

THE GLOBAL OCEAN SHIP-BASED HYDROGRAPHIC INVESTIGATIONS PROGRAM

An External Review of US GO-SHIP

Purpose, Process, and Recommendations

Presented by Heather Benway (OCB/WHOI)

On behalf of the Review Committee

June 27, 2019 - OCB 2019



Review Purpose

WHY? To **assess effectiveness** of US GO-SHIP in collecting and providing high-quality oceanographic data sets that **support and advance the scientific research** of the US Climate Variability and Predictability (CLIVAR) and OCB communities

WHY NOW? To **inform US GO-SHIP renewal proposals** in 2020

SCOPE? US GO-SHIP represents the US contribution to international GO-SHIP, a sustained observing component of the Global Ocean Observing System (GOOS). This was a **review of the US program only**, facilitated by US CLIVAR and OCB

US GO-SHIP Evaluation Components

- Planning and implementation
- Data synthesis and outcomes
- Leveraging
- Work force
- Leadership
- Training and mentoring
- Ships and instrumentation
- Coordination and communication

Review Process

PHASE 1. Review committee selection (summer 2018)

Fred Bingham (UNCW), Laurie Juranek (OSU), Matt Mazloff (SIO),
Galen McKinley (LDEO/Columbia), Norm Nelson (UCSB), Susan Wijffels
(WHOI)

