



(A basin-wide research program co-sponsored by IOC-UNESCO, SCOR and IOGOOS)

To advance our understanding of interactions between geologic, oceanic and atmospheric processes that give rise to the complex physical dynamics of the Indian Ocean region, and to determine how those dynamics affect climate, extreme events, marine biogeochemical cycles, ecosystems and human populations.

Visualization Analytics of Argo metadata for effective data management

Visual analytics is the use of sophisticated tools and processes to analyze datasets using visual representations of the data. Through visual analytics data are presented through graphs, charts, and maps which will help users to identify various patterns which will help them develop some actionable insights. Visual analytics is a useful tool particularly for displaying various information pertaining to ocean observations. This gives power for better management of the observational platforms. In this work Visual analytics was developed for Argo float program. Argo is an international coordinated program in which 3000 floats are seeded into the global ocean. Ever since its inception the Argo program is complementing the ocean observations which are otherwise taken by ship based CTDs and XBT/XCTDs. With the achievement of target in November, 2007 Argo is contributing 1,00,000 profiles per year to the oceanographic community. The data from these platforms have grown enormously and the state of the art techniques like big data and data analytics are needed to effectively handle them.

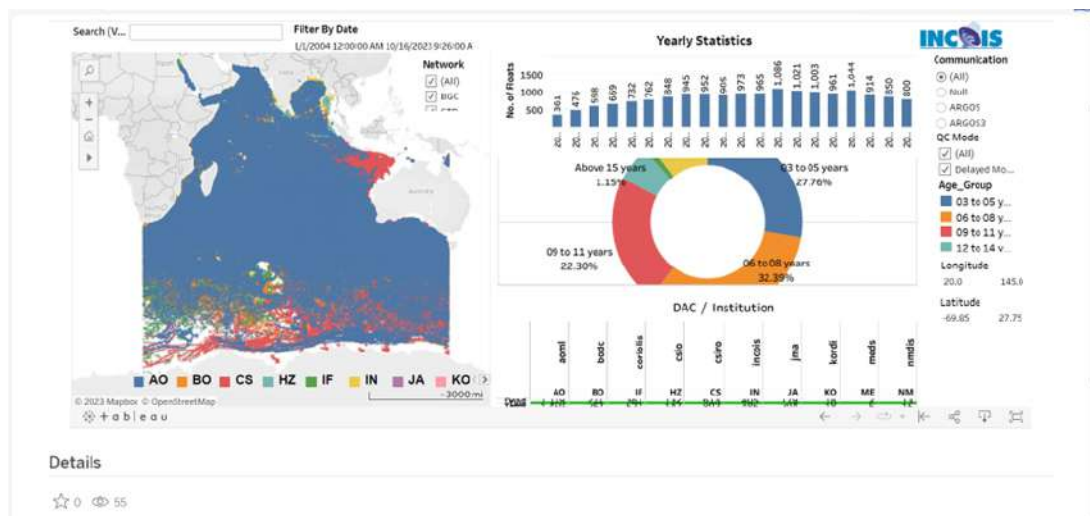


Figure: Visual analytics of Argo program in Indian Ocean.

A comprehensive visualization of metadata of the profiles from Argo floats deployed and maintained by various Data Assembly Centers (DAC) is needed for effective planning. Through visual analytics the metadata is effectively managed to visualize plots like bubble plots of DACs contributions, yearly growth of float contribution by each DACs, data availability from each of the floats with different color codes, etc. as illustrated in the Figure above. User can play with a range of data by choosing the time periods of choice, which will result in on the fly generation of a range of plots. A comprehensive visualization system of this nature saves the time and effort in repeated generation of the plots for demonstration to administrators and cruise planners. As this system is built on the index files provided by Global Data Assembly Center, changes in the data at the global levels will allow automatic updation of the data and plots resulting in optimization of the efforts. Full capabilities and analytics can be obtained from below link:

https://public.tableau.com/app/profile/pajo/viz/IndianARGOCTD_BGC/IndianARGOViz?publish=yes

[Report Courtesy:] Pavan Kumar (pk.jonnakuti-p@incois.gov.in) and T V S Udaya Bhaskar (uday@incois.gov.in), INCOIS, Hyderabad, India.]

