2nd International Indian Ocean Expedition 2015-2020

IIOE-2

Newsletter

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

Volume-3, Issue-8
August, 2019

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.

Exciting collaboration for IIOE-2: Deep Argo deployments from RV Investigator

Deep Argo is part of the international ocean observing system to clarify changes in the global ocean environment, especially the ocean heat content and the deep ocean circulations. Deep Argo is intended to extend measurements below 2000m depth using floats based on "Argo" technologies, and pilot observational studies are being implemented by several institutions, including JAMSTEC.

The RV Investigator, with two Deep Argo floats provided by JAMSTEC on board, left Fremantle on May 13th, 2019 for her special voyage along 110°E under the IIOE-2 program. These two deep Argo floats were successfully deployed by a team led by Prof Lynnath Beckley at the southern and northern ends of the 110°E line near 39.5°S and 11.5°S. They are now observing and providing in-situ data as a part of the Indian Ocean Observing System (IndOOS), demonstrating an astonishing international collaboration that made a "next-to-impossible" arrangement possible!

On March 12th, 2019 at the end of her talk about the upcoming 110°E voyage to the participants at the IIOE-2 Steering Committee meeting in Port Elizabeth, South Africa, Prof Beckley indicated the possibility of deploying additional Argo floats from the RV Investigator. Prof. Yukio Masumoto, who was in the audience, relayed this information to Dr. Shigeki Hosoda of JAMSTEC. It was a golden opportunity to deploy Argo floats in the Indian Ocean particularly for Shigeki and the Argo group in JAMSTEC, who are always looking for such opportunities. However, the RV Investigator was due to leave from Fremantle, Australia just two months later, which seemed to be too short a time for all the arrangements and transport of the deep Argo floats from Japan to Fremantle. Usually, a float with lithium batteries should take sea transportation which may take several months. How could these successful deployments be achieved?

International shipments are fraught with accidental delays as agents sometimes try to choose marine transport all the way to the nearest port which may require long shipping and waiting times. Quarantine restrictions on materials that are brought in with floats (e.g. wooden box, packing etc.) are also an issue. In addition, recently, limitations on the amount of lithium batteries carried on board have become very strict in many countries and airlines. Asking support from a well-experienced shipping agent, with accumulated know-how on these issues, was crucial for success and saved time considerable time.

The company we chose this time put together a carefully arranged plan to transport the floats from Tokyo to Sydney by air and then by railway from Sydney to Fremantle across Australia, a not insignificant distance of 4 000km. Another typical bottle-neck point is the customs clearance. Frequent and detailed communication of accurate information among the shipping agent, CSIRO and JAMSTEC was required before and during shipping to further improve success and avoid long delays during clearance. Given the above factors, we predicted that the success rate might only be around fifty-fifty. Fortunately, everything came together and made it possible for the two deep Argo floats to reach the agent in Fremantle on 8th May, earlier than we expected.

It was with great excitement that the deep Argo buoys in their big wooden boxes festooned with many transportation stickers were lifted aboard the RV Investigator and lashed to the deck for the voyage (Figure -1). As it is important to have a deep CTD completed near to where the floats are deployed, it was decided to aim for deployments near to the first station and the last station and thereby ensure that the already arranged tight voyage schedule was not

disrupted. Unlike normal Argo floats, which are just pushed over the stern of the vessel, the Deep Argo floats are heavier and it was recommended that a small crane be used to deploy them. Under the supervision of physical oceanographer Dr Helen Phillips (Figure-2), the first spherical deep Argo float was lifted from its wooden box and deployed into the Indian Ocean from the RV Investigator just before dawn on the 17th May (Figure-3). The second float was similarly deployed just before dawn on the 5th June prior to the last station.

Now, the two floats deployed during this cruise are sending data from the deep ocean, accumulating invaluable information on ocean conditions. The success in preparation and deployment of the floats is entirely due to great collaborative work among colleagues in JAMSTEC, CSIRO, and on board the RV Investigator. We need to keep searching for such opportunities of exciting collaboration to keep and enhance the observing system in the Indian Ocean.