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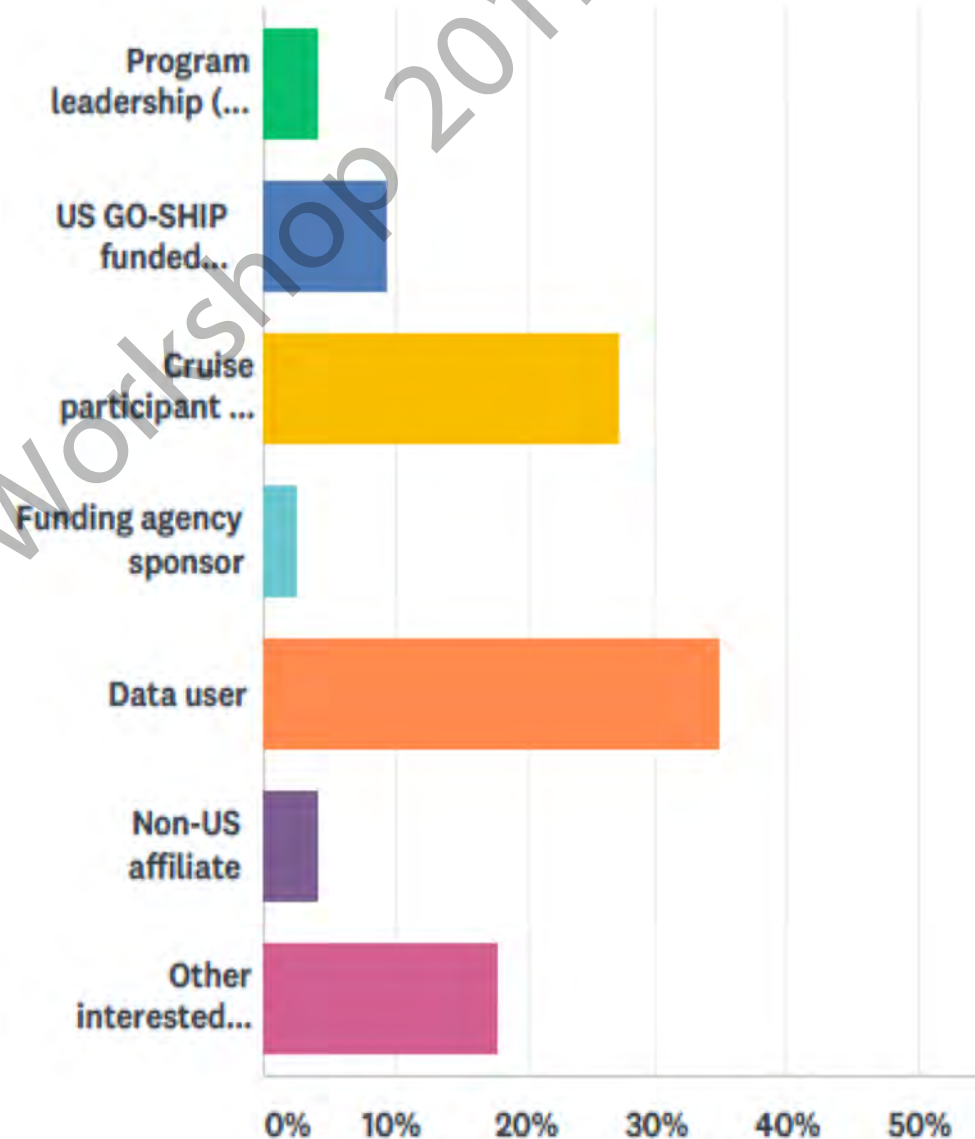
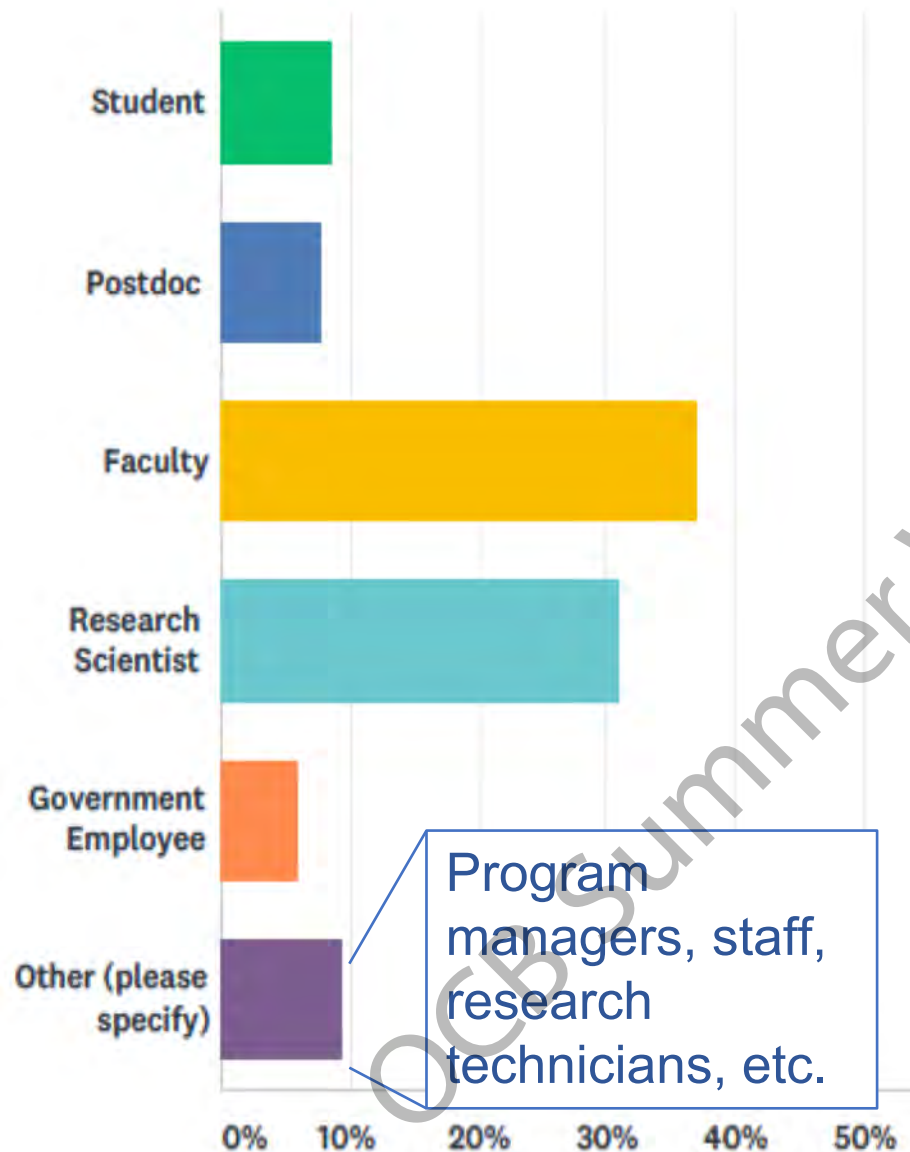
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