GRA Background Report

GLOBAL OCEAN OBSERVING SYSTEM FOR INDIAN OCEAN

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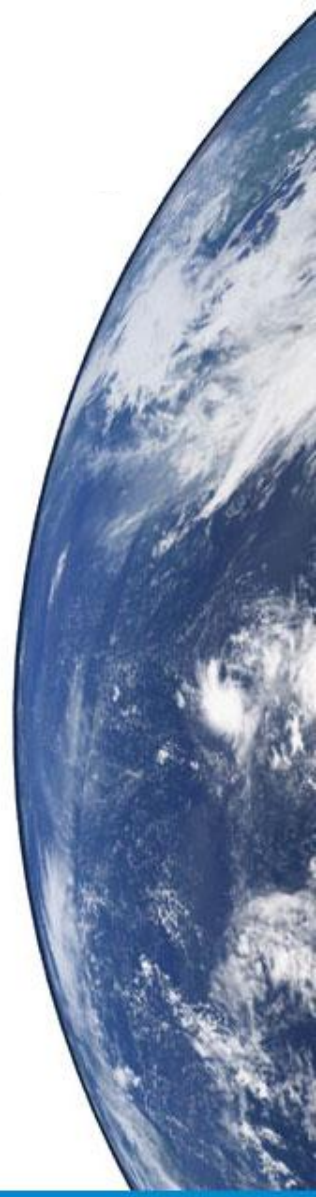
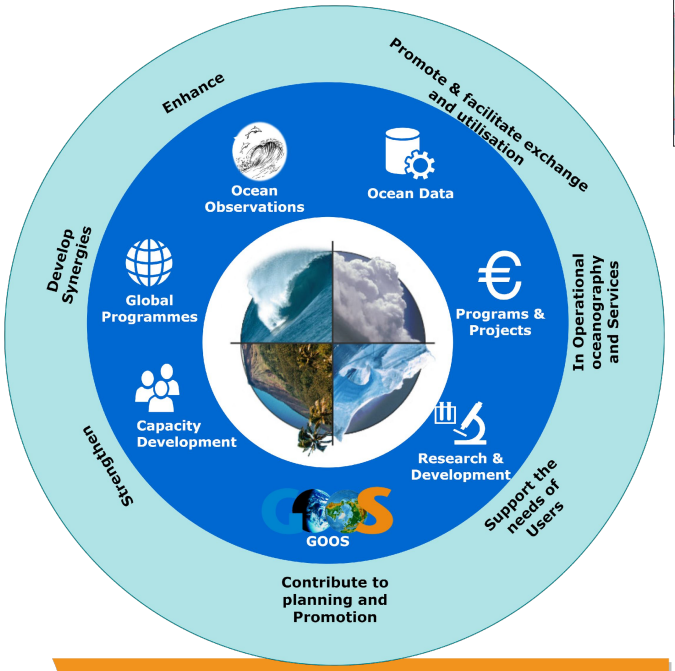
GOOS Regional Forum-11,

