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Respondent

10

Anonymous

22:03

Time to complete

## Basic information

### 1. Name of GRA \*

- GRA: Black Sea GOOS
- GRA: CIOOS
- GRA: EuroGOOS
- GRA: GOOS Africa
- GRA: GRASP
- GRA: IOCARIBE-GOOS
- GRA: IMOS
- GRA: IOGOOS
- GRA: MonGOOS
- GRA: NEAR-GOOS
- GRA: OCEATLAN
- GRA: PI-GOOS
- GRA: SEAGOOS
- GRA: U.S. IOOS

### 2. Your name \*

Nagaraja Kumar M

### 3. Your email \*

iogoos@incois.gov.in

### 4. Your role in the GRA \*

Secretary, IOGOOS

## GRA Overview

### 5. Vision and mission of the GRA \*

To collaborate and work together for developing programmes for the implementation of GOOS in the Indian Ocean, to address the shared challenges faced by our member countries around the Indian Ocean rim. This includes and for promoting activities of common interest for the development of operational oceanography in the Indian Ocean region, by broadly to: (i) Enhance the Ocean Observing System in the region. (ii) Promote and facilitate efficient and effective management, exchange and utilization of oceanographic data. (iii) Promote programs and projects in operational oceanography and ocean services in the region meeting the requirements of end-users. (iv) Strengthen capacity building to enhance the capabilities in the region. (v) Develop synergies with other ocean programs and regional GOOS bodies, and (vi) Contribute planning and promotion of GOOS.

### 6. Affiliated organisations and agencies of the GRA \*

- Governments/Member States
- Academia
- Research Institutions
- Regional organisations
- Non-governmental Organisations (NGOs)
- Private sectors
- Ministries

### 7. Please list the national observing systems that the GRA is connecting to.

- (i) The Indian Ocean Observing System (IndOOS) (<https://incois.gov.in/IOE-2/goos.jsp>)
- (ii) National Ocean Observing System of India (<https://incois.gov.in/site/datainfo/OON.jsp>)
- (iii) Integrated Marine Observing System (IMOS) of Australia (<https://imos.org.au/>)
- (iv) Indian Ocean – RAMA: Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (<https://www.pmel.noaa.gov/gtmba/pmel-theme/indian-ocean-rama>)
- (v) OMNI Buoys Under the Ocean Observation Network (OON) programme of Ministry of Earth Sciences (MoES, Govt. of India), a moored buoy network in the Indian Ocean was established. <https://incois.gov.in/site/datainfo/jointportal.jsp>
- (vi) Indian Ocean Tsunami Warning and Mitigation Systems hosted by Australia, Indonesia and India (part of the UNESCO TSP)

### 8. How does the GRA connect to GOOS National Focal Points (NFPs) in the respective countries? \*

If so, please specify GOOS NFPs in which countries you are currently connecting to. Link to current GOOS NFPs is: <https://goosocean.org/who-we-are/goos-national-focal-points/group/>

We haven't yet connected to any National Focal Points of GOOS, except for India where the GRA Secretariat is established. In coming years, as part of re-aligning the strategy of IOGOOS with GOOS 2030 Strategy, we will establish the necessary mechanisms for the same. We will engage with the NFPs to ensure alignment of our activities with country needs

### 9. Governance of the GRA. \*

Please outline governing bodies of the GRA, including Chair, Secretariat, Steering Committee, etc.

The IOGOOS Members are joined through signing of a Memorandum of Association (MoU) between marine institutes in the Indian Ocean. The following is the Structure of IOGOOS Governance. The Secretariat of IOGOOS has been established at INCOIS, Hyderabad since Nov 2002. Governance Structure: Officers Representing Central, Eastern, Western Indian Oceans and representatives from projects of IOGOOS. At present

Eastern Indian Ocean Officer: Dr. Brett Molony, Chair  
Central Indian Ocean: Vacant, Officer  
Western Indian Ocean: Dr. Faiza Al-Yamani, Officer  
IOGOOS Project Representative: Dr. Jenny Huggett, Officer  
IOGOOS Project Representative: Dr. Juliet Hermes, Officer  
IOGOOS Secretariat: Mr. M. Nagaraja Kumar, Secretary

## 10. Strategic documents of the GRA. \*

Please list titles, dates, and relevant information of the most recently updated version of the governing documents, including the **links** if available. Strategic documents may include: MoU, Goals and Objectives, Planning documents (e.g. Strategic Plan, Work Plan, Implementation Plan), Data Policy, etc.

