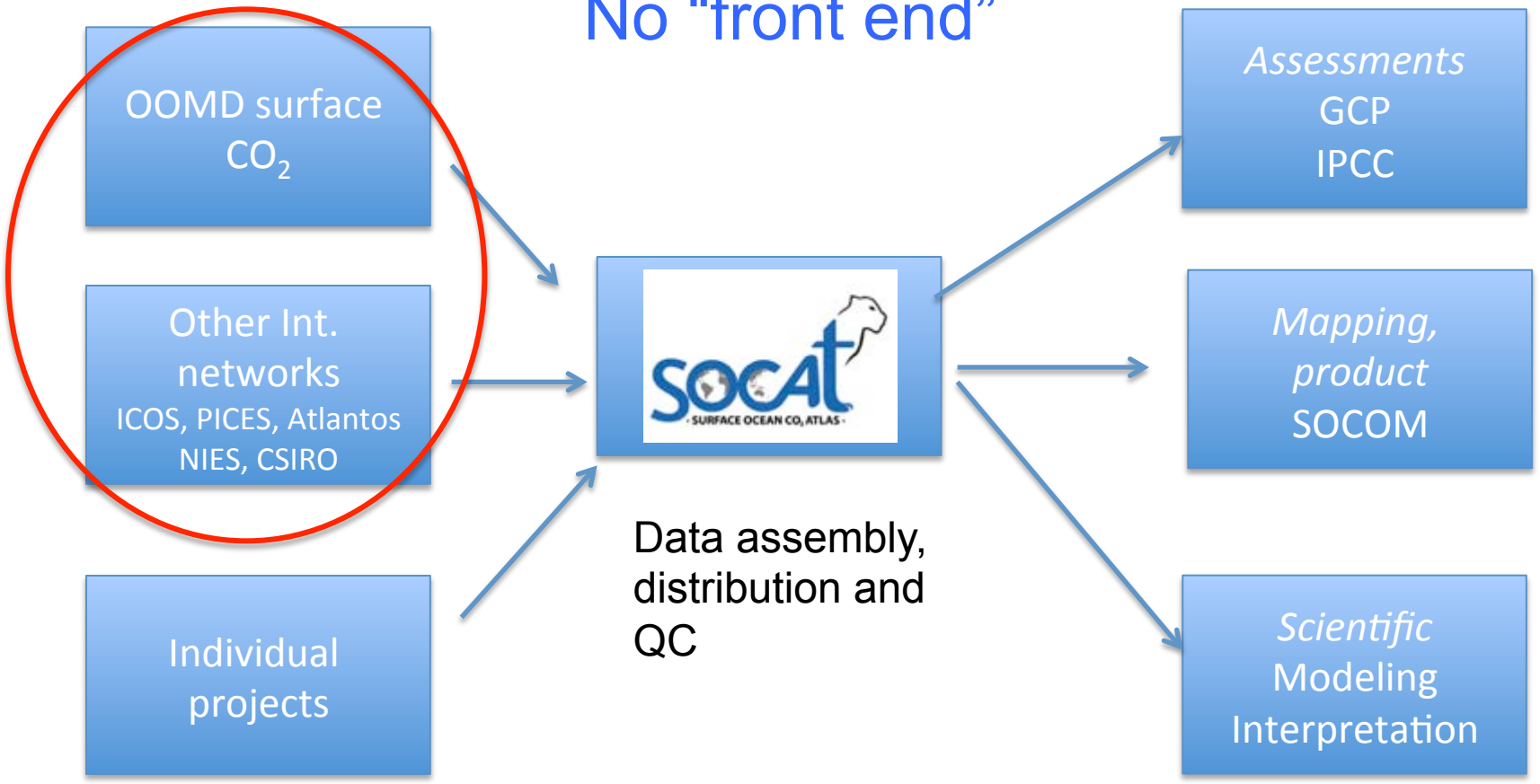
Current status of surface CO_2 measurements: No "front end"



The surface water CO_2 efforts funded by OOMD started as one of the few sustained projects to map surface CO_2 levels. Several others projects [NIES, Japan; CSIRO, Australia; ICOS, EU] are becoming sustained entities. Becoming part of JCOMM will aid in sustaining effort and facilitate best practices

