# Updates and Opportunities for Engagement

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DOOS Project Director

What is DOOS?

The Global Ocean Observing System
GOS
NSF
2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development

The Deep Ocean Observing Strategy (DOOS) is a community-driven, international initiative strategically aligning the deep ocean observing community toward collective solution-based science.
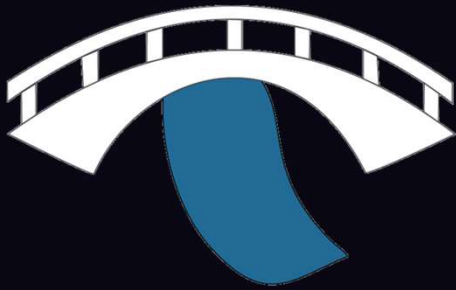
Builds bridges across disciplines and communities
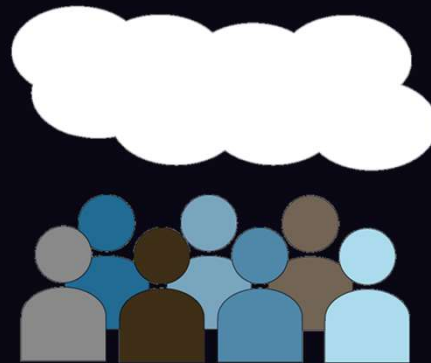
Facilitates discussions between people/groups tackling similar global deep-sea challenges
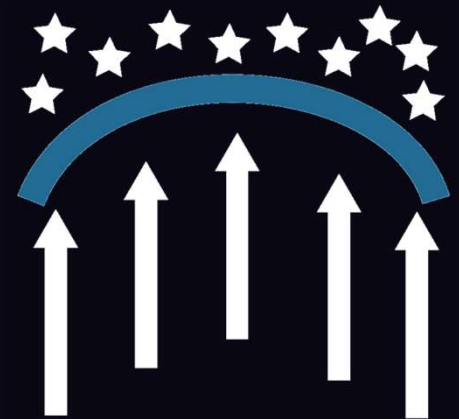
Promotes the development of future leaders and elevates diverse global voices

How do we do DOOS?

DOOS working groups address global deep sea challenges at the <u>intersection</u> of communities and disciplines.

Working groups were designed with…
    …..community input to determine priority actions,
    …..leverage existing research efforts and resources,
    …..and address defined challenges and gaps together.

Our Working Model - Align individual efforts toward shared aims of addressing challenges in the deep seaby creating a series of initiatives designed to 1) add value to the work of the global volunteers and 2) lead to novel research collaborations and external funding opportunities.

Recent Updates/Highlights

- Received funding from the US NSF AccelNet; support for 4 years
- Endorsed as an UN Ocean Decade Programme
- Held two virtual Annual Meetings
  - 2022 - 263 Registered participants from 41 Countries, 57% ECOPS
  - 2023 - 223 Registered participants from 39 Countries, 54% ECOPS
- Upcoming in-person event - Deep Ocean Collective Solution Accelerator
  - Oct 2-5 Scripps Institution of Oceanography, La Jolla, CA USA
- 4 Peer reviewed publications in 2022
- Participation in community events
  - 20+ Presentations at US & International Events
  - Hosted 4 sessions at community events
  - Decade Satellite Activity, Ocean Sciences Meeting, ESIP, OBPS
  - Participation in UN Ocean Conference & COP 27
- Established the DOERs - 120 DOERs (⅔ outside the US, 33 from developing countries)
- Our collaborative efforts have resulted in new funding for specific initiatives and research projects!!

Working Group Initiatives

Connection points for engagement.

Essential Ocean Variables - providing a deep ocean perspective
- Creation and review of spec sheets and background documentation

Improving coordination to close gaps in understanding of climate change in the deep sea
- Crowd sourced IPCC AR6 Gap analysis
- New collaborations funded for observing system simulation experiments
- Multi-disciplinary workshop funded for surface to deep climate connections

Cheap(er) & Deep(er) Technology for Capacity Development
- Scoping exercise - open-source online repository
- Journal Special Issue to promote tech solutions
- Summer School for training next generation

Working Group Initiatives

Connection points for engagement.