IOGOOS Strategic documents: <https://incois.gov.in/IIW/IOGOOS/home.jsp> (Strategy Tab)  
IOGOOS Meeting documents: <https://incois.gov.in/IIW/IOGOOS/meetings.jsp>  
IOGOOS Revised MoU: [https://incois.gov.in/documents/iogoods/pdfs/Revised\\_IOGOOS\\_MOU\\_IOGOOS20-Amendment.pdf](https://incois.gov.in/documents/iogoods/pdfs/Revised_IOGOOS_MOU_IOGOOS20-Amendment.pdf)

## 11. Communication tools of the GRA. \*

Please list links of GRA website, contact person, newsletter, brochure, introductory video, etc., if any.

The IOGOOS has its dedicated website (<https://incois.gov.in/IIW/IOGOOS/home.jsp>) for making available all the information to the stakeholders. The major communication being used is email (a dedicated email account - [iogoods@incois.gov.in](mailto:iogoods@incois.gov.in)) to the focal points of member institutions.

The contact point for the Secretary as of now is Mr. M. Nagaraja Kumar, Secretary, IOGOOS. [raja@incois.gov.in](mailto:raja@incois.gov.in) / [iogoods@incois.gov.in](mailto:iogoods@incois.gov.in).

The IOGOOS Newsletter has been discontinued and the information related to IOGOOS events are made available through the IIOE-2 Newsletters - [https://incois.gov.in/IIOE-2/Publications.jsp?mode\\_pub\\_id=NL](https://incois.gov.in/IIOE-2/Publications.jsp?mode_pub_id=NL) and Indian Ocean Bubble: <https://iioe-2.incois.gov.in/IIOE-2/Bubble.jsp>

## 12. Primary financial sources of the GRA. \*

Please consider the investment in the ocean observing system itself as well as for GRA coordination.

The primary financial sources of GRA were the membership fees and the funds from IOC-UNESCO and other in-kind support from INCOIS, India. Currently membership fees are voluntary and the IOC-UNESCO funds and in-kind support of member institutes to host the annual meetings / training programmes are the primary source of funds.

## Achievements since last GRA Forum (April 2024)

## 13. Meetings and workshops the GRA organised or sponsored. \*

IO-Predict 2024: The Indian Ocean Global Ocean Observing System (IOGOOS) and the International Training Centre for Operational Oceanography (ITCOOcean), a Category-2-Centre of UNESCO have jointly organized the 'IOPredict-2024' workshop, during 9-13 December 2024 at ITCOOcean, INCOIS Campus, Hyderabad, India. 07 international students (out of 10 selected) were able to participate, and 05 participants were fully funded under IOGOOS budget allocation by Intergovernmental Oceanographic Commission (IOC) of UNESCO that was facilitated by GOOS Project Office, France. This international event brought experts, early career researchers and students together to share new research and ideas in ocean processes, modeling and prediction to address important challenges in ocean sciences and its contribution to the Blue Economy. Over 80 participants including students and young researchers from India, Malaysia (1), South Africa (5) and Brazil (1) have participated in the workshop. In addition to the lectures by invited speakers, the participants were also given the opportunity to present their research work in the Workshop.

IOGOOS-20: IOGOOS has conducted Integrated Annual Meetings of IOGOOS and its allied programs—Indian Ocean Regional Panel (IORP), Sustained Indian Ocean Biogeochemistry and Ecosystem Research (SIBER), IndOOS Resource Forum (IRF), and the International Indian Ocean Expedition-2 (IIOE-2) Steering Group—along with KUDOS. The conference was hosted by the "Department for Continental Shelf, Maritime Zones Administration & Exploration of the Prime Minister's Office, Republic of Mauritius" and held from May 5 to 9, 2025, in Port Louis, Mauritius. The event brought together approximately 30 international delegates representing member states of the Indian Ocean Global Ocean Observing System (IOGOOS) and the leads and members of its projects and programs. Of these, 10 participants were extended full financial sponsorship through the IOGOOS budgetary provisions, under the generous support of the Intergovernmental Oceanographic Commission (IOC) of UNESCO. The funds were administered in coordination and with the support of GOOS Project Office, France. These integrated meetings aimed to review the progress and scientific knowledge gained through the concerted efforts of these regional bodies and to formulate action plans addressing key issues in line with the goals of the UN Decade of Ocean Science for Sustainable Development (2021–2030).