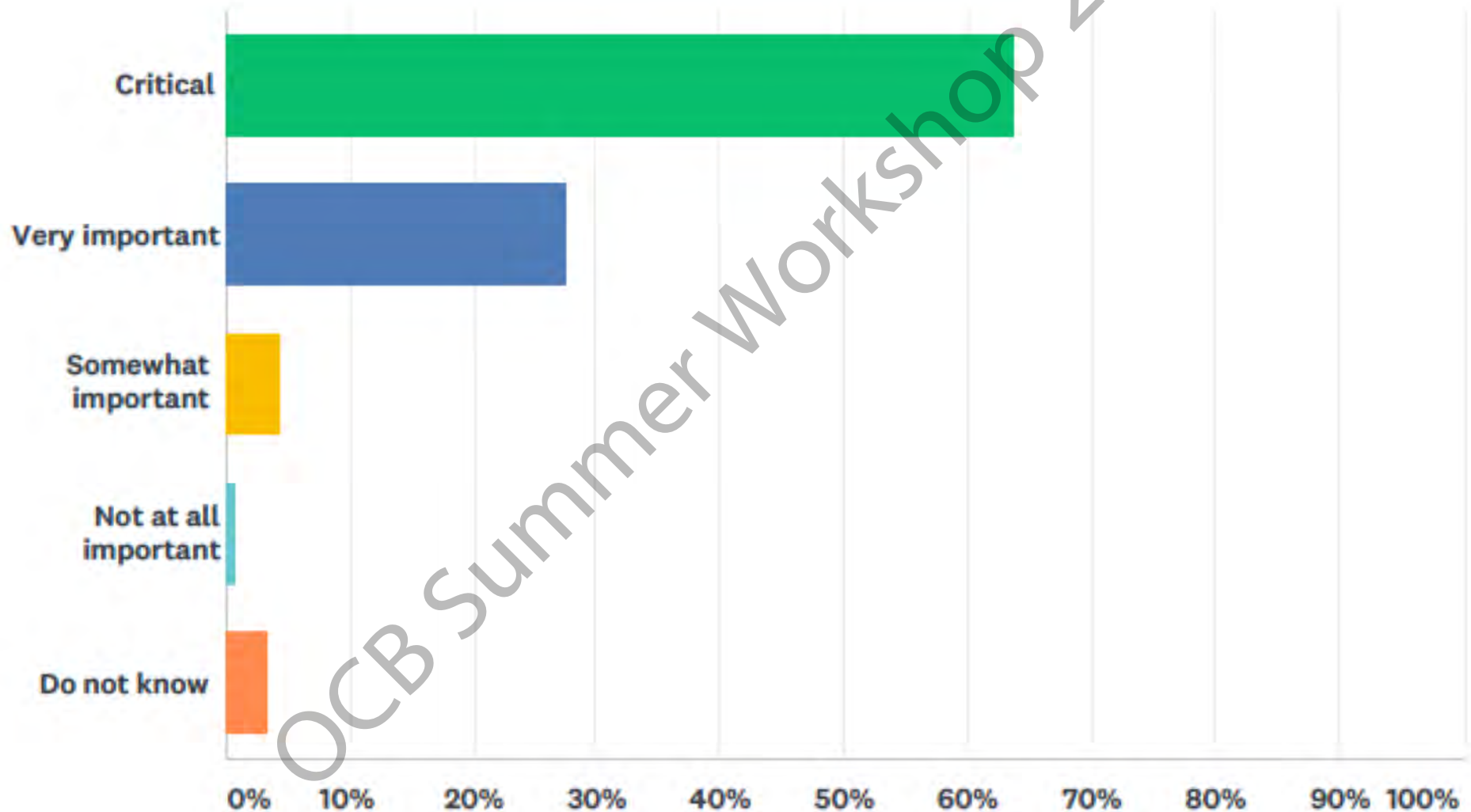
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PHASE 2. Community survey (fall 2018) (n=118)

