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

Viviane Menezes¹ and Denis L. Volkov²,³

¹Woods Hole Oceanographic Institute
²NOAA Atlantic Oceanographic and Meteorological Laboratory
³Cooperative Institute for Marine and Atmospheric Studies
GO-SHIP program carries out a systematic and global re-occupation of select hydrographic sections and provides approximately decadal resolution of the changes in inventories of heat, freshwater, carbon, oxygen, nutrients and transient tracers, covering the ocean basins from coast to coast and full depth (top to bottom).

Overlapping Scientific Objectives:
- Heat and Freshwater Storage and Flux Studies
- Deep and Shallow Water Mass and Ventilation Studies
- Carbon System Studies
- Data for Model Calibration and Validation
- Calibration of Autonomous Sensors

Recent GO-SHIP cruises:
- 2016 – I08S and I09N (USA)
- 2018 – I07N (USA)

Upcoming GO-SHIP Cruises:
- 2019 – I06S (USA)
- 2019-2020 – I05 (USA)
- 2019 – I07S (Japan)
- 2019 – I08N (Japan)
- 2020 – I09S (Australia)

Details and Data available at http://usgoship.ucsd.edu/
I07N Cruise Onboard NOAA Ship “Ronald H. Brown”


- 5200 nm
- 126 CTD stations
- 15 Argo floats
- 10 SVP drifters
- 3 wave buoys
## Measurement/Sampling Program

**CTD:**
- Conductivity/Temperature/Depth/O₂
- LADCP
- Discrete salinity
- Discrete oxygen
- Nutrients
- Total Alkalinity / pH
- Dissolved Inorganic Carbon (DIC)
- CFCs / SF₆
- Dissolved Organic Matter (DOM)
- DI¹⁴C, DOC¹⁴, POM, genetics, Ca, ...

**Underway:**
- ADCP
- pCO₂
- 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 CO₂ reference network will

• measure surface water and atmospheric CO₂ at high-accuracy
• to determine global air-sea CO₂ fluxes and trends in surface water CO₂ levels

Goals of the Surface Ocean CO₂ (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 (will link to IOCCP)
A collation of established efforts:

<table>
<thead>
<tr>
<th>Region</th>
<th>Institute</th>
<th>Lead</th>
<th>Partner</th>
<th>Platforms</th>
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<tr>
<td>Australia/New Zealand</td>
<td>CSIRO</td>
<td>B. Tilbrook</td>
<td>C. Neill</td>
<td>Mooring, Research Ships, Cargo Ships, Research Ship</td>
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<td>NIWA</td>
<td>K. Curry</td>
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<td>Japan</td>
<td>NIES</td>
<td>S. Nakaoka</td>
<td>A. Murata</td>
<td>Cargo Ships, Research Ships, Floats, Research ships</td>
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<td>JAMSTEC</td>
<td>A. Murata</td>
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<td>MJI/JMA</td>
<td>M. Ishii</td>
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<td>Europe</td>
<td>ICOS/OTC</td>
<td>T. Johannessen</td>
<td>C. R. Batiste</td>
<td>Cargo Ships, Research ships, Cargo Ship</td>
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<td>ATLANTOS/Horizon 2020</td>
<td>T. Steinhoff</td>
<td>U. Shuster</td>
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<td>N. Lefevre</td>
<td>F. Perez</td>
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<td>M. Gonzalez-Davila</td>
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<td>South Africa</td>
<td>CSH/CHPC</td>
<td>P. Monteiro</td>
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<td>Research ships, Cargo ships, ASV</td>
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<td>USA</td>
<td>NOAA</td>
<td>R. Wanninkhof</td>
<td>R. Feely</td>
<td>Research ships, Cargo ships, Ice Breakers</td>
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<td>D. Pierrot</td>
<td>T. Takahashi</td>
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<td>C. Sweeney</td>
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<td>C. Cosca</td>
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<td>J. Cross</td>
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<td>Central/South America</td>
<td>NSF</td>
<td>A. Sutton</td>
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<td>Mooring, ASV, Research Ships, Polar Supply, Mooring</td>
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<td>NSF/OOI</td>
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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/](https://www.nodc.noaa.gov/ocads/)
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)

http://www.oceanacidification.noaa.gov/
2nd State of the Carbon Cycle Report (SOCCR-2)
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 1st Order draft, federal steering committee review, author revisions
→ Second-Order Draft

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

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
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<td>II</td>
<td>Governmental, intergovernmental and interagency context</td>
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<td>III</td>
<td>Executive Summary</td>
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<td><strong>Part I Synthesis</strong></td>
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<tr>
<td>1</td>
<td>What is the C cycle and why care/the C cycle in a global context</td>
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<td>North American C budget past, present, and future</td>
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<td><strong>Part II Human Dimensions of the C Cycle</strong></td>
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<td>Energy Systems (incl. Transportation)</td>
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<td>Tribal Lands</td>
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<td><strong>Part III: State of Air, Land and Water</strong></td>
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<td>Terrestrial Wetlands</td>
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<td>Inland waters</td>
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<td>Tidal wetlands and estuaries (incl. blue carbon)</td>
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<td>Oceans and continental Shelves (oceans, methane hydrates etc.)</td>
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<td><strong>Part IV: Consequences and ways forward</strong></td>
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<td>Consequences of rising atmospheric CO2 (e.g. ocean acidification)</td>
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<td>Decision-support (social, behavioral, economic)</td>
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<td>Future projections and associated climate change in North America</td>
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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**