2nd International Indian Ocean Expedition 2015-2020

Newsletter

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(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.

Modeling physical-biological interactions along the passage of cyclones in the Arabian Sea

The study of changes occurring in the upper ocean biogeochemistry followed by the response of ecosystem to a tropical cyclone is often a difficult task, primarily due to the paucity of direct observations of such events. In a recent paper, a team of scientists from INCOIS illustrate how a fully coupled physical-biogeochemical model can be used to understand the underlying responses to a tropical cyclone. Utilising a Regional Ocean Modeling System (ROMS) for assorted cyclonic events in the semi-landlocked basin of the Arabian Sea in the northern Indian Ocean, these scientists have identified Ekman pumping for leading the shoaling of thermocline depth and triggering productivity by entraining nutrients in the upper ocean (see representative figure below). Along a cyclone passage, there is a lag of approximately one week between the maximum surface chlorophyll concentration after the peak in the nitrate concentration. The studies also show a linear relationship between the enhancement of surface chlorophyll concentration and cyclone intensity, and is also inversely proportional to the translational speed of the cyclone. Full-text version of the publication can be accessed at:
https://authors.elsevier.com/a/1XNhk4wy0KX43K

Chakraborty, K., Kumar, N., Akhand, A., Prakash, S., Paul, A., Ghosh, J., Udaya Bhaskar TVS, and Chanda, A. (2018) Modelling the enhancement of sea surface chlorophyll concentration along the cyclonic events in the Arabian Sea, Journal of Sea Research, DOI: 10.1016/j.seares.2018.07.003.

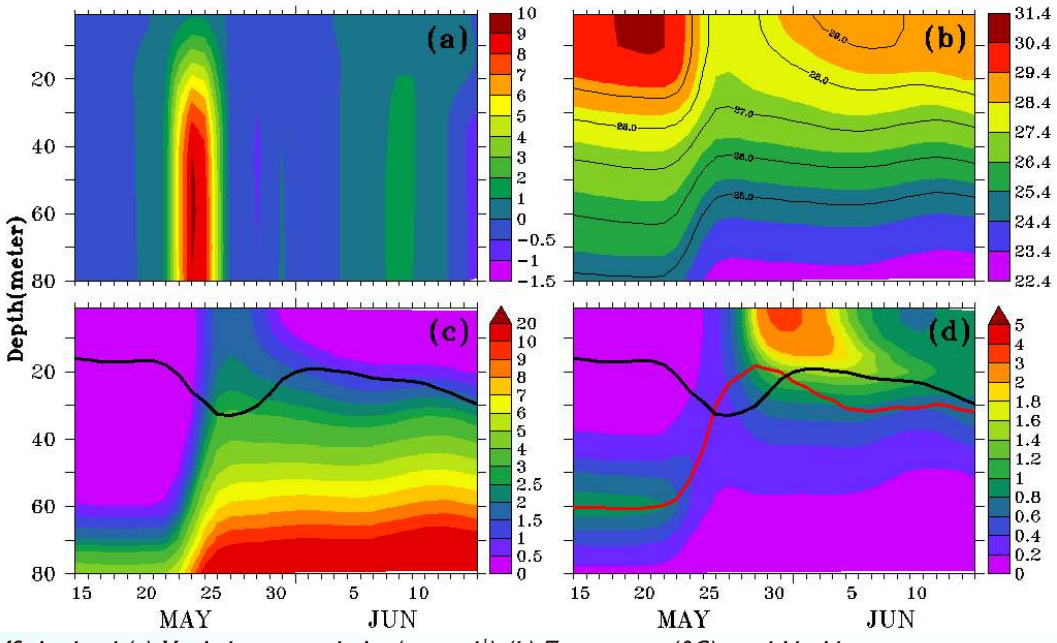


Figure: ROMS simulated (a) Vertical current velocity (meter d^{-1}) (b) Temperature (°C) overlaid with temperature contours (c) Nitrate concentration (mM m^{-3}), and (d) Chlorophyll concentration (mg m^{-3}) concentrations, along the track of cyclonic event C01A during May 21-28, 2001. Black line in (c) and (d) is Mixed Layer Depth (MLD). Red line in (d) is mean-depth of DCM (Deep Chlorophyll Maxima).

[Report Courtesy: Kunal Chakraborty and Nimit Kumar Joshi, INCOIS, Hyderabad, India.]

RV Sagar Nidhi in the Bay of Bengal

A scientific cruise onboard RV Sagar Nidhi led by scientists from INCOIS and the Physical Research Laboratory (PRL), Ahmedabad is currently under way in the Bay of Bengal (5 July - 5 Aug, 2018).

The primary objectives of this cruise are to carry out measurements of the turbulence characteristics and biogeochemical parameters, besides near surface and upper atmospheric observations using radiosonde. Apart from point locations (see figure), a few time series observations are also planned during the cruise. Water samples are being collected and incubation experiments are being carried out to estimate nitrogen fixation, primary production and nutrient stoichiometry. Observations using radiosonde are aimed at understanding the atmospheric properties during active and break periods of the monsoon. Twenty scientists from many Indian institutes are participating in this cruise, in addition to those from INCOIS and PRL.

[Report Courtesy: M. S. Girish Kumar, INCOIS, Hyderabad, India.]