Delving into Chilika Lagoon's Seagrass Ecosystem: A Review Sheds Light on Conservation Challenges and Opportunities

Seagrass ecosystems in India, especially in the expansive Chilika lagoon, are a topic of growing importance and concern. Recent research reveals that despite the vast diversity of seagrass across India's coastlines, the majority of scientific attention has been concentrated in Palk Bay and the Gulf of Mannar, leaving India's second largest seagrass meadow (Chilika) relatively unexplored. This is a matter of concern given that Chilika's seagrass beds play a vital role in nurturing biodiversity, acting as a potential blue carbon stock and maintaining the ecological balance of this unique lagoon. While the good news is that Chilika's seagrass beds have shown resilience over the past two decades, threats loom large. Factors such as surface runoff carrying sediment and pollutants, climate change, developmental activities like dredging and construction, and aquaculture-related impacts pose significant challenges. Additionally, the lax enforcement of existing environmental regulations and a lack of awareness among stakeholders about the crucial ecosystem services provided by seagrass add to the concerns. The recent review of seagrass in Chilika by Acharyya et al. (2023) calls for more focused research efforts to better understand this vital ecosystem and its response to changing climate conditions. It emphasizes the need for sustainable conservation measures and underscores the importance of raising awareness among stakeholders. Chilika's seagrass meadows are not just a local treasure but a critical component of the global effort to conserve marine ecosystems. By shedding light on its significance and challenges, this review sets the stage for future research and conservation initiatives aimed at safeguarding this precious underwater resource.

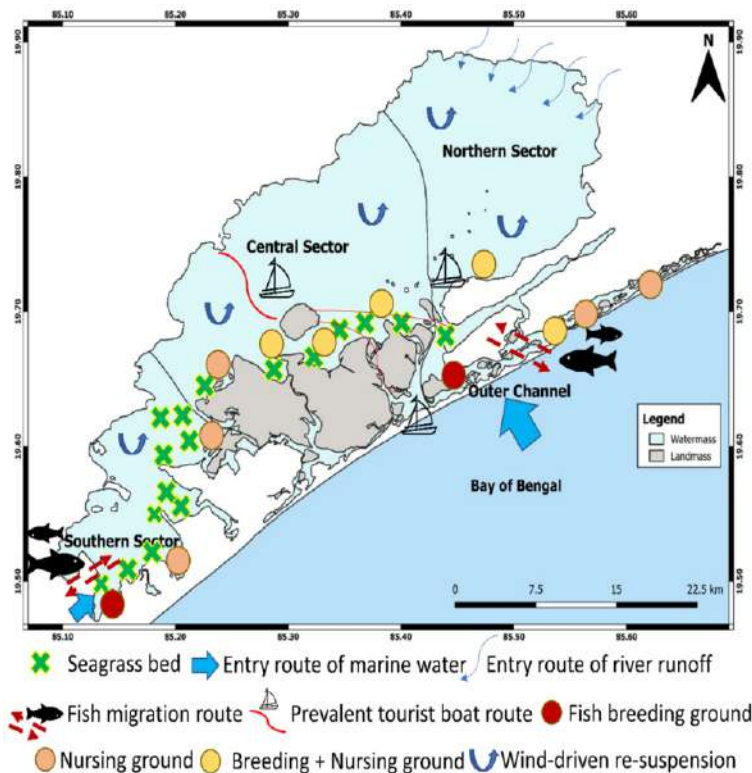


Diagram depicting the ecosystem functions provided by Chilika's seagrass beds, influenced by both natural and human factors. (Image reprinted with permission from Springer-Nature, Acharyya et al. 2023).

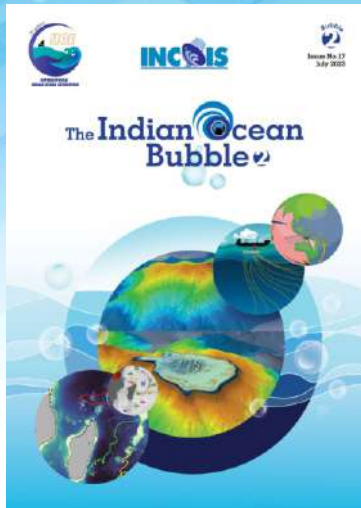


Visual representation illustrating proposed conservation approaches for Chilika Lagoon's seagrass meadows (Image reprinted with permission from Springer-Nature, Acharyya et al. 2023).

Citation: Acharyya, T., Raulo, S., Singh, S., Sudatta, B.P., Srichandan, S., Baliarsingh, S.K., Samal, R.N. & Sahoo, C.K., (2023). Status and conservation challenges of the second-largest seagrass bed in India: Chilika lagoon. *Environmental Science and Pollution Research*, 1-17. <https://doi.org/10.1007/s11356-023-29369-w>

[Report Courtesy: Dr. Suchismita Srichandan (suchismita.sima@gmail.com), Dr. Tamoghna Acharyya (acharyya.tamoghna@gmail.com), Berhampur University, India, & Dr. Sanjiba Kumar Baliarsingh (baliarsingh.s@incois.gov.in), INCOIS, Hyderabad, India.]