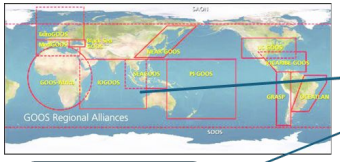
8-9 April 2024 Barcelona, Spain

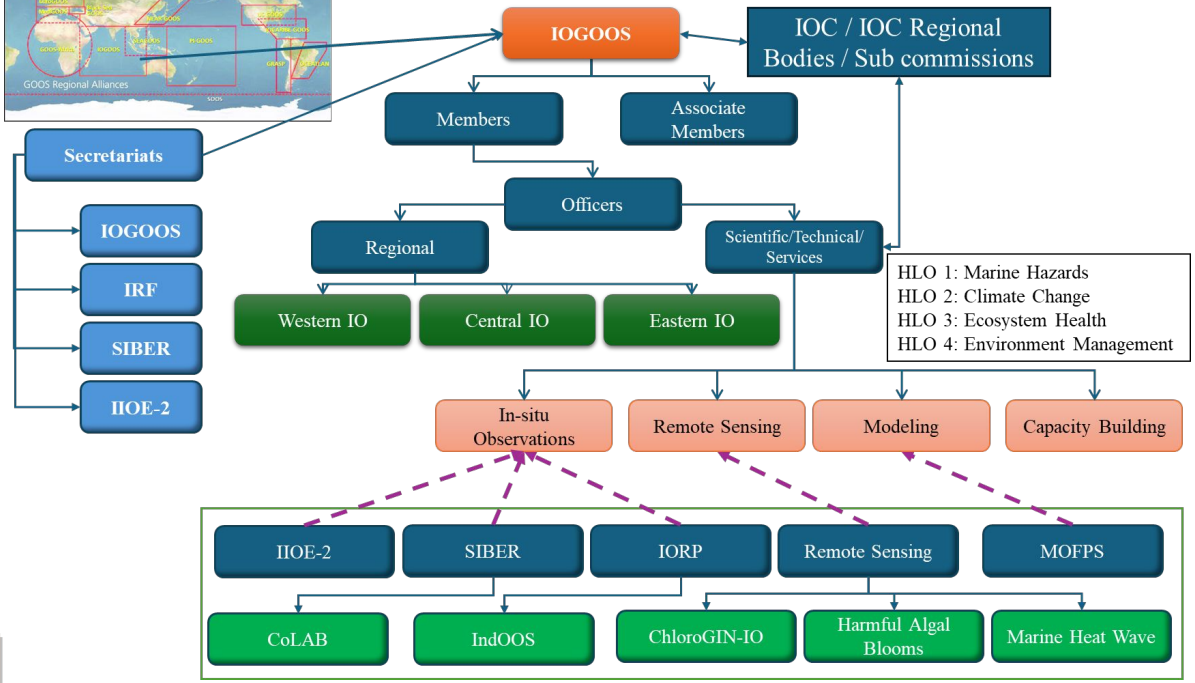


IOGOOS Governance

Aims & Objectives







IOGOOS Programs / Projects

Indian Ocean Regional Panel
To develop, coordinate and implement a plan for sustained ocean observations of the Indian Ocean for climate research and ocean state estimation.
IORP

Sustained IO Biogeochemistry and Ecosystem Research
To motivate and coordinate international interest to improve understanding of role of IO in global biogeochemical cycles and marine ecosystem
SIBER

IndOOS Resource Forum
A high-level members forum under IOGOOS to review the progress of the Indian Ocean Observing System and the resources allocation, coordination, etc.
IRF

2nd International Indian Ocean Expedition
To advance our understanding of IO and its role in the Earth System in order to enable informed decisions in support of sustainable development and the well-being of humankind
IIOE-2

- IOGOOS established in Nov 2002 after the Indian Ocean Conference in Mauritius
- **Membership:** 29 Marine institutes from 17 Countries (Australia, Bangladesh, France, India, Indonesia, Iran, Kenya, Kuwait, Madagascar, Malaysia, Maldives, Mauritius, Mozambique, South Africa, Sri Lanka, Tanzania, USA) – Grown from 19 organizations from 10 countries
- IOGOOS Secretariat hosted by INCOIS since its inception in 2002.

Indian Ocean Observing System (IndOOS)