IIOE-2025: IOGOOS Secretariat and Second International Indian Ocean Expedition (IIOE-2) Project office have jointly organized the International Indian Ocean Science Conference (IIOE-2025). The conference was hosted by the "Indian National Centre for Ocean Information Services (INCOIS)" and held from December 1-5, 2025, in Hyderabad, India. IIOE-2025 witnessed the participation of 361 delegates from 15 countries representing Research institutes, Academia, Industries and NGOs. IIOE-2025 also featured plenary session where the principal investigators of the projects endorsed under IIOE-2 presented their research synthesis. A dedicated plenary session was also conducted to showcase the future roadmap of IIOE-2 including new initiatives and opportunities aligning with the UN Decade of Ocean Science for Sustainable Development, the knowledge gaps and challenges in coastal research and monitoring, marine spatial planning (MSP), increased engagement of the research communities in the western Indian Ocean, Marginal Seas and eastern Bay of Bengal, and the need to increase capacity development efforts and promote early career scientists. The conference also featured popular talks, where the eminent scientists shared their knowledge, inspiring the general audience across the wide scientific spectra. In summary, a total 192 participants presented their research in oral form and 117 in poster form in which 83 were Early Career Scientist. The conference also witnessed presentations on the significant re

**14. Contribution/Integration to the Global Ocean Observing Networks. \***

If the GRA is currently contributing/integrating to other networks other than GOOS networks, please specify them in the field of 'Other'.

- Ship Observations Team (SOT)/Voluntary Observing Ships (VOS)
- Ship Observations Team (SOT)/XBT-Ship of Opportunity Programme (SOOP)
- Ship Observations Team (SOT)/Automated Shipboard Aerological Programme (ASAP)
- Global Ocean Ship-Based Hydrographic Investigations Programme (GO-SHIP)
- Global Sea Level Observing System (GLOSS)
- OceanSITES
- Data Buoy Cooperation Panel (DBCP)/Moored Buoys (MB)
- Data Buoy Cooperation Panel (DBCP)/Tsunami Buoys
- Data Buoy Cooperation Panel (DBCP)/Drifting Buoys (GDA)
- Argo
- The Global High Frequency Radar Network
- Ocean Gliders
- Animal-Borne Ocean Sensors (AniBOS)
- Emerging: Fishing Vessel Observing Network (FVON)
- Emerging: Surface Ocean CO2 Observing Network (SOCONET)
- Emerging: Science Monitoring And Reliable Telecommunications (SMART) Subsea Cables
- Emerging: SUN Fleet
- None
- IOC-Sea level Monitoring/Tide gauges Data

**15. Any other ocean observation projects and activities uniquely conducted by the GRA?**

IOGOOS collaborates with INCOIS and conducted couple of Training programmes on Ocean Observations, with financial support from POGO and INCOIS.

**16. Contribution of data at local/national/regional/global level. \***

Please indicate other data centers and repositories in 'Other', if applicable.

- Ocean Data and Information System (ODIS)
- IODE National Ocean Data Center (NODC)
- IODE Associate Data Unit (ADU)
- IODE Associate Information Unit (AIU)
- WMO Information System (WIS)
- Other

17. Describe the primary roles of the GRA in facilitating the **delivery of Information, Products and Services to end users** and how these are different/complementary to national activities. \*

The IOGOOS taking the advantage of its secretariat at INCOIS, Collaborates with INCOIS for making available various ocean observations data as well as the services / products available to the IOGOOS community in the Indian Ocean Region.

WMO-Regional Specialized Metrological Center : . - <https://incois.gov.in/site/services/rsmc.jsp>

Ocean Services for Pacific Islands: <https://incois.gov.in/site/services/pacific.jsp>

Ocean Information Portal for countries of Colombo Security Conclave: <https://incois.gov.in/oceanservices/csocean.jsp>

Neighbouring Countries : <https://incois.gov.in/site/services/trimes.jsp>

Indian Ocean Forecast System (INDOFOS) – Maldives : <https://incois.gov.in/site/services/maldives.jsp>

Indian Ocean Forecast System (INDOFOS) – Seychelles <https://incois.gov.in/site/services/seychelles.jsp>

Indian Ocean Forecast System (INDOFOS) - Srilanka  
<https://incois.gov.in/site/services/srilanka.jsp>

Indian Ocean Forecast System (INDOFOS) - Comoros  
<https://incois.gov.in/site/services/comoros.jsp>

Indian Ocean Forecast System (INDOFOS) - Madagascar  
<https://incois.gov.in/site/services/madagascar.jsp>

Indian Ocean Forecast System (INDOFOS) - Mozambique  
<https://incois.gov.in/site/services/mozambique.jsp>

IOTWMS - Indian Ocean | Tsunami Programme UNESCO-IOC

18. In what areas (checklist is below) does the GRA enable co-designed/co-produced ocean observing solutions? \*

More detailed information & services, e.g. links, can be indicated in 'Other'

- Biodiversity conservation
  - Sustainable fisheries
  - Coastal resilience
  - Climate resilience mitigation and adaptation
  - Sustainable ocean planning
  - Marine carbon capture and storage
  - Safety of life at sea
  - Coastal hazard warnings
  - Disaster risk reductions
  - Human health
  - Ocean science
- Algal Bloom Information- <https://incois.gov.in/site/services/hab.jsp> Marine Heatwave Advisory Services (MAHAS) - <https://incois.gov.in/ocea>

19. Please list new Best Practice documents completed in 2025 (and submitted to the OBPS). \*

NIL

## 20. Capacity Building and Knowledge Sharing

Please state the capacity building activities organised in 2024-2025, and # of beneficiaries; expertise/experience shared with other GRAs in terms of capacity building.