Ecological Mapping & Datastream Planning for Spatially Managed Areas
- Pilot study area in Monterey Bay; harmonize with similar efforts to expand globally

Supporting FAIR Data Practices
- ODIS OceanInfoHub Decade Programme
- NSF DeCODER project - increasing data findability via schema.org
- ECR data training

Science to Policy Translation
- UN & International Bodies Listening Sessions
- Desktop Studies
    - IPCC AR6 Deep Ocean Gap Analysis
    - Review of IOC State of the Ocean Report & GESAMP Reports
    - Assessment of Ocean Data used by FAO in RFMOs

Stay Engaged!

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www.deepoceanobserving.org
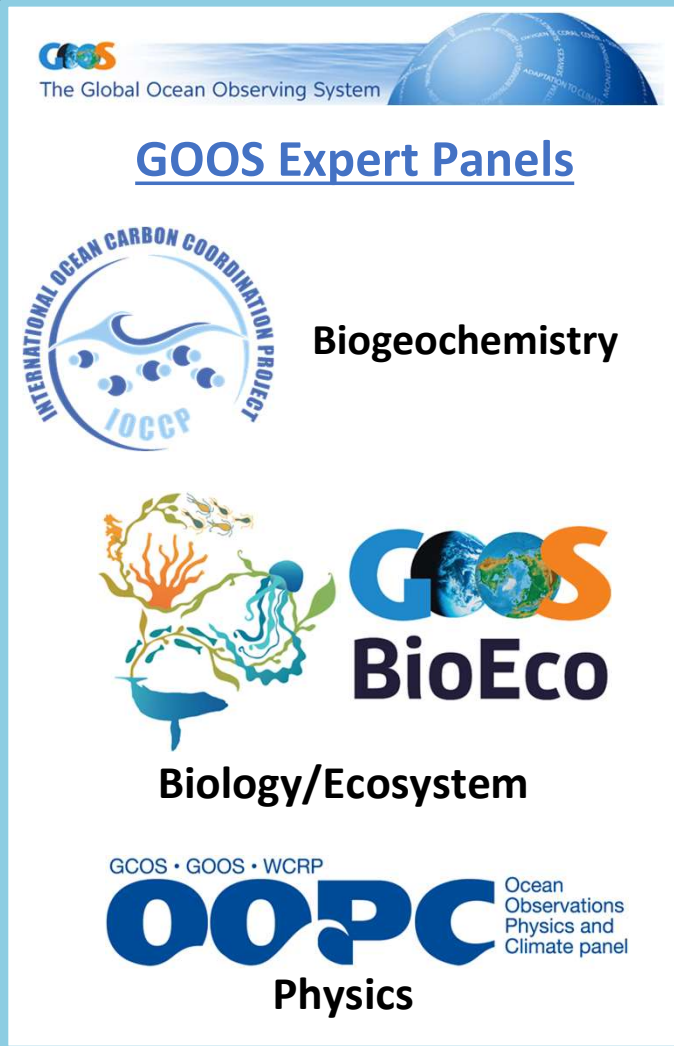
Additional Reference Materials

The remaining slides note specific initiatives and accomplishments of DOOS Working Groups since Fall 2021.

Essential Ocean Variables

Advancing and Implementing EOVs in Physics, Biogeochemistry, and Biology/Ecology

- Physics:
  - Ocean Bottom Pressure - Accepted
  - Turbulence - OOPC review
  - Geothermal Heat Flux - Under development
- Biogeochemistry:
  - Methane - Community review
  - Seafloor Respiration - Spec sheet drafted
  - Seafloor Labile Organic Matter - Spec sheet drafted
- Biology/Ecology:
  - Invertebrates - Perspective paper submitted
  - Cold Water Coral - Community review
  - Sponges - Spec sheet drafted

GOOS Expert Panels

Biogeochemistry

Biology/Ecosystem

Physics

Connecting Modeling & Observing

Improving coordination to close major gaps in our understanding of climate change in the deep sea:

- Grant funded by the Gordon and Betty Moore Foundation to advance **SMART Subsea Cables** by supporting observing system simulation experiments to quantify benefits of ocean bottom temperature and pressure (EOV).

- Proposal funded by NSF Chemical Oceanography to interrogate an effective strategy for **global ocean oxygen monitoring** by expanding the Deep Argo Array.

- Interdisciplinary workshop funded by US CLIVAR & OCB to explore **surface to deep ocean climate connections** in Spring 2024 (co-organized by US CLIVAR POS & OCB).

