



# Overview of the US GO-SHIP I07N Cruise in the Indian Ocean

Viviane Menezes<sup>1</sup> and Denis L. Volkov<sup>2,3</sup>

<sup>1</sup>Woods Hole Oceanographic Institute

<sup>2</sup>NOAA Atlantic Oceanographic and Meteorological Laboratory

<sup>3</sup>Cooperative Institute for Marine and Atmospheric Studies





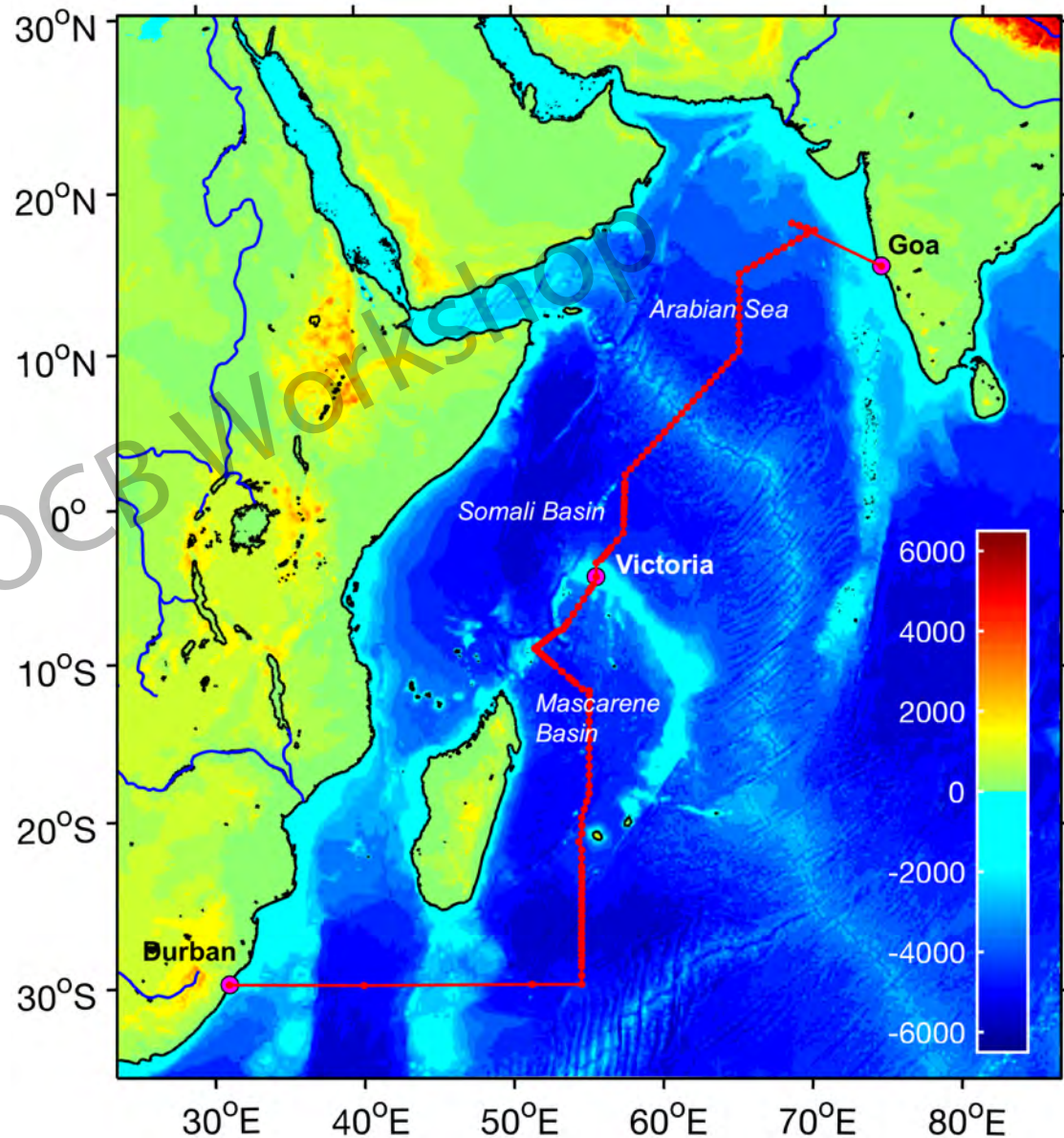
# I07N Cruise Onboard NOAA Ship “Ronald H. Brown”