Figure-1: One of the Deep Argo floats being lifted aboard the RV Investigator in Fremantle (Photo: Helen Phillips)

Figure-2: Dr Helen Phillips and PhD student Earl Duran admiring the Deep Argo float prior to deployment from the RV Investigator (Photo: Karlie McDonald)

Figure-3: The spherical Deep Argo float being deployed by crane into the Indian Ocean before dawn from the RV Investigator (Photo: Karlie McDonald)

[Report Courtesy: Lynnath Beckley, Murdoch University, Western Australia, E-mail: L.Beckley@murdoch.edu.au*]*

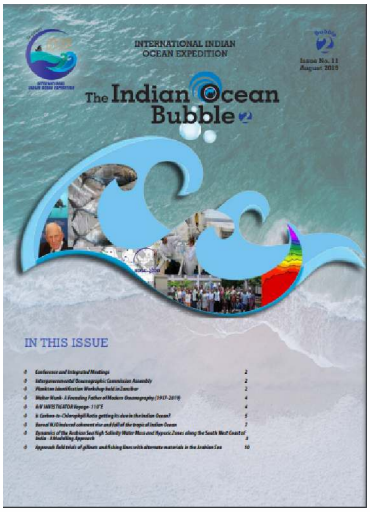
The need for a dedicated observing system for cyclone prediction

A community white paper on "Ocean Observations in Support of Studies and Forecasts of Tropical and Extratropical Cyclones" by Ricardo Domingues et al. (2019) has been published recently in Frontiers in Marine Science (https://doi.org/10.3389/fmars.2019.00446). Measurements from the climate-oriented ocean observing system have been key to advancing the understanding of extreme weather events that originate and intensify over the ocean such as tropical cyclones (TCs) and extratropical bomb cyclones (ECs). However, the authors feel that a dedicated observing system component specifically to support these studies for efficient forecasts has not yet been implemented. The authors highlight the critical need for a dedicated observing system component in order to foster further advancements to predict and better understand these extreme weather events. TC development is associated with unstable atmospheric conditions, which are primarily linked with boundary layer temperature ie., sea surface temperatures (SST), upper-layer ocean mean temperatures, in addition to the atmospheric favorable conditions. The importance of the satellite observations, underwater gliders, profiling floats, ocean buoys (both moored and drifting), air deployed profiling instruments, electromagnetic autonomous profiling explorer floats, and biologging in forecasting the cyclones are described in detail in this paper. Since latency in data availability can have unwanted downstream effects on the use of observations for operational purposes, the criticality of efficient data management, including data transmission for ensuring availability of observations in real-time or near-real-time for assimilation into forecast models is stressed. It is suggested that data assembly centers should transmit data in real-time to systems such as the GTS to ensure data availability for forecasters and to validate models. As a vision for the next 10 years, an integrated multiplatform ocean observing system for studies and forecasts is proposed, which is not currently in place.

The need for Pilot networks of sustained multi-platform observations (similar to those in tropical Atlantic), assimilation of ocean observations into the models, resolving upper ocean features such as barrier layers, spatial variability of warm currents, mesoscale ocean heat content changes, and surface waves prior to and during the season in each basin where TCs occur, for example, are suggested. Some of the key recommendations with which the paper concludes are (i) maintaining the elements of the observing system that have proven valuable for cyclone forecasting, (ii) to evaluate optimal ocean observational strategies, (iii) implementing sustained and targeted ocean observations, (iv) to foster additional sustained measurements of sea level pressure, waves, sea spray, mixed-layer turbulence, tropical cyclone heat potential, ocean mean temperature and barrier layer thickness, and (v) to improve coverage of high-frequency and high-resolution observations.

[Report Courtesy: M M Ali, International CLIVAR Monsoon Project Office, IITM, Pune, India,
E-mail: mm.ali@tropmet.res.in*]*

The Indian Ocean Bubble, Issue No.11 is now available online



Web Link: https://iioe-2.incois.gov.in/IIOE-2/pdfviewer_pub.jsp?docname=IIOE-2-DOC_OM_157.pdf

Call for Contributions

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)

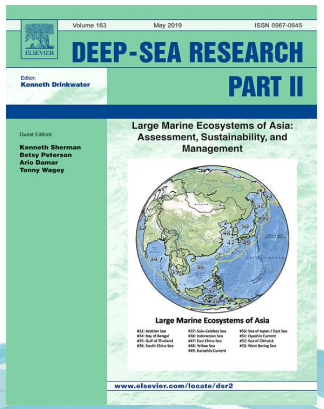
Deadline: **30th November, 2019**

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

Call for papers - Special IIOE-2 Issue
Volume 3 DEEP SEA RESEARCH- PART II

The first volume of DSR II special issue on IIOE2 is published in March 2019 and is available at https://www.sciencedirect.com/journal/deep-sea-research-part-ii-topical-studies-in-oceanography/vol/161/suppl/C

Congratulations to all the contributors



The 2nd issue is being finalised and will be available soon. Manuscripts are now being solicited for publication in the third volume of a DSR II Special Issue on IIOE-2, edited by Raleigh Hood, Jerry Wiggert, Lynnath Beckley, Jerome Vialard, Sunil Singh and Birgit Gaye.