The Indian Ocean Bubble, Issue No.17 is now available online



Web Link: https://iioe-2.incois.gov.in/IIOE-2/pdfviewer_pub.jsp?docname=IIOE-2-DOC_OM_260.pdf

Informal articles are invited for the next issue. Contributions referring Indian Ocean studies, cruises, conferences, workshops, tributes to other oceanographers etc. are welcome.

Articles may be up to 1500 words in length (Word files) accompanied by suitable figures, photos (separate .jpg files)

Deadline: **15 November, 2023**

Send your contributions as usual to iioe-2@incois.gov.in

Join us for the Ocean Insights – Indian Ocean Seminar Series feat. ECRs. !

The IIOE-2 Early Career Scientist Network is thrilled to present yet another exciting talk of "Ocean Insights – Indian Ocean Seminar Series feat. ECRs", designed especially for early career scientists focusing on the Indian Ocean to share about their research. This captivating seminar series offers a unique opportunity for the Early Career Researchers to showcase their work, build connections, and explore collaborations within the marine sciences community.

Whether you are an early career researcher, an experienced scientist, or simply an enthusiast seeking to broaden your knowledge of marine science in the Indian Ocean, **ALL ARE INVITED!**

Why Should You Join?

- Engaging presentations from early career marine scientists.
- Interactive Q&A sessions to delve deeper into research topics and foster innovative ideas.
- A platform to connect with like-minded researchers and experienced scientists.

Don't miss out on the opportunity to enhance your understanding of marine science in the Indian Ocean and connect with fellow researchers. [Register now](#) and mark your calendars!

Details on the upcoming talk are given below. We look forward to your enthusiastic participation!

Key Details:

Title: Ocean Insights – Indian Ocean Seminar Series feat. ECRs ; Region: Indian Ocean; Format: Online

Link: https://zoom.us/meeting/register/tJUudOGsrzkiHNzP_5mFljstUxIUQBhS6Z-

Date: Every first Friday of the month, starting on **03rd November 2023**

Time: 10:30-11:30 SAST
14:00-15:00 IST
16:30-17:30 AWST

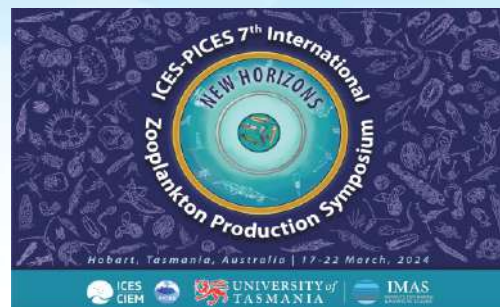
If you are enthusiastic about sharing your contributions, please reach out to us at the email address: ecsn.iioe@gmail.com



ICES - PICES 7th International Zooplankton Production Symposium during Autumn 17-22 March 2024, Hobart, Australia

SCOPE

We are living in the Anthropocene. Our oceans are warmer, more acidic, have widespread plastic and other pollution, and are subjected to increasing exploitation including overfishing. Zooplankton play a pivotal role in our oceans, as grazers of primary production, as drivers of carbon and nutrient cycles, and as prey for higher trophic level consumers including both harvested fish species and iconic marine mammals and seabirds. How zooplankton will respond to the dramatic changes in our marine ecosystems will impact the health and productivity of our oceans and our planet.



To better understand zooplankton in a changing world, ICES and PICES are holding the 7th International Zooplankton Production Symposium as a forum to discuss the latest zooplankton research. The ICES/PICES Zooplankton Production Symposium will bring together the top zooplankton researchers globally, showcasing recent advances. Understanding the current and evolving role of zooplankton will require new insights provided by:

- Assessing the impact on zooplankton of climate change, fishing, and pollution such as microplastics
- State-of-the-art sampling techniques such as DNA, imaging, and bioacoustics
- Biochemical methods applied to unravelling complex trophic ecology
- The application of cutting-edge approaches in zooplankton modelling, including size and trait-based biogeochemical and ecosystem models
- Revealing the role of microzooplankton in biogeochemical cycling and food webs
- Exploring the structure and functioning of macrozooplankton communities and their impact on carbon sequestration and trophic ecology
- Examining zooplankton in fisheries science, including dynamics of fish larvae, the impact of zooplankton on fish larval mortality and growth, and the commercial harvest of zooplankton
- Elucidating the vital role of zooplankton in polar environments
- Understanding the role of gelatinous filter feeders and jellyfish in carbon sequestration and trophic ecology
- The use of zooplankton as ecosystem indicators in a changing ocean

Our Symposium will be held over five days in the historic waterfront district of Hobart, Australia, during Autumn, from 17-22 March 2024. This event will be held in-person and provide the first opportunity since 2016 for zooplankton researchers to meet, build networks, and hear the latest science. We are monitoring the COVID-19 situation closely and will adapt our plans as needed.