Demographics & Connections to US GO-SHIP



Importance of US GO-SHIP in supporting science goals of US CLIVAR and OCB?



The word cloud is a circular arrangement of text centered around the title "Ocean Data". The words are in various sizes, colors (blue, green, yellow, white), and orientations. The most prominent words are "ocean", "data", "changes", "global", "measurements", "carbon", "heat", "oceans", "content", "estimates", "program", "cruises", "community", "parameters", "decadal", "change", "biogeochemical", "variability", "long term", "dynamics", "inventories", "protocols", "pathways", "mixing", "science instrument collection", "fluxes", "transient", "column", "oceanic", "oxygen", "repeat", "major", "research", "distribution", "special systems new", "decades", "energy", "water masses", "hydrography transport", "cycles", "context", "information", "coordination", "institutions", "oceanographic", "warming", "properties", "depth", "critical", "basin-scale", "calibration", "deep monitoring", "understudied", "nutrients", "Monitoring", "high quality", "scale", "understanding", "decadal meridional temporal", "sampling", "variables", "deep ocean", "anthropogenic", "trends", "physical", "uptake", "storage", "climate quality", "hydrographic", "observations", "essential", "regions", "waters", "carbon dioxide", "Long term", "models", "system", "sections", "Reference", "High quality data", "oceanographers", "student", "processes", "water", "measuring", "time", "tracers", "full", "autonomous", "temperature", "density", "monitor", "floats collect", "studies", "biogeochemistry", "remote", "reference", "circulation".

ocean acidification

Long term

- **Consistently high-quality data sets** to monitor interannual to decadal variability
- **Full water column** (deep) measurements
- **Repeat access to remote**, under-sampled regions with **global** scope
- **Supporting science** on oceans and climate
- Validation data sets for **modeling**
- Calibration data sets for **autonomous platforms**
- **Early career** scientist training
- Providing context for **planning regional-scale process**

studies

remote

circulation
reference

cruises

program

occupations

community

Decadal
parameters

standing
networking significant
participate
oceanography
cultural studies

- Overwhelmingly **positive** feedback
- US GO-SHIP has been a **critical, career building** component for many, especially co-chief scientists
- Important **learning opportunity** for oceanographic data collection, QC, and science applications
- Cruises represent important **networking** opportunities
- Post-cruise **collaborations** lead to **high-level publications**

data
oppo

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PHASE 2. Community survey (fall 2018)

PHASE 3. Site visit to Scripps (January 17-18, 2019) – review committee, US GO-SHIP PIs and Executive Council

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PHASE 2. Community survey (fall 2018)

PHASE 3. Site visit to Scripps (January 17-18, 2019)

PHASE 4. Report (spring/summer 2019)

- Executive Summary
- Background
- Review Process - Purpose, Scope, Goals, and Process
- Community Survey Results
- **Findings and Recommendations**

General Impressions of US GO-SHIP

- Critical platform for supporting **high-impact ocean and climate research**
- **Strong leader** in/contributor to international GO-SHIP
- Yields consistently **high-quality data** sets
- Field programs and data system are **well run** and make **good use of funds**
- Provides important training and leadership **opportunities for early career scientists**
- Supports development of **autonomous platforms/networks** but can't be replaced by them!

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Bottom line: Program should be continued and enhanced.

Succession Planning

Concerns

- Program leadership largely consists of mid-senior-level PIs, many of whom are approaching retirement
- Program lacks formalized mechanisms for leadership transition and requisite knowledge transfer

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Recommendations

- Develop a formal **training/apprenticeship** system for key program components (parameter sets, data QC and management, data analysis, etc.)
- Identify and **entrain new talent** (chief and co-chief scientists and other cruise participants) for important leadership roles

Broadening Opportunities

Concerns

Many in the oceanography/climate communities-at-large are unaware of US GO-SHIP and its valuable seagoing career development opportunities because they are not consistently publicized as broadly as they could be.