Societal Needs in the Indian Ocean Region

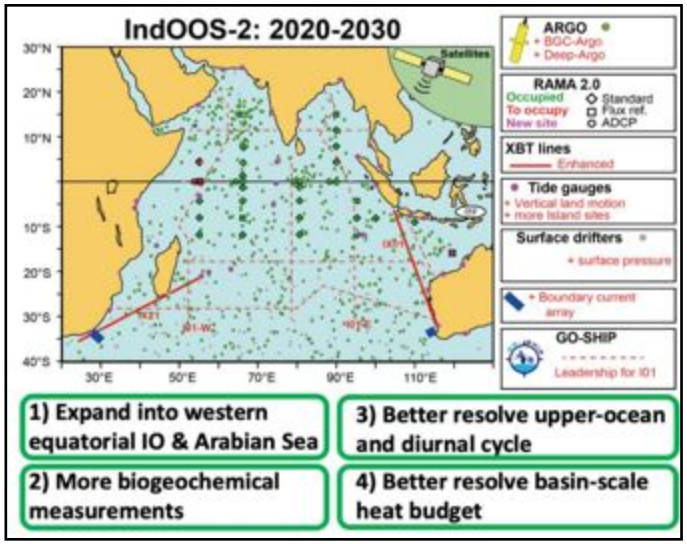
- > 50 Nations around (mostly developing ones)
- 1.5 Billion Population
- Rapid growth in blue economies and opportunities to harness ocean resources and services
- Agriculture Farming dependent on Monsoon
- Marine Fisheries dependent on ocean conditions
- Coastal populations vulnerable to extreme weather events and climate change

Science Drivers

- Oxygen Minimum Zones (OMZs)
- Upwelling and Subduction Zones,
- Major Heat flux components
- Tropical modes of the MJO
- Monsoon Intra-seasonal Oscillation
- IO Dipole (IOD) & IO Basin Mode (IOBM)
- Subtropical modes of Ningaloo Nino and Subtropical IOD,
- Cyclogenesis and Climate Change

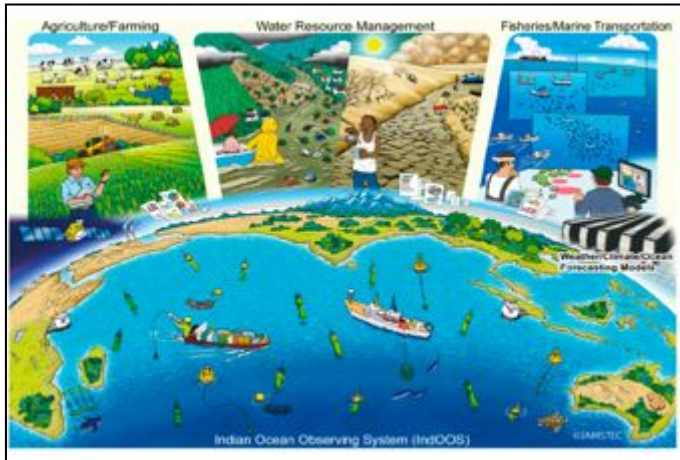
Operational Drivers

Need for accurate and timely ocean forecasting services
Operational Sub seasonal-to-Seasonal (S2S) Forecasting
Improvement of Surface Fluxes
Ocean data Assimilation Systems



Scientists and Institutions from within and outside IO have been major contributors to the design and implementation of IndOOS since 2006

IndOOS-2
A roadmap to sustained observations of the Indian Ocean for 2020-2030

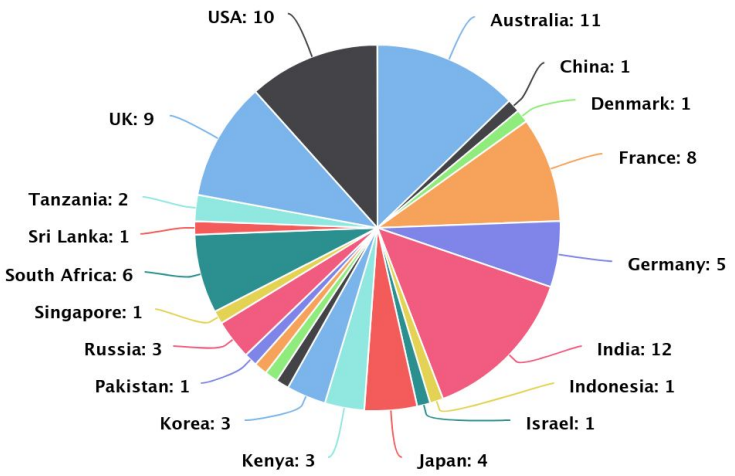


Ocean Observations - IIOE-2

2nd International Indian Ocean Expedition (IIOE-2) - To advance our understanding of the Indian Ocean and its role in the Earth System in order to enable informed decisions in support of sustainable development and the well-being of humankind”