**Leg 1:** Durban, South Africa – Victoria, Seychelles, 23 Apr – 15 May, 2018.

**Leg 2:** Victoria, Seychelles – Goa, India, 19 May – 6 June, 2018.

- 5200 nm
- 126 CTD stations
- 15 Argo floats
- 10 SVP drifters
- 3 wave buoys



# 107N Cruise Onboard NOAA Ship “Ronald H. Brown”



## Measurement/Sampling Program

### CTD:

- Conductivity/Temperature/Depth/O<sub>2</sub>
- LADCP
- Discrete salinity
- Discrete oxygen
- Nutrients
- Total Alkalinity / pH
- Dissolved Inorganic Carbon (DIC)
- CFCs / SF<sub>6</sub>
- Dissolved Organic Matter (DOM)
- DI<sup>14</sup>C, DOC14, POM, genetics, Ca, ...

### Underway:

- ADCP
- pCO<sub>2</sub>
- Meteo
- Bathymetry

## Participating Institutions

- NOAA-AOML (USA)
- NOAA-PMEL (USA)
- CIMAS / University of Miami (USA)
- RSMAS / University of Miami (USA)
- Woods Hole Oceanographic Ins. (USA)
- Japan Agency for Marine-Earth Science and Technology (JAMSTEC, Japan)
- Lamont-Doherty Earth Observatory (USA)
- Texas A&M University (USA)
- JISAO / University of Washington (USA)
- University of California Irvine (USA)
- University of Maryland (USA)
- Coastal Caroline University (USA)
- Scripps Institution of Oceanography (USA)
- Western Washington University (USA)



JCOMM - OCG

# Surface Ocean Carbon (Reference) Network

Rik Wanninkhof

NOAA/AOML, Miami

(Ute Schuster, Adrienne Sutton, Kathy Tedesco, Maciej Telszewski)

9th Session of the JCOMM Observations Coordination Group

14 - 17th May 2018, Brest, France

# Mission

The global surface ocean CO<sub>2</sub> reference network will

- measure surface water and atmospheric CO<sub>2</sub> at high-accuracy
- to determine global air-sea CO<sub>2</sub> fluxes and trends in surface water CO<sub>2</sub> levels

## Goals of the Surface Ocean CO<sub>2</sub> (Reference) Network

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

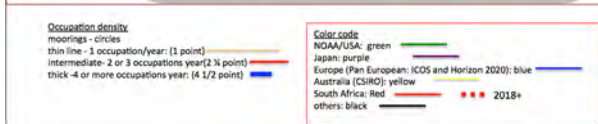
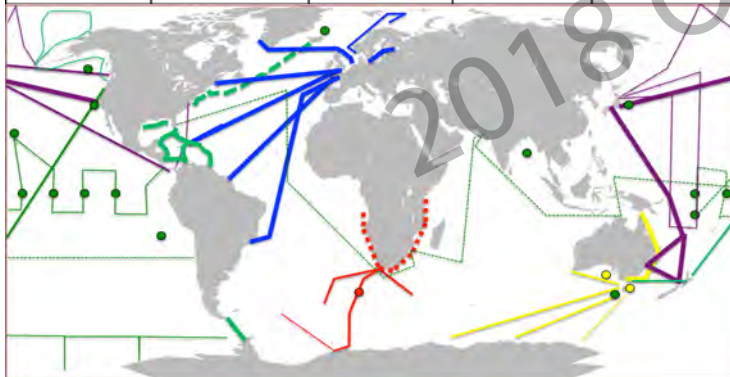
[www.soconet.info](http://www.soconet.info) (will link to IOCCP)



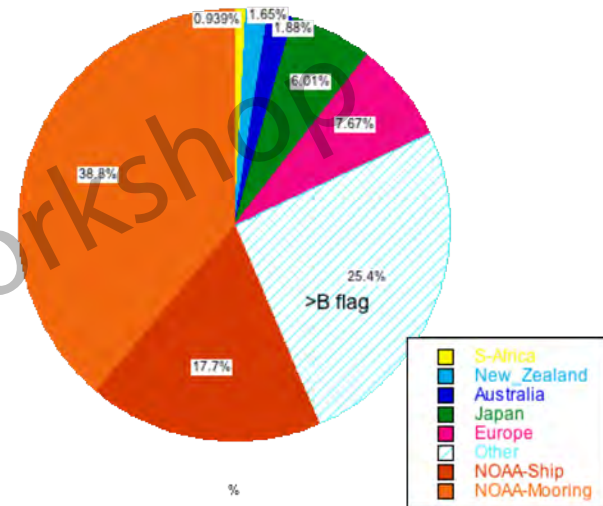
# Surface Ocean CO<sub>2</sub> Network

A collation of established efforts:

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



**SOCAT holdings by observation days**  
(Jan-2014 though Dec-2016)  
25084 days(68years)



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

# Ocean Carbon Data System (OCADS)

- The new **Ocean Carbon Data System (OCADS) Project** (former **CDIAC Oceans**) launched by NOAA National Centers for Environmental Information (NCEI). <https://www.nodc.noaa.gov/ocads/>

**NOAA** NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

OCADS Home Access Data Submit Data About

OCADS > OCADS Home

## Ocean Carbon Data System (OCADS) (formerly CDIAC-Oceans)

The Ocean Carbon Data System (OCADS) is a data management project located within the NOAA National Centers for Environmental Information (NCEI) in Silver Spring, Maryland. It contains all the CDIAC-Oceans data and serves all functions of the former CDIAC-oceans including dissemination of all newly acquired ocean carbon data.. [More...](#)

### Ocean Carbon and Acidification Data Portal

Search for individual collection level data sets in the NCEI Ocean Archives, by cruise information (EXPOCODE, cruise name, platform name), observation dates and locations, observation categories, or by matching variables or parameters.

### Subsurface/Bottle Data

Data from **World Ocean Circulation Experiment (WOCE)**; **CLIVAR/GO-SHIP Repeat Hydrography Program**; **SOCCOM Cruises**; and **Discrete Data Synthesis Products: GLODAPv2, GLODAP, CARINA, and PACIFICA**.

### Surface / Underway

Data from **Ships of Opportunity Program (SOOP)**; Surface / Underway Data Syntheses: **LDEO Database** and **SOCAT**.

### Ocean Carbon Dioxide

Rising atmospheric CO<sub>2</sub> and climate change are increasing ocean temperatures and affecting ocean chemistry (for example, ocean acidification). Monitoring these important changes using ships and other platforms generates large amounts of data from heterogeneous sources. Since its inception in 1993 as the Carbon Dioxide Information Analysis Center (CDIAC) Ocean Carbon Data Management Project, OCADS has been organizing, quality assuring, documenting, archiving and disseminating ocean carbon-related data collected via a number of U.S. and international ocean-observing programs.

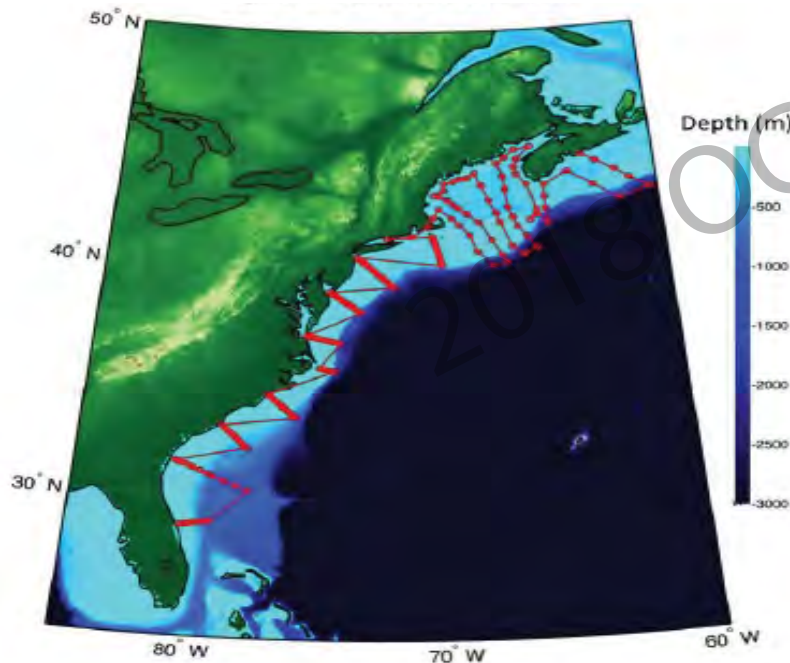
The OCADS ocean carbon data collection includes discrete and underway measurements from a variety of platforms (including research ships, commercial ships, and buoys). The measurements come from deep and shallow waters from all oceans. Technological advances make it possible to deliver ocean carbon data real-time but questions about instrument reliability and data quality limit this practice at this moment. All ocean carbon data OCADS receives is provided by individual investigators and groups, following initial data review.