IOGOOS collaborated with ITCOOcean and POGO in a capacity building programme specifically designed on Ocean Observing Systems. IOGOOS requests ITCOOcean/INCOIS in giving preference to the representatives of IOGOOS Member institutes while selection of the trainees under various training programs. ECOPs were given priority in the capacity building programs. The list of trainings conducted with the participation of representatives from IO rim countries is given below. (i) ITCOOcean Training Program on Fishery Oceanography for the Ocean Decade (F.O.O.D.) (ii) On job training to officials from Mauritius on PFZ Services, (iii) OTGA-INCOIS Training Course: "Ocean Color Remote Sensing - Data, Processing and Analysis" , (iv) IOCCG - ITCOOcean Program : 2024 Summer Lecture Series Frontiers in Ocean Optics and Ocean Colour Science , (v) Empowering the Next Wave of Indian Ocean Prediction: IOPredict-2024 and (vi) Training/Workshop on Tsunami Evacuation Maps, Plans, and Procedures and UNESCO-IOC Tsunami Ready Recognition Programme

## Essential Ocean Variables (EOVs) Measurement

GOOS Essential Ocean Variables (EOVs) are defined as the *minimum set of ocean variables* that are needed to assess ocean state and variability for important global ocean phenomena, and to provide essential data for applications that support societal benefit. Please see more detailed information and specification sheet for each EOv via <https://goosocean.org/what-we-do/framework/essential-ocean-variables/>

21. Please indicate the **physics EOVs** that have been/are being measured by your GRA. \*

	Yes	No	No info
Sea state	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean surface stress	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sea ice	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Sea surface height	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea surface temperature	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsurface temperature	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Surface currents	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsurface currents	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sea surface salinity	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Subsurface salinity	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean surface heat flux	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Ocean bottom pressure	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Turbulent diapycnal fluxes (*pilot)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

22. Please indicate the **biochemistry EOVs** that have been/are being measured by your GRA. \*

	Yes	No	No info
Oxygen	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Nutrients	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Inorganic carbon	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Transient tracers	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Particulate matter	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Nitrous oxide	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Stable carbon isotopes	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Dissolved organic carbon	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

23. Please indicate the **biology and ecosystems EOVs** that have been/are being measured by your GRA. \*

	Yes	No	No info
Phytoplankton biomass and diversity	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Zooplankton biomass and diversity	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Fish abundance and distribution	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Sea turtles abundance and distribution	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Seabirds abundance and distribution	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Marine mammal abundance and distribution	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Coral cover and composition	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Seagrass cover and composition	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Macroalgal canopy cover and composition	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Mangrove cover and composition	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Microbe biomass and diversity (*pilot)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Benthic invertebrate abundance and distribution (*pilot)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

24. Please indicate the **cross-disciplinary (including human impact) EOVs** that have been/are being measured by your GRA. \*

	Yes	No	No info
Ocean colour	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ocean sound	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Marine debris (*pilot)	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

25. **Additional comments on EOV measurement by your GRA.**

NIL

## Planning and Support

26. **Top 3 Challenges and Opportunities \***

To highlight the **challenges** for operation of GRA and how to address them; as well as the **opportunities** for new partnerships with regional networks, programme/project, countries; new funding opportunities including cooperation with industries; emerging requirements for delivery of information and services, and etc.

The main challenges that the GRA is facing is (i) Diminished interest from the participating members because of change in jobs and closure of locally supported projects. (ii) Lack of renewed participation due to changed priorities of member institutions at local level (iii) Lack of funds to support the project activities, (iv) increasing travel costs and (v) geopolitical uncertainties

27. **Planning for 2026-2027 \***

To highlight top 3-5 priorities of the GRA over next two years.

- (i) Conduct of Annual meetings of IOGOOS and its allied projects IIOE-2, IORP, SIBER, IRF, etc. (16-20 March 2026 and one in 2027)
- (ii) Conduct two Capacity Building programmes on (i) Ocean Forecasting and (ii) Ocean Observations

28. **Requested Support from GOOS \***

May include but not limited to communication support; capacity building support; partnership building support; leveraging support from member states, etc. Indicate priority or urgency.

- (i) Looking forward for financial support towards participation of the delegates/ trainees in annual meetings as well as the capacity building initiatives.
- (ii) Connect NFPs of GOOS with IOGOOS
- (iii) Establish a connected network with other overlapping GRAS from IO region and jointly organise the capacity building programs.
- (iv) Assessment of common end user needs across GOOS/GRA