



2nd International  
Indian Ocean  
Expedition  
2015-2020

# Newsletter

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June, 2019

(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.*

## In the wake of HMAS Diamantina

The Research Vessel Investigator departed Fremantle on 14<sup>th</sup> May, 2019 for a month-long oceanographic voyage to the 110°E meridian in the south-east Indian Ocean (Figure-1). This voyage followed in the wake of the HMAS Diamantina (Figure-2), which in the 1960s, regularly took Australian scientists to study the physical, chemical and biological oceanography of the same region as part of the first International Indian Ocean Expedition (IIOE). During the 2019 voyage, which is Australia's major contribution to the second International Indian Ocean Expedition (IIOE-2; <https://iioe-2.incois.gov.in/IIOE-2/EP06-1Info.jsp>), a multi-national team of scientists repeated many of the measurements made nearly six decades ago to ascertain if there have been significant changes in the pelagic ecosystem in the south-east Indian Ocean.

The HMAS Diamantina is the last remaining example of the British River Class frigates in the world. Built in Australia, and launched in 1944, the ship saw service in the latter part of World War 2 around Papua New Guinea, Solomon Islands, Bougainville and Nauru before being paid off into the Reserve in August 1946. The vessel was recommissioned in June 1959 as an Oceanographic Research Ship under the command of Lieutenant Commander Bruce D. Gordon RAN. The ship carried scientists from the CSIRO but also assisted the Australian Army survey team along the coast of north-western Australia.



Figure-1. Professor Eeva Leinonen (right), Vice Chancellor of Murdoch University, doing the honours and raising the second International Indian Ocean Expedition flag aboard RV Investigator in the Port of Fremantle prior to departure on the 110°E voyage.

Captain Adrian Koolhof and Prof Lynnath Beckley (Chief Scientist) observed the proceedings.

Photo: Micheline Jenner AM.



Figure-2. The frigate HMAS Diamantina was the primary vessel used by Australian scientists during the first International Indian Ocean Expedition. Photo courtesy of the Queensland Maritime Museum.



Figure-3. The original HMAS Diamantina, in her current dry berth at the Queensland Maritime Museum in Brisbane. Photo courtesy of the Queensland Maritime Museum.



Although there is now a new HMAS Diamantina 2 (a Huon Class minehunter) in the Australian fleet, the legacy of the original vessel lives on as a popular exhibit at the Queensland Maritime Museum in Brisbane (Figure-3). Furthermore, her name is immortalised in hydrography with one of the deepest areas in the Indian Ocean, the Diamantina Deep (around 8,000 m depth) in the Diamantina Fracture Zone some 1,100 km south-west of Fremantle named after the ship. On the RV Investigator voyage, the connection with the Australian Navy was maintained with Captain Curt Jenner AM and Captain Micheline Jenner AM conducting research on underwater sound for the Australian Defence Force.

The RV Investigator voyage along 110°E was supported by a grant of sea time from the CSIRO Marine National Facility.

[Report Courtesy: Prof Lynnath Beckley (Murdoch University, Australia), E-mail: [L.Beckley@murdoch.edu.au](mailto:L.Beckley@murdoch.edu.au)]

### Does Somali current upwell during the summer monsoon?

Somali coast is argued to be one of the strongest upwelling zones in the Indian Ocean during the summer monsoon. Based on observations and ocean model experiments we have shown that upwelling along the Somali coast is limited to the early phase of the summer monsoon when the alongshore Findlater Jet sets in across the Arabian Sea. At this time, the windstress curl turns negative over most part of the Arabian Sea south of approximately 15°N. As the wind strengthen during July/August, the wind stress curl also gets intensified resulting in strong Ekman pumping (negative vertical velocity) over the interior of the basin and therefore, deepens the thermocline. Subsequently, these downwelling signals then propagate west to interfere the upwelling signals off Somalia. As a response, the thermocline along the major part of the Somalia coast (~60%) deepens by about 40-60 m, particularly in the central part of the Somali coast. Moreover, strong alongshore winds and weaker stratification allow more mixing in the bottom of the mixed layer which further deepen the thermocline there. As a result, during the peak summer months, upwelling becomes limited primarily to the eddy dominated frontal flows in the northern and to some extent in the southern part of the coast. Further, we show that thermal surface flux and the entrainment driven cooling play a key role in the strong sea surface temperature cooling observed along this coast. We believe that our results not only augment the existing knowledge of the Somali current system, but also raises serious implications on our existing understanding of the processes important for primary productivity in this region. It also underscores the use of only alongshore winds-based projections of future climatic changes in the upwelling intensity along this coast.