<https://www.ncei.noaa.gov>



NOAA OAP supports one ~30 DAS cruise each year to document the rate, magnitude, and primary controls of ocean acidification with the coastal LME's. Each year the mission rotates to one of 4 systems which are subsequently reoccupied on a regular schedule. Core measure include full water column constraint of the carbonate system, oxygen, nutrients to GO-SHIP standards. Considerable leverage is brought to bare from contributing partners across NOAA, NASA, and academic institutions.

## ECOA II June – July, 2018



### Scientific Objectives:

- Track rate and magnitude ocean acidification with the nations coastal large marine ecosystems (LME's).
- Understand multi-decadal to subannual dynamics in carbonate system.
- Inform OA vulnerability assessment

### Recent OA cruises:

- 2017 – GOMECC III (Gulf of Mex, U.S., Mex, Cuba)
- 2018 – ECOA II (Eastern U.S., Can)

### Upcoming GO-SHIP Cruises:

- 2019 – ACOA II (Gulf of Alaska, U.S., Can)
- 2020 – WECOA IV (Westcoast, U.S., Mex)
- 2021 – GOMECC IV (Gulf of Mex, U.S., Mex, Cuba)
- 2022 – ECOA III (Eastern U.S., Can)
- 2023 – ACOA IV (Gulf of Alaska, U.S., Can)



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# 2<sup>nd</sup> State of the Carbon Cycle Report (SOCCR-2)

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2015

May: USGCRP Leadership approves draft report plan; Scoping workshop with science community

Summer-Fall: Federal Steering Committee, science leadership team, editorial team and report mechanisms, roles formalized

Feb: FRN nominations for technical contributors  
Public Forum

Spring-Fall: developed 1<sup>st</sup> Order draft ,federal steering committee review, author revisions  
→ Second-Order Draft Interagency Review

2017

Spring-Summer : Author revisions, reviews by federal steering committee and USDA  
→ Third Order Draft Interagency Review

Summer-Fall:  
Author revisions, reviews by federal steering committee, Oak Ridge editorial review  
→ Fourth Order Draft

Nov : Start of Public Comment Period and National Academy of Sciences (NAS) Review

2018

Jan 8: End of Public Comment Period

Feb 12: End of NAS Review

Early Spring: Author Revisions, federal steering committee and SGCR clearance  
→ Fifth Order Draft

Late Spring- Summer: Editorial Work/Production  
→ Final report and interactive website

Fall 2018:  
Final Report Release

2016

2018 OCB Workshop

	#	SOCCR-2 Chapters
	I	Preface/motivation for the report/ advances since SOCCR-1
	II	Governmental, intergovernmental and interagency context
	III	Executive Summary
<b>Part I Synthesis</b>	1	What is the C cycle and why care/the C cycle in a global context
	2	North American C budget past, present, and future
<b>Part II Human Dimensio ns of the C Cycle</b>	3	Energy Systems (incl. Transportation)
	4	Urban
	5	Agriculture
	6	Societal Perspective on Carbon
	7	Tribal Lands
<b>Part III: State of Air, Land and Water</b>	8	Atmosphere
	9	Forests
	10	Grasslands
	11	Arctic/Boreal/Permafrost regions
	12	Soils
	13	Terrestrial Wetlands
	14	Inland waters
	15	Tidal wetlands and estuaries (incl. blue carbon)
	16	Oceans and continental Shelves (oceans, methane hydrates etc.)
<b>Part IV: Conseque nces and ways forward</b>	17	Consequences of rising atmospheric CO2 (e.g. ocean acidification)
	18	Decision-support (social, behavioral, economic)
	19	Future projections and associated climate change in North America

# Fall AGU Sessions

**GC072**. Partnerships for Advancing and Facilitating Science: The State of the Carbon Cycle & 20 years of Research Coordination.

**GC082**. State of the Carbon Cycle in North America: Key Findings from Assessing a Decade of Science, Decisions, and Management Impacts.

**AGU abstract deadline is 1 August 2018**