- IOC, SCOR and IOGOOS – Joint Sponsors / Patrons
- Joint Program Office (JPO) at Australia (formerly) and India
- Endorsed 52 scientific projects that align with the IIOE-2 objectives (https://iioe-2.incois.gov.in/IIOE-2/Endorsed_Projects.jsp).
- Outreach: Ocean Bubble (Issues-17No’s), Monthly Newsletter (Issues-85No’s), E-mails, Posters, etc.

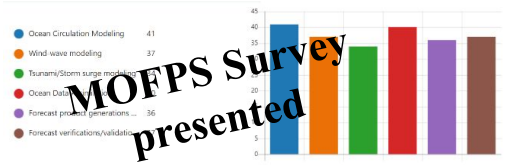
Participant Nationalities Wise No. of Endorsed Projects Submitted as on 2024



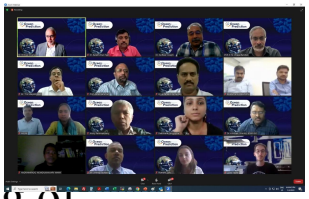
Indian Ocean Data Management

- EKAMSAT (India-US Collaboration) – (Facilitated the participation of representatives from Bangladesh, Mauritius and Sri Lanka)
- MoES-NOAA OMNI-RAMA Joint Data Portal (https://incois.gov.in/portal/datainfo/buoys.jsp)
- EARTH SYSTEM SCIENCE DATA PORTAL (https://incois.gov.in/essdp/)
- In-situ Data (https://incois.gov.in/portal/datainfo/insituhome.jsp)
- Remote Sensing Data
- (https://incois.gov.in/portal/remotesensing/TERA_display.html)
- Indian Ocean Core Remote Sensing Project – ChloroGIN-IO Products and HAB Info Products (https://incois.gov.in/portal/ChloroGIN)
- LIVE ACCESS SERVER (https://las.incois.gov.in/)
- Integration of the data with ERDDAP
- Metadata portal to make oceanographic data from the region discoverable and widely accessible (https://iioe-2.incois.gov.in/IIOE-2/data.jsp).

Modelling for Ocean Forecasting and Process Studies (MOFPS)



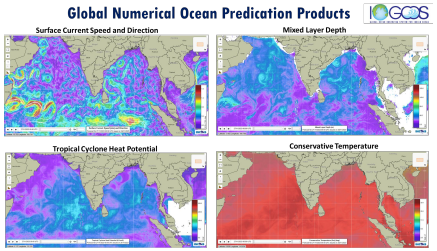
- Increased interest in the region
- Aligning with the 'UN Ocean Decade" through OceanPredict Program
- The detailed survey form designed in June 2023 https://forms.office.com/r/CZME07EK8P
  - General Information (Name, Affiliation, Filed of work, Products user or not, etc.) and more specific information on the products being used, modelling parameters and models used, modelling and observation capabilities of the institutes, requirements of the member institutes, etc.

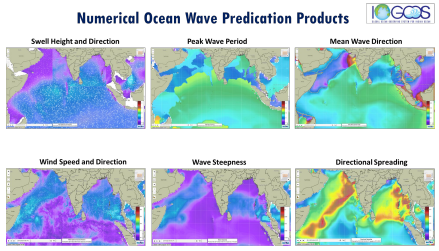


- Collaboration with OceanPredict DCC
  - Members are part of Regional Team for Indian Ocean
  - Co-hosted virtual meeting of the first Indian-seas regional team meeting of OceanPredict DCC (Mercator Ocean), was hosted by INCOIS on 3-May-2023 - Representatives from Member Institutes/Countries have participated and obtained Users Feedback (Scientific Users, NGOs, Fishermen community, etc.)