- DOOS community **review of IPCC AR6** underway to collate deep ocean sciences gaps for understanding and monitoring climate change.
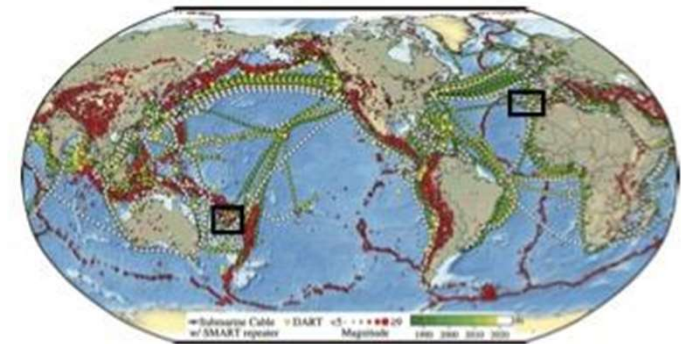
Credit: Bruce Howe, U. Hawaii
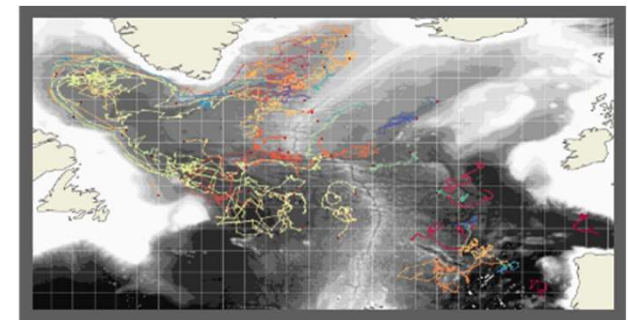
Credit: Damien Desbruyères, IFREMER

Cheap & Deep Technology for Capacity Development

- Session at Ocean Best Practices Workshop

- Scene setting synthesis publication

- Next steps:
  - Developing an open-source online repository of current cheap & deep solutions to increase their accessibility.
  - MTS Journal Special Issue to promote these solutions
  - Potential Summer School for training the next gen of deep ocean tech developers and researchers

- Co-led by the Ocean Discovery League

Maka Niu

Photo: Sheen Talma
(Maldives @ 900 m)