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Recommendations

- **More consistent and effective communication** of US GO-SHIP seagoing opportunities to **broaden participation** and entrain new talent and leadership
- **Formalize application/review process** for adding Level 3 activities/measurements to cruises

US GO-SHIP Vessels

Concerns

Global-class research vessels (GCRVs) are necessary for the operation of US GO-SHIP repeat hydrography (berth/deck/lab space and endurance). Many of the GCRVs in the current fleet are aging without viable replacements on the horizon.

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Recommendations

- EC should **engage with UNOLS** to plan and develop **new GCRVs**, as these will be critical to continued success of US GO-SHIP
- Factor **extra time into cruise schedules** (maintenance delays) for aging vessels to avoid disruption of sampling

Data Collection, QC, Reporting, and Access

Concerns

- Maintaining data quality - multiple ships, PIs, chief scientists, and rotating personnel
- Data that are served by multiple groups (e.g., ADCP) make it more challenging to access – underutilized?
- Cruise info compiled in hydro-table on website - vulnerable to becoming outdated
- CTD and O₂ data cumbersome to download (for full database analysis)
- Occasional delays in posting data sets due to incorrect formatting during data submission
- Lack of credit given to US GO-SHIP PIs/data collection

Data Collection, QC, Reporting, and Access

Recommendations

- Need formalized mechanisms for **transfer of knowledge** to ensure **uniformity of process** (continuous training and updates of hydro-manual, etc.)
- Need dedicated person/effort to continually update hydro-table to ensure **access to all cruise data**
- Publish a regularly updated concatenated **CTD and O₂ data product**
- Ensure that PIs adhere to **proper data formatting** guidelines during submission to avoid delays in posting
- **Assign DOIs** to US GO-SHIP data sets/products to increase data discoverability, track data usage, and credit data providers

Funding and Strategic Planning

Concerns

- Level funding in the face of increasing costs and demands on the program
- Very limited support for the follow-up science and data analysis that greatly increase program impact
- Lack of cohesive vision for program

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Recommendations

A **strategic plan** that provides a compelling scientific and operational vision for the program is needed to justify increased support for science and data analysis, additional parameters, etc.

Program Implementation

Concerns

- Program operations rely heavily on a few very busy PIs and limited staff (many on soft money)
- Chief/Co-chief scientist compensation inadequate and includes no science support
- Program communication, coordination, and transparency are sometimes lacking or inconsistent
- Sustainability of CLIVAR & Carbon Hydrographic Data Office (CCHDO), which provides much of US GO-SHIP's data management, in providing data management for international GO-SHIP without additional funds

Program Implementation

Recommendations

US GO-SHIP should establish a **project officer** (0.5-1.0 FTE) to assist with administrative, coordination, and communication tasks:

- ***Chief/Co-chief scientist support*** – expectations/best practices, EEZ clearances, pre/post-cruise communications, sample shipping, cruise mob/demob, etc.
- ***Communications*** – website/media/outreach to raise profile and engage broader participation, Executive Council support, coordination with international GO-SHIP, program reporting/metrics, etc.
- ***Policies and procedures*** – formal L3 application/review process, leadership rotation, L1/2/3 measurement specifications/progression and continually updated protocols, harassment policies, cruise participant expectations, etc.

TAKE HOME MESSAGES

US GO-SHIP is a highly efficient LEAN MACHINE

- Succession planning needs attention
- We're building RCRVs but what about GCRVs?
- Need centralized coordination/communication to better support US GO-SHIP PIs, chief/co-chief scientists, and leadership
- Consistent and transparent decision making (L3), protocols and best practices
- Overarching (international?) strategic plan to provide cohesive vision for national contributors
- Broaden engagement through its communication efforts to entrain new participation and leadership
- Funding to conduct the follow-up science and data analysis that make it so impactful