Ocean Prediction services to Member States – WMO RSMC

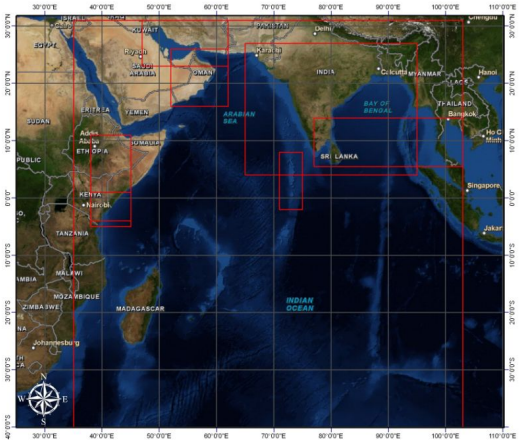
Customized Forecast Services for IOGOOS & RIMES Member States

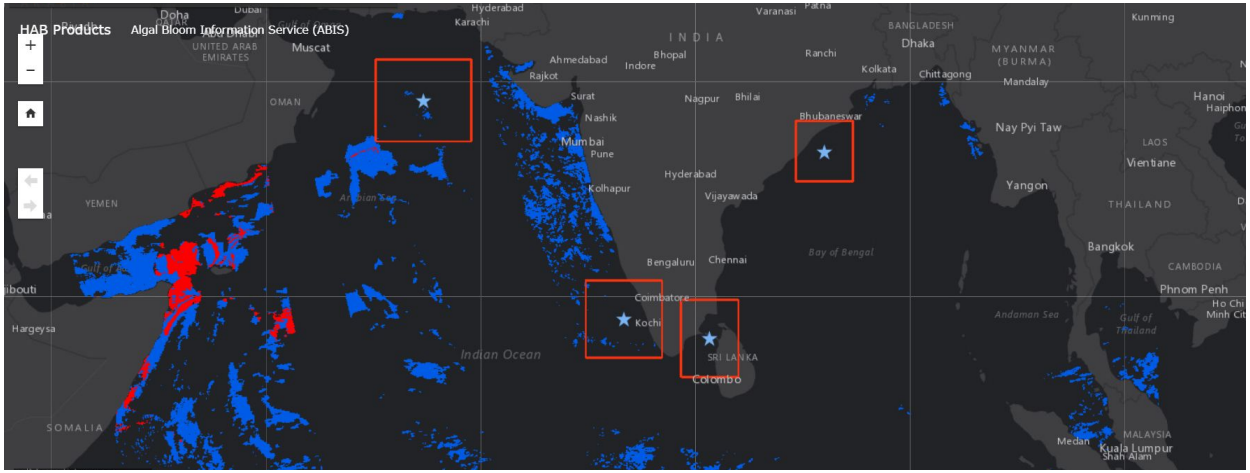




Indian Ocean Core Remote Sensing Project

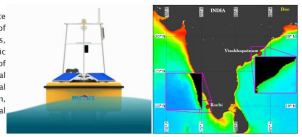
- Continued to provide the RS Data products to Member institutes (India, Sri Lanka, Iran, Kenya, Maldives, Oman, Tanzania and Thailand)
- Satellite remote sensing-based advisories on Harmful Algal Bloom (https://incois.gov.in/portal/hab.jsp)
- Integrated the satellite-based information into the 'Water Quality Nowcast System' of INCOIS
- Marine Heat Wave Services for the Northern Indian Ocean