The Organizing Committee invites proposals for sessions to be held during the Symposium. Proposals are welcome for sessions incorporating talks and posters, panel discussions and/or workshops. Sessions could cover, but are not limited to, the key areas listed above.

The symposium website may be accessed here: <https://meetings.pices.int/meetings/international/2024/zps7/scope>

Proposals may be submitted here: <https://meetings.pices.int/meetings/international/2024/zps7/proposals>

DEEP-SEA RESEARCH PART II



THE SUBMISSION PORTAL FOR VOL. 6 OF THE DEEP-SEA RESEARCH II
SPECIAL ISSUE SERIES ON THE IIOE-2 IS NOW OPEN

Submission of manuscripts that describe the results of studies related to the physical, chemical, biological, and/or ecological variability and dynamics of the Indian Ocean (including higher trophic levels) is encouraged.

Submission of manuscripts from students and early career scientists is also encouraged.

If you are interested in submitting a manuscript, please contact Raleigh Hood (rhood@umces.edu).

XI Indo-Pacific Fish Conference to be held in Auckland, New Zealand during 20-24 November 2023

A session entitled Larval fishes - solving phylogenetic, life-cycle and ecological questions will be part of the XI Indo-Pacific Fish Conference to be held in Auckland, New Zealand from 20-24 November 2023.

Most marine bony fishes have a two-phase life history with pelagic larvae that differ in morphology, ecology and habitat from the adults. These phases operate in separate evolutionary theatres, and ecologically, effectively function as separate species. Larval morphological features provide characters for phylogenetic analysis and aspects of life history are determined during the larval phase, including recruitment and scale of genetic and demographic connectivity. Although larval survival is necessary for persistence of species, larvae are often neglected by researchers and managers focused on adults. This session will address many of the unanswered questions about the pelagic larval phase of Indo-Pacific fishes.



The session will be co-chaired by

- Jeff Leis (University of Tasmania; jeffrey.leis@utas.edu.au)
- Lynnaeth Beckley (Murdoch University; L.Beckley@murdoch.edu.au) and
- Ainhoa Bernal (Institut de Ciències del Mar; bernal@icm.csic.es)

Those interested in contributing to the larval fish session should contact one of the session co-chairs.

Final programme available at the below link:

<https://bpb-ap-se2.wpmucdn.com/blogs.auckland.ac.nz/dist/9/608/files/2023/10/Draft-Conference-Programme-ver-3.pdf>

The conference website is <https://www.ipfc11-asfb.ac.nz/>

Endorse your projects in IIOE-2

Don't miss the opportunity to network, collaborate, flesh out your research project and participate in IIOE-2 cruises!!

The endorsement of your scientific proposal or a scientific activity focusing on the Indian Ocean region is a recognition of the proposal's or activity's alignment with the mission and objectives of IIOE-2, of its potential for contributing to an increased multi-disciplinary understanding of the dynamics of the Indian Ocean, and of its contribution to the achievement of societal objectives within the Indian Ocean region. Over 51 international, multi-disciplinary scientific projects have already been endorsed to date by the IIOE-2. Yours could be the next one!

Visit <https://iioe-2.incois.gov.in/IIOE-2/EndorsementForm.jsp> for further details and for projects already endorsed by IIOE-2 https://iioe-2.incois.gov.in/IIOE-2/Endorsed_Projects.jsp.

CLIVAR October 2023 Bulletin is available online



The International CLIVAR Project Office distributes a monthly bulletin with announcements, funding opportunities, meeting notifications relevant to the ocean/climate science community.

The latest CLIVAR Bulletin October, 2023 is available at:

<https://www.clivar.org/clivar-bulletin>

Call for Contributions

Informal articles/short notes of general interest to the IIOE-2 community are invited for the next (November-end) issue of the IIOE-2 Newsletter. Contributions referring IIOE-2 endorsed projects, cruises, conferences, workshops, "plain language summary" of published papers focused on the Indian Ocean etc. are welcome. Articles may be up to 500 words in length (Word files) accompanied by suitable figures, photos.(separate.jpg files).

Deadline: **25 November, 2023**



Access the latest issue of Indian Ocean Bubble-2

<https://iioe-2.incois.gov.in/IIOE-2/Bubble.jsp>



Enroll yourself with IIOE-2 Community

<https://iioe-2.incois.gov.in/IIOE-2/Signup.jsp>

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