The Second International Indian Ocean Expedition (2015-2025)

The New Frontier of Indian Ocean Science

The Second International Indian Ocean Expedition (IIOE-2) is a global coordination effort that is advancing our understanding of the physical, biological, geological, climatological and socio-economic role of the Indian Ocean. Launched in 2015, the IIOE-2 brings together institutions and scientists to support innovative research for sustainable development. Five decades on from the first IIOE (1959-65), IIOE-2 brings an exciting contemporary approach and capacities for vastly improved ocean observational techniques within, at and above the sea surface, data information and management and modelling and applications for societal benefit.
The Core Group comprises 3 Working Groups (WG1 Science & Research, WG2 Data & Information Management & WG3 Operational Coordination)

Each WG interact with each other, the Joint Project Offices’s (in Perth till July 2021 and Hyderabad) and the Co-Chairs who represent the sponsors and oversee the Core Group.
IIIOE-2 is a Truly Global Effort

As on June, 2021

🌐 28 countries
are represented in the IIIOE-2 community as highlighted in the map above.

🚢 17 research cruises
have already been completed as part of the IIIOE-2 with more to come.

🔗 45 projects
have been endorsed by the IIIOE-2 Steering Committee, which oversees the Expedition.

📚 >100 scientific papers
are soon to be published in four special IIIOE-2 issues of Deep Sea Research II plus dozens more in other high-impact scientific journals.

IIIOE-2 National Committees
Providing nationally coherent engagements in the IIIOE-2. Eight so far
Australia, France, Germany, India, Japan, South Africa, UK, USA

IIIOE-2 Early Career Scientists Network
Connecting emerging scientists and practitioners, across the developing and developed ocean science worlds
Participant Nationalities Wise No. of Endorsed Projects Submitted as on 09-Apr-2021

- USA: 7
- Australia: 6
- China: 1
- France: 3
- Germany: 1
- Tanzania: 1
- South Africa: 3
- Singapore: 1
- Russia: 3
- Mauritius: 1
- Korea: 1
- Japan: 2
- Kenya: 1
- Israel: 1
- Indonesia: 1
- India: 9
Special Issues on IIOE-2

- We have put together a set of synthesis papers on the Indian Ocean for publication as a special issue of EGU Journals.
- Guest editors: Raleigh Hood and Hermann Bange
- Inspired by IIOE-2 Science Plan Research Themes
- 6 manuscripts submitted, in review and published
Deep-Sea Research Special Issues on IIOE-2

- We are putting together a set of special issues on IIOE-2 for publication in DSR II. 42 papers published thus far.


- Guest editor volumes 1 and 2:
  1. Raleigh Hood (rhood@umces.edu)
  2. Jerry Wiggert
  3. Lynnath Beckley
  4. Birgit Gaye
  5. Jerome Vialard
  6. Sunil Singh

- Guest editor team volumes 3 and 4:
  1. Raleigh Hood (rhood@umces.edu)
  2. Zouhair Lachkar
  3. Lynnath Beckley
  4. Birgit Gaye
  5. Jerome Vialard
  6. VVSS Sarma

- Volumes 1-3 are published

- Volume 4 is nearly complete with 6 manuscripts in production and several more in various stages of review and revision. Deadline is June 30, 2021. Contact Raleigh Hood if you want to submit a paper.

- Volume 5 is focused on 2019 R. V. Investigator Cruise along 110° East. 15 manuscripts anticipated.

- Volume 6 is planned.
Elsevier Book

- We are putting together an interdisciplinary book of synthesis chapters on the Indian Ocean for publication as an Elsevier book.

- Editors: Caroline Ummenhofer and Raleigh Hood

- 20 chapters under development, with several first drafts completed:

  1. Raleigh Hood et al., “Introduction”
  2. Timothy Walker et al., “History of the Indian Ocean”
  3. Andrew Turner et al., “Monsoon variability and its drivers”
  5. Toshi Yamagata et al., “Climate phenomena of the Indian”
  7. Charlotte Demott et al., “Indian Ocean intraseasonal variability”
  8. Janet Sprintall et al., “Oceanic Interbasin connections”
  9. Caroline Ummenhofer et al., “Indian Ocean impact on global climate”
  10. Francis Marsac et al., “Indian Ocean primary productivity & fisheries variability”
  11. Raleigh Hood et al., “Nutrient, phytoplankton and zooplankton variability in the Indian Ocean”
  15. Faiza Al-Yamani et al., “Physical and biogeochemical characteristics of Indian Ocean marginal seas”
  17. Toshi Shinoda et al., “Modeling the Indian Ocean”
  18. Mahyar Mohtadi et al., “Paleo evidence to understand Indian Ocean variability across a range of timescales”
  19. MK Roxy et al., “Future projections for the Indian Ocean”
  20. Ming Feng et al., “Extreme events & impacts”
IIOE-2 Research Initiatives

The Eastern Indian Ocean Upwelling Research Initiative: It is ongoing anchored by China, Japan and USA. The main foci of this initiative is on the upwelling regions that develop seasonally off Java, Sumatra, and northwestern Australia.

The Western Indian Ocean Upwelling Research Initiative: Also ongoing. Anchored by Solstice Project and DEA Agulhas II cruises. Significant progress has been made.

The Years of the Maritime Continent: In addition to these research initiatives, the IIOE-2 coincided with and embraced the Years of the Maritime Continent (YMC) as a major IIOE-2 field champagne in 2017-2018. This is completed.
Summary of National IIOE-2 Efforts:

**USA:** US National Committee formed and active, science plan development workshop funded and convened (September 11-13, 2017 at SIO), US science plan completed, *RV Ron Brown* cruise completed in 2018, leading YMC, EIOURI cruise funded by NSF (Landry)

**South Korea:** Engaged through NOAA, especially related to supporting RAMA / IndOOS, science planning workshop to set South Korean science priorities for participating in IIOE-2 convened in November, 2017, proposal development workshop convened in November 2018, multiple cruises funded out to 2023, multiple proposal submissions completed and planned

**India:** IIOE-2 National Organizing Committee formed, hosting JPO in Hyderabad / INCOIS, hosting website, leading IO Bubble and Newsletter publications, multiple cruises undertaken and planned including GEOTRACES (Shenoi, Rajan, Singh, Prakash et al.)

**Japan:** Hosted and convened first EIOURI workshop, co-leading EIOURI, research cruises undertaken