Water Quality Nowcast System

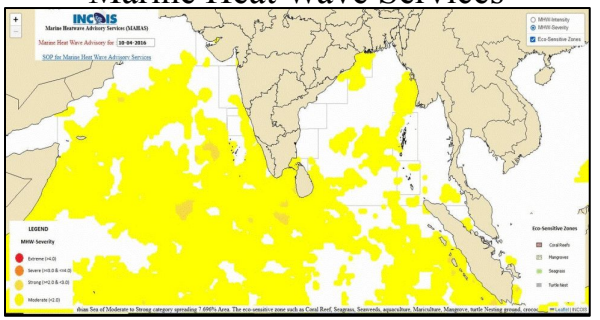
The human impacts on the coastal ocean in terms of pollution and waste disposals have greatly modified the water quality and the fluxes of material to the coastal waters. Natural processes of monsoonal winds, river water fluxes, and ocean circulation often make anthropogenic perturbations more complex to study. "Coastal Monitoring" program of INCOIS envisages monitoring time-series of various biogeochemical parameters to assess the biogeochemical variability in the Indian coastal waters and understand the ecosystem trophic status. Under this program, INCOIS has established two time-series stations in the Indian coastal waters read more...



Water Quality Status

Real-Time Feed | Derived Parameters | Satellite Retrieved Parameters

Marine Heat Wave Services



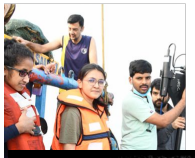
Capacity Building

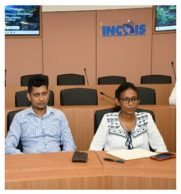
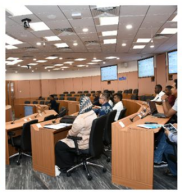
- Fishery Oceanography for the Ocean Decade (F.O.O.D.)
- Ocean Observations to Coastal Applications
- Machine Learning based Species Distribution Modelling
- Visualization of Marine Met data (using FERRET)
- Oceanographic Remote Sensing: Bridging the Gap between Fundamentals and Applications
- Coastal Vulnerability Mapping and analysis using QGIS
- Ocean Color Remote Sensing - Data, Processing and Analysis





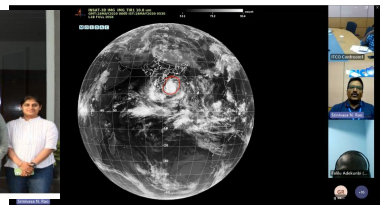
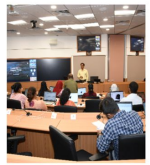
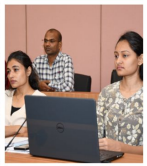
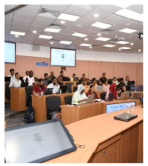








Member state Country	No. of participants
Bangladesh	44
India	639
Indonesia	3
Iran	1
Kenya	6
Madagascar	2
Maldives	1
Mauritius	2
Mozambique	1
South Africa	1
Srilanka	62
Tanzania	4
USA	1
Other countries	15

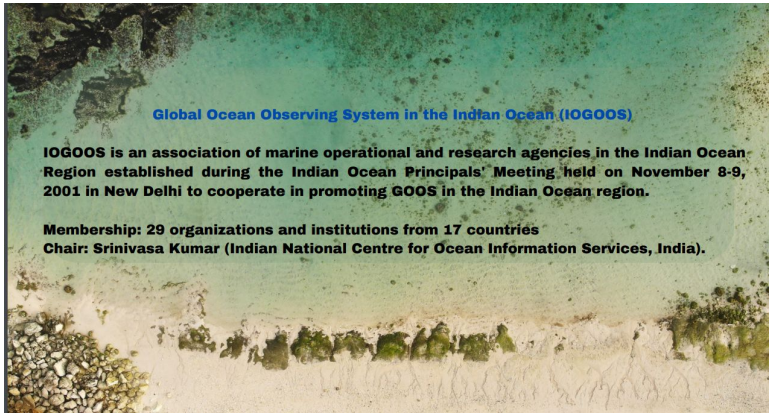
Sponsors: INCOIS, ITEC, ITCOOcean, OTGA, POGO