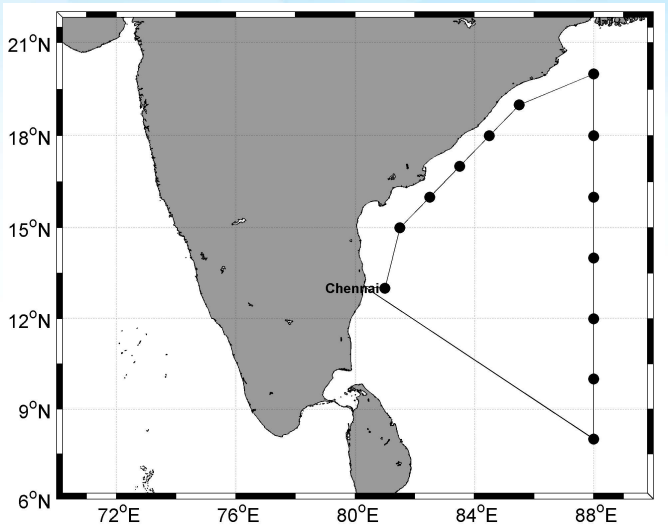
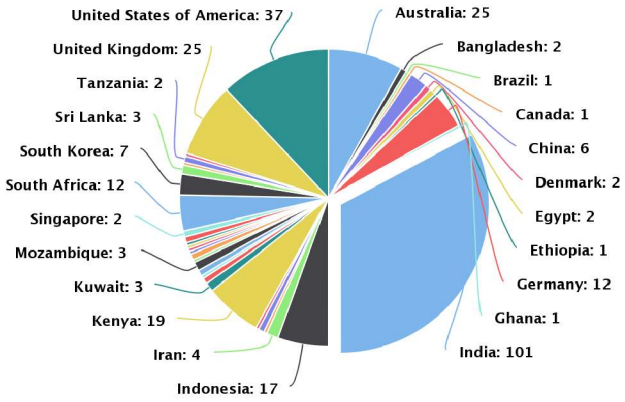


Figure: Planned Cruise Track of RV Sagar Nidhi.

IIOE-2 Community is now 300 plus strong!



It is heartening that the IIOE-2 community has grown to more than 300 registered members from 38 different countries.

We at the two JPOs provide regular updates on IIOE-2 related activities to all the members through the monthly Newsletter as well as the bi-annual "Ocean Bubble-2". We also provide regular updates on planned cruises in the Indian Ocean and IIOE-2 related conferences.

Enroll yourself with IIOE-2 Community
http://www.iioe-2.incois.gov.in/IIOE-2/Signup.jsp

Recent Publication

Research Article | Full Access

Ventilation of Oxygen to Oxygen Minimum Zone Due to Anticyclonic Eddies in the Bay of Bengal

V. V. S. S. Sarma, T. V. S. Udaya Bhaskar

https://doi.org/10.1029/2018JG004447

We would like to draw your attention to the recent publication on "Ventilation of Oxygen to Oxygen Minimum Zone Due to Anticyclonic Eddies in the Bay of Bengal" by V. V. S. S. Sarma and T. V. S. Udaya Bhaskar in Journal of Geophysical Research, Biogeosciences (2018, DOI:10.1029/2018JG004447).

This paper highlights the role of Anticyclonic eddies(ACEs) supplying Dissolved Oxygen(DO) rich water leading to weakening of Oxygen Minimum Zone(OMZ) in the Bay of Bengal(BoB). Six ACEs sampled by Bio-Argo floats and measured in situ hydrography and DO were used in this work. Warm and DO rich waters were observed in the core of OMZ(150–300m), influenced by ACEs, by 0.5–1.46°C and 3.2–6.5M, respectively, than no eddy region in the BoB.

[Report Courtesy: T. V. S. Udaya Bhaskar, INCOIS, Hyderabad, India.]

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!!

Over 30 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

- World of Drones Congress 2018 during 9 - 10 August, 2018 at the Brisbane Convention & Exhibition Centre, Queensland, Australia. https://www.worldofdrones.com.au/
- OTGA-INCOIS Training Course on "Data Visualization of Marine Met data (using FERRET)" during 27 - 31 August, 2018, International Training Centre for Operational Oceanography (ITCOocean), ESSO-INCOIS, Hyderabad, India. http://www.incois.gov.in/ITCOocean/otga0818.jsp
- IV International Conference on El Niño Southern Oscillation: ENSO in a warmer Climate, 16-18 October 2018. Guayaquil – Ecuador. http://www.ensoconference2018.org/
- SOLAS Open Science Conference during 21-25 April 2019, at Hokkaido University Conference Hall, Sapporo, Japan. https://www.confmanager.com/main.cfm?cid=2778
- "Ocean sustainability for the benefit of society: Understanding, challenges, and solutions", 17-21 June 2019, Brest, France. Call for Sessions and Workshops at the Second Open Science Conference of the Integrated Marine Biosphere Research (IMBeR) Project.
  http://www.imber.info/en/events/osc--imber-open-science-conference/osc-2019/2019-imber-open-science-conference

Call for Contributions

Informal articles/short notes of general interest to the IIOE-2 community are invited for the next (August-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 August, 2018**

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

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INCOIS

The Indian Ocean Bubble-2

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IOGOOS Global Ocean Observing System for Indian Ocean

UNESCO United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

International Council for Science SCOR Scientific Committee on Oceanic Research