2022 Global Deep-Sea Capacity Assessment

https://deepseacapacity.oceandiscoveryleague.org
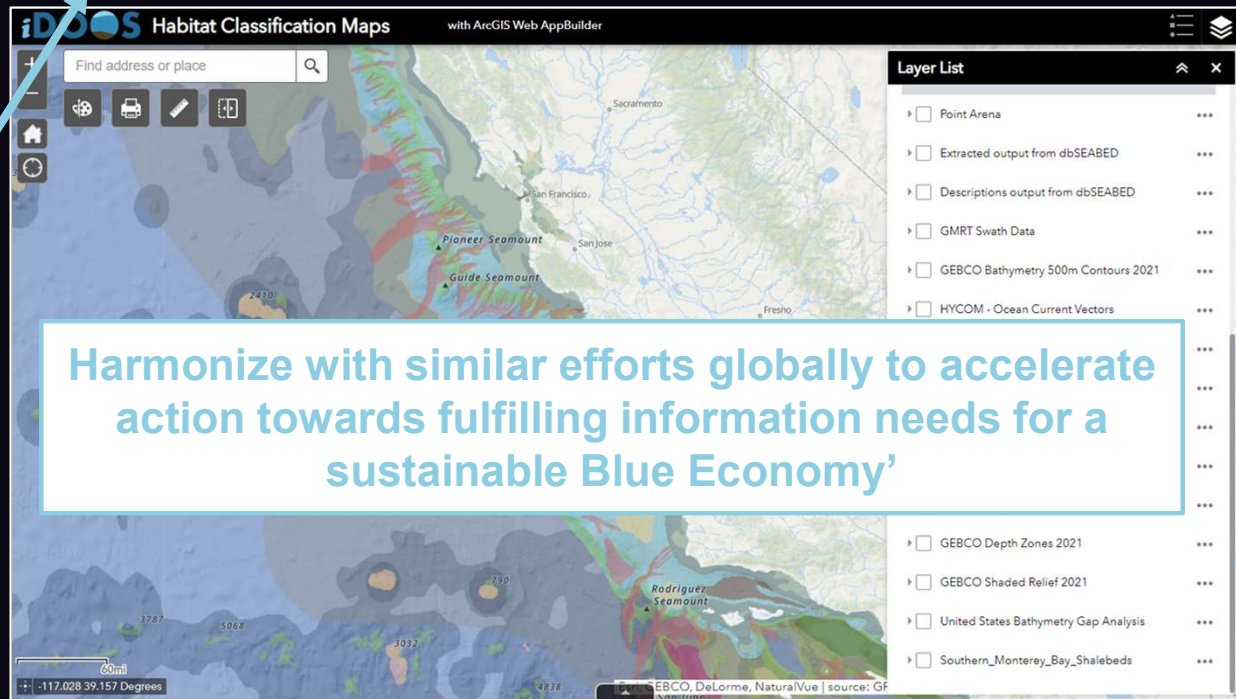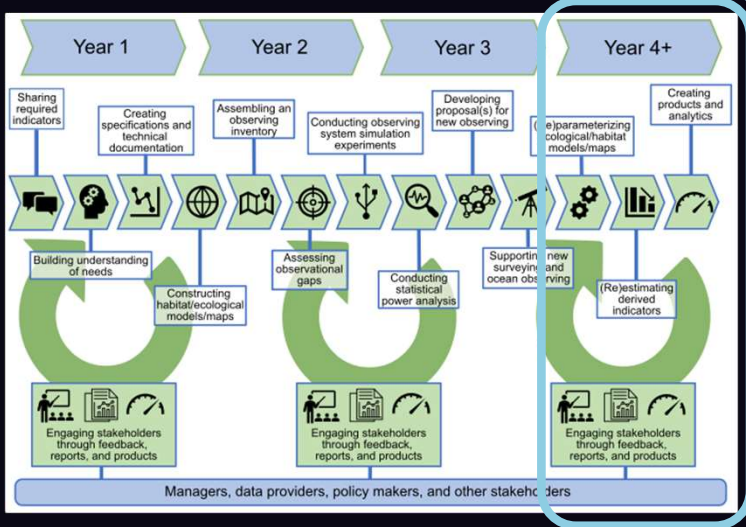
Ecological Mapping

Datastream Planning

Goal - gridded benthic invert map of the west coast EEZ for use across applications - MPAs, Sanctuaries and offshore wind.

ICES Journal of Marine Science, 2022, 0, 1–5
DOI: 10.1093/icesjms/fsac145
Food for Thought

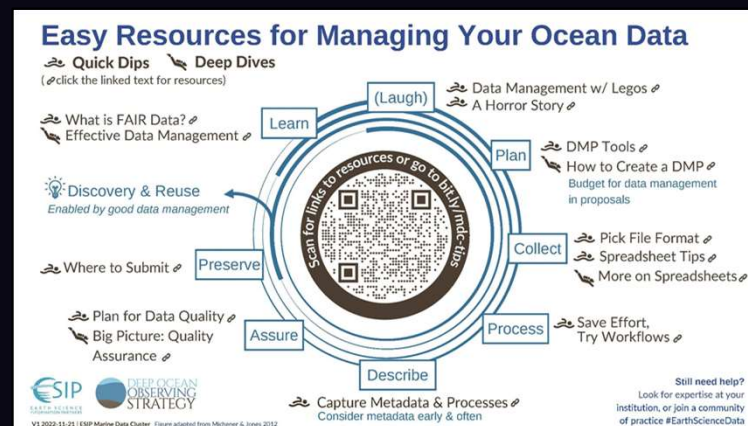**Building on a human-centred, iterative, and agile co-design strategy to facilitate the availability of deep ocean data**

Diana E. LaScala-Gruenewald[1], Natalie H. N. Low[1], James P. Barry[1], Jennifer A. Brown[2,3], Chad King[3], Francisco P. Chavez[1] and Henry A. Ruhl[1,*]

Harmonize with similar efforts globally to accelerate action towards fulfilling information needs for a sustainable Blue Economy'

Supporting FAIR-er data

- Collaborations with ODIS OceanInfoHub Decade Programme

- Awarded funding to implement schema.org in deep sea data repositories = increased findability (DeCODER project)

- Awarded funding to facilitate communication between data managers and users in collaboration with ESIP Marine Data Cluster