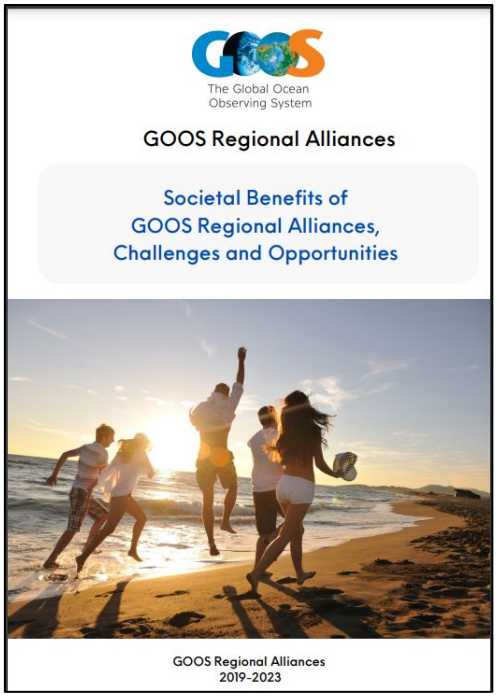
IOGOOS in UN Ocean Decade

- Collaborate with Decade Collaborative Centre for the Indian Ocean Region (DCC-IOR) – cohost the events and collaborative opportunities with Member institutes
- Collaborate with OceanPredict DCC to cater to the needs of MOFPS project
- Collaborate with CoastPredict Activity
- Co-hosted the INDIAN OCEAN REGIONAL DECADE CONFERENCE 2024 (IOCON24) - Bridging billions to Barcelona (An Official Prelude to the 2024 Ocean Decade Conference in Barcelona) during February 1-3, 2024
  - Indian Ocean Region Session during IOCON24

IOGOOS AS A CASE STUDY

- Case study in "Societal Benefits of GOOS Regional Alliances, Challenges and Opportunities"
  - IIOE-2 as one of the success story under Ocean Observing and Monitoring;
  - IndOOS under Data Management and Services;
  - SIBER under Analysis, Modeling and Forecasting Systems;
  - ChloroGIN Data Products under Products and Applications
  - IndOOS Resource Forum under Institutional and Governance





Priorities

- **Short term (in the next year or two)**
  - Organizing major International Indian Ocean Science Conference in late 2025 or early 2026 to celebrate 10 years since launch of IIOE-2
  - Identifying new co-chairs for IIOE-2 Working Group and Science Themes
  - Review SIBER Membership with more engagement of ECSN
  - Finalizing the proposal for extension of IIOE-2 from 2025 to 2030 and SIBER post 2025
  - Capacity building and best practices for coastal ocean observations and Ocean Forecasting
  - Conduct the detailed survey on the requirements of the member states on ocean prediction/modelling for ocean forecasting
  - Notification for hosting IOGOOS Secretariat (in 2025-26)
- **Long term (5+ years)**
  - Revise IOGOOS Strategy (sync to GOOS priorities and align UNOD) and Work Plans
  - Implementation of addendum to the IIOE-2 science plan and revised implantation strategy aligned with the UN Decade of Ocean Science for Sustainable Development
  - Connect science with social science for effective policymaking

What support do you **need** from GOOS?

- From GOOS structures (Steering Committee, panels, the Observations Coordination Group and JCOMMOPS, GOOS Office)?
  - Ocean Observing system (Technical support, co-design, best practices, etc.)
  - Resources Support (Financial resources for organizing the annual meetings and capacity building activities)
- From other GRAs?
  - Better connections among GRAs on collaborative activities (Observing systems and capacity building activities)
  - Sharing of scientific knowledge and experience
- From the GRA Forum?
  - Establish the connectivity among the GRAs
  - Establish Common Group with GRA Leads and Secretariat

Thank You

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