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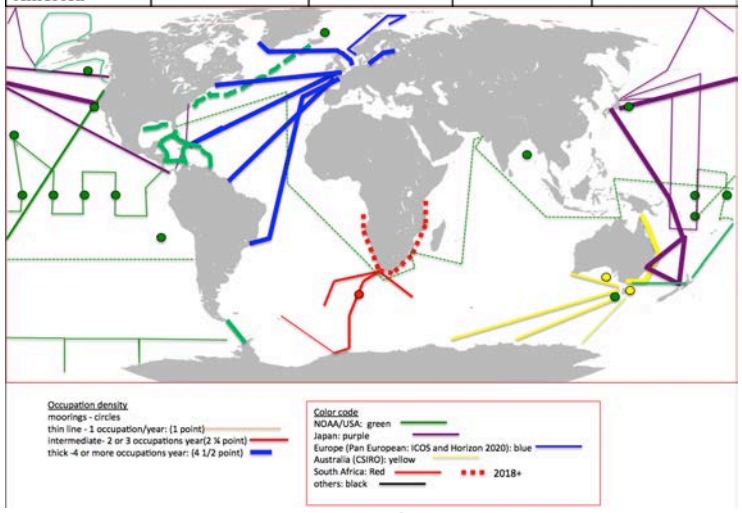
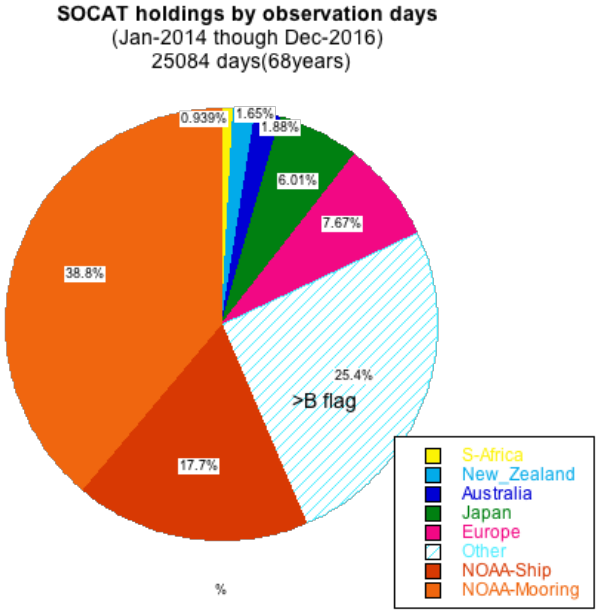
Surface Ocean CO_2 Network
JCOMM Affiliated Program?

A collation of established efforts:

Region	Institute	Lead	Partner	Platforms
Australia/New Zealand	CSIRO NIWA	B. Tilbrook K. Curry	C. Neill	Mooring, Research Ships, Cargo Ships Research Ship
Japan	NIES JAMSTEC MRI/JMA	S. Nakaoka A. Murata M. Ishii		Cargo Ships Research ships *Floats*[a] Research ships
Europe	ICOS/OTC AtlantOS/Horizon 2020	T. Johannessen T. Steinhoff N. Lefevre	C. R. Batiste U. Shuster F. Perez M. Gonzalez-Davila	Cargo ships Research ships Cargo Ship *Mooring/Floats*
South Africa	CSIR/CHPC	P. Monteiro		Research ships Cargo ships *ASV*[b]
USA	NOAA NSF NSF/OOI[c]	R. Wanninkhof D. Pierrot A. Sutton ? ?	R. Feely T. Takahashi C. Sweeney D. Munro K. Sullivan C. Cosca J. Cross	Research ships Cargo ships Ice Breakers Mooring *ASV* Research Ships Polar Supply *Mooring*
Central/South America	?	?		





An estimate of total data captured by proposed network members (by observation day)

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Strategic goals, challenges, opportunities and risks

Goals of the Surface Ocean CO_2 (Reference) Network

- Platform and metadata tracking (JCOMMOPS)
- Providing data that can be used to validate other measurements and approaches
- Providing calibrated consistent dataset for data products (SOCAT) and high profile results (GCP)
- Recognition to facilitate sustaining the efforts

Challenges

- Goals not Ocean-only: surface CO_2 efforts strongly aligned with Global Carbon Budget Effort (Ocean, Atm. Terrestrial) (e.g. ICOS-EU)
- Alignment with JCOMM. Surface ocean CO_2 network focused on Essential Products. Uses multiple platforms.
- JCOMM and JCOMMOPS are unknown quantities in the CO_2 community
- Funding for JCOMMOPS activities

Opportunities

- Strengthening SOOP effort

Risks

- Failure of group to engage in the JCOMM/GOOS framework

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Opportunities for improved coordination cross-network

- Surface water thermosalinograph (TSG) network and data management GOSUD (http://www.gosud.org).
- Validation of pCO_2 estimates from BGC ARGO floats.
- VOS Meteorological observations.
- Comparison of marine boundary layer (MBL) CO_2 in support of remote sensing and inverse modeling.
- Build-out of BGC network in the essential ocean variable (EOV) framework.

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Requests to OCG for action

1. Input and guidance on this effort, (Variable/product vs. platform specific).

2. Approval of this activity as a JCOMM affiliated program – (fits with “what it means to be an OCG network”)

3. Support from JCOMMOPS for coordination with other networks, platform and metadata tracking, recruitment, and MSR requests.

Assessment of the GO-SHIP network against attributes to be an OCG Network

✓ ≈40ships, 20 moorings	Global in scale
✓ Since 1990	Sustained over multiple years, beyond the time-span of single research projects
◆ Part of Development	Coordinates a community of best practice and governance, e.g. a means of developing multi-year strategy, implementation standards and development plans
✓ SOCAT&LDEO	Data are free, open and available in a timely manner, e.g. a data management infrastructure that delivers interoperable/inter-comparable data in realtime and/or with minimal delay after becoming available, through an internationally recognised set of data centres or services
✓ Inorganic Carbon	Contributes to meeting requirements for one or more relevant Essential Ocean Variables/Essential Climate Variables.
◆ Network Design	Has defined observation mission(s) and implementation targets, such that a role in the GOOS is defined & progress towards targets can be supportedh
◆ Finetune Best Practices	Will have agreed best practices to ensure consistent delivery of observational data (from equipment design, sensor calibration, through to data delivery). Ideally these are documented, consistent with other OCG networks, and utilised by members
◆ Pilot- Mature (4)	At least 'Pilot' in all aspects of the FOO (Requirements, Observing Systems, Data Management) with a roadmap to maturing in all areas