- Focused data training for early-career researchers
  https://www.deepoceanobserving.org/pages/doers-data-training

DeCODER
Democratized Cyberinfrastructure for Open Discovery to Enable Research

Easy Resources for Managing Your Ocean Data

https://www.deepoceanobserving.org/pages/tips-for-managing-your-ocean-data

Foundational Practices for FAIR Data

Collaborating in the Research Data Lifecycle

Best Practices in Ocean Sciences

The "R" in the FAIR Data Lifecycle: Reusable Data

Science to Policy Translation

Listening Sessions with UN & International Bodies

Leads: Lisa Levin, Dawn Wright, Kristina Gjerde

ICES Journal of Marine Science, 2022, **0**, 1–4
DOI: 10.1093/icesjms/fsac143
Food for Thought

Designing, generating, and translating deep-ocean observations for and with international policy makers

Lisa A. Levin [1,*], Laura Cimoli[2], Kristina Gjerde[3], Harriet Harden-Davies[4], Patrick Heimbach [5],
Diana LaScala-Gruenewald [6], Maria Pachiadaki [7], Helen R. Pillar[5], Leslie M. Smith[8],
Karen Stocks[9], Justin E. Stopa[10] and Dawn J. Wright [11]

Desktop Projects:

- Review of Deep Ocean in IOC's State of the Ocean Report - Pilot June 2022, COMPLETED

- Assessment of Ocean Data Use by RFMOs - Led by Amelia Bridges and Lissette Victorero

- Climate-Related Data Gaps (AR 6) - Led by Laura Cimoli, Liz Hetherington and Helen Pillar

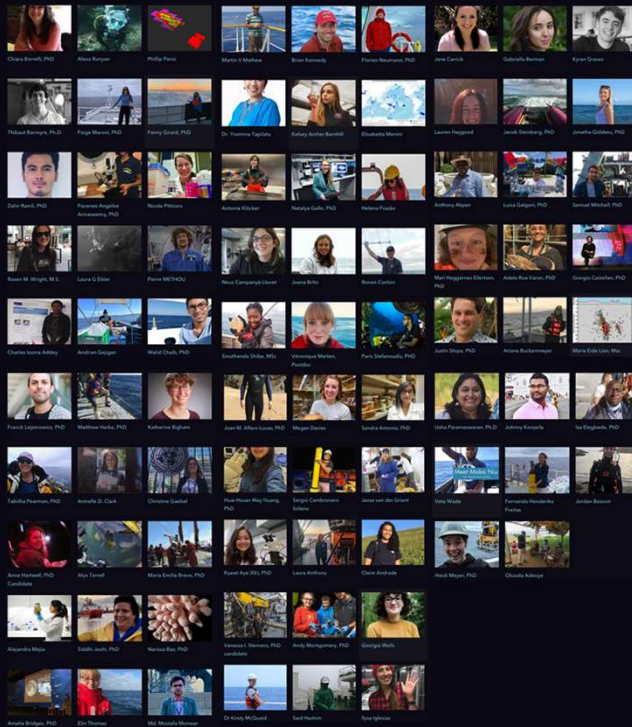- GESAMP Reports and the Deep Ocean - TO BE INITIATED

DOERs - Deep Ocean Early-career Researchers

The science we need for the ocean we want...
requires a sustained & innovative workforce

Climate Education Hub EARTHDAY.ORG x COP27 — COP27 — DOSI — DEEP OCEAN OBSERVING STRATEGY

The Deep Sea, the Climate, and the Next Generation

Wednesday, November 9, 2022
4.30pm-5:30pm GMT+2 (10:30am EST)
Climate Education Hub, Blue Zone COP27
Watch online: earthday.org/climateeducationhub/

Dr. Sarah Seabrook
National Institute of Water and Atmospheric Research, New Zealand

Dr. Narissa Bax
South Atlantic Environmental Research Institute, Falkland Islands

Dr. Isa Elegbede
CEESP/TGER/IUCN, Switzerland
Lagos State University, Nigeria

Olívia S. Pereira
Scripps Institution of Oceanography, USA

Michelle Guraieb
Scripps Institution of Oceanography, USA

Dr. Lisa A. Levin (moderator)
Scripps Institution of Oceanography, USA

Photo: ROV SuBastian/Schmidt Ocean Institute (FK210726/PI Levin)