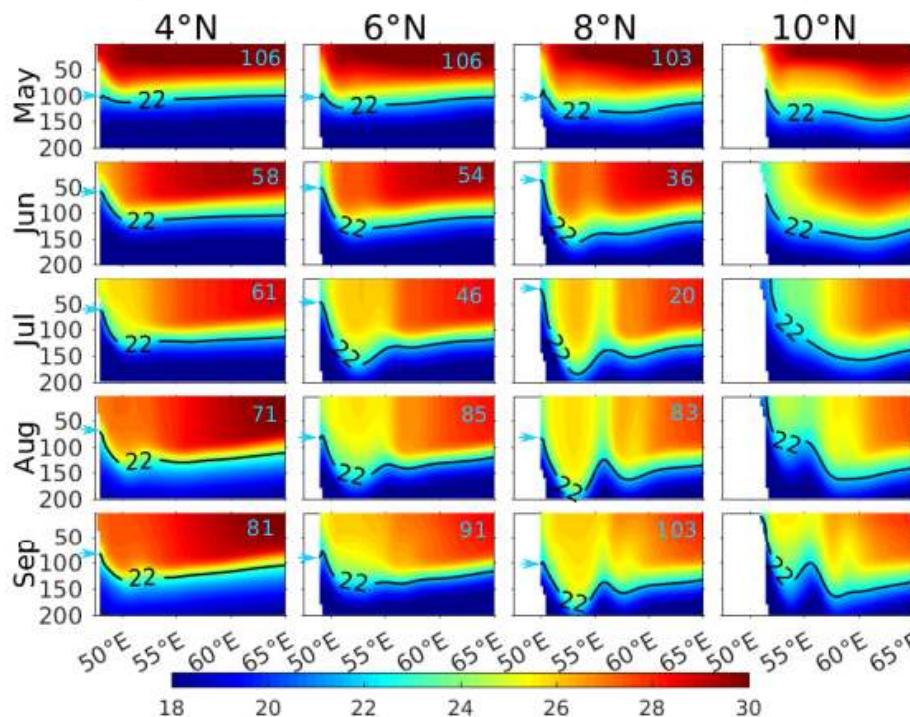


Figure: Vertical sections of temperature along 4°N, 6°N, 8°N and 10°N off the Somalia coast during May–September. The black contours represent D22 and the cyan fonts represent the depth of the D22 right adjacent to the coast marked by cyan arrow.

Abhishek Chatterjee, B. Praveen Kumar, Satya Prakash and Purna Singh (2019). Annihilation of the Somali upwelling system during summer monsoon. Nature Scientific Reports 9:7598. <https://doi.org/10.1038/s41598-019-44099-1>

[Report Courtesy: Abhishek Chatterjee, INCOIS, Hyderabad, India, E-mail: [abhishek.c@incois.gov.in](mailto:abhishek.c@incois.gov.in)]

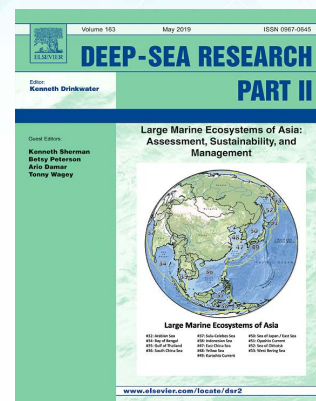
## Call for papers - Special IIOE-2 Issue Volume 3 DEEP SEA RESEARCH- PART II

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 2<sup>nd</sup> 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 ([rhoo@umces.edu](mailto:rhoo@umces.edu)).

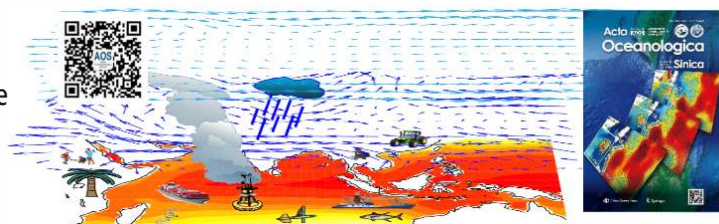


## Call for papers - Special Issue in Acta Oceanologica Sinica on “Environment and Ocean-Atmosphere Interaction in the Indian Ocean”

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](mailto:zhoulei1588@sjtu.edu.cn)).



## First announcement: International Indian Ocean Science Conference-2020 (IIOSC-2020)

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 first announcement is made available at the below web link:

<https://iioe-2.incois.gov.in/documents/IIOE-2/IIOSC2020/FirstAnnouncement-IIOSC2020.pdf>



## 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

- ☞ 26<sup>th</sup> Conference of Pacific Congress on Marine Science and Technology (PACON-2019) July 16-19, 2019, Far Eastern Federal University, Ajax bay, Russkiy Island, Vladivostok, Russia.  
<http://www.pacon-conference.org>
- ☞ OceanObs'19 — Connecting Science and Society during 16 -20 September, 2019 at Honolulu, Hawaii, United States.  
<http://www.oceanobs19.net/>
- ☞ 14<sup>th</sup> International Conference on Copepoda (ICOC) during 14-19 June, 2020 at Kruger Park, South Africa.  
[http://abevents.co.za/WEB\\_ICOC2020/index.php](http://abevents.co.za/WEB_ICOC2020/index.php)

## CLIVAR June 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 June, 2019 is available at:  
<https://mailchi.mp/clivar.org/clivar-june-2019-bulletin?e=0e7979fd09>

## Call for Contributions

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

*The IIOE-2 Newsletter is published online by:*



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



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