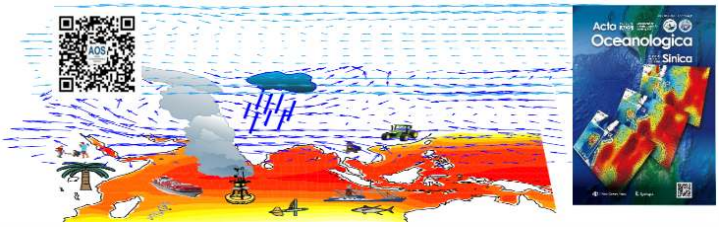
If you are interested in submitting a manuscript or would like more information, please contact Raleigh Hood (rhood@umces.edu).

Call for papers - Special Issue in Acta Oceanologica Sinica on "Environment and Ocean-Atmosphere Interaction in the Indian Ocean"

Manuscripts are being invited for a special issue in Acta Oceanologica Sinica. All manuscripts about the ocean dynamics, environment, air-sea interactions over the Indian Ocean (including the Maritime Continent and the Southern Ocean connected to the Indian Ocean) are welcome. Manuscripts on interdisciplinary studies related to physics or dynamics, interactions between ocean basins, and ocean-land interactions related to the Indian Ocean are also welcome.

The target date for submission is **December 31, 2019**

If you are interested in submitting a manuscript or would like more information, please contact Lei Zhou (zhoulei1588@sjtu.edu.cn).



International Indian Ocean Science Conference-2020 (IIOSC-2020)- Call for Abstracts

The "International Indian Ocean Science Conference 2020 (IIOSC-2020)" sponsored by Ministry of Earth Sciences (MoES), Govt. of India, will be held during 16-20 March 2020 at Goa India co-hosted by National Institute of Oceanography (NIO) Goa, National Centre for Polar Ocean Research (NCPOR) Goa, Goa University and Indian National Centre for Ocean Information Services (INCOIS) Hyderabad, India. The conference aims at assessing the progress and scientific knowledge gained during the last 4 years of IIOE-2 (during 2016-2020). It is also an opportunity for scientists working on different facets of the Indian Ocean to present their ideas and discuss the outstanding issues, identify the knowledge gaps and plan a way forward to address such issues.

Scientists and colleagues who are interested in the Indian Ocean may kindly take note of this and freeze their dates for the conference. A detailed second announcement is made available at the below web link:

Conference Website: https://iiosc2020.incois.gov.in/

Second Announcement: https://iiosc2020.incois.gov.in/documents/IIOE-2/IIOSC2020/SecondAnnouncement-IIOSC2020.pdf

Call for Abstracts: https://iiosc2020.incois.gov.in/IIOSC2020/Abstracts.jsp

IMPORTANT DATES

- Abstract Submission Opens: 15 August, 2019
- Abstract Submission Closes: 15 October, 2019
- Abstract Acceptance: 15 November, 2019
- Registration opens on: 01 October, 2019
- Early Bird Registration: 15 December, 2019
- Last Date for Registration: 15 January, 2020

https://iiosc2020.incois.gov.in/

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GLOBAL OCEAN OBSERVING SYSTEM FOR INDIAN OCEAN

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

International Council for Science SCOR Scientific Committee on Oceanic Research

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 35 international, multi-disciplinary scientific projects have already been endorsed to date by the IIOE-2. Yours could be the next one!

Visit http://www.iioe-2.incois.gov.in/IIOE-2/EndorsementForm.jsp for further details and for projects already endorsed by IIOE-2.

Some Upcoming Events

- OceanObs'19 — Connecting Science and Society during 16 -20 September, 2019 at Honolulu, Hawaii, United States.
  http://www.oceanobs19.net/
- 36th International Geological Congress during 2-8 March, 2020, India EXPO Centre, Delhi, India. The call for Abstracts and Registration is now open and the deadline for online submission of the Abstracts is 15th October, 2019. There is no Abstract Submission fee till 15th September, 2019. https://www.36igc.org
- 14th International Conference on Copepoda (ICOC)during 14-19 June, 2020 at Kruger Park, South Africa.
  http://abevents.co.za/WEB_ICOC2020/index.php

CLIVAR August 2019 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 August, 2019 is available at:
https://mailchi.mp/clivar.org/clivar-august-2019-bulletin?e=0e7979fd09

Call for Contributions

Informal articles/short notes of general interest to the IIOE-2 community are invited for the next (September-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 September, 2019**

The Indian Ocean Bubble-2

Access the latest issue of Indian Ocean Bubble-2
https://www.iioe-2.incois.gov.in/IIOE-2/Bubble.jsp

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SCOR International Council for Science Scientific Committee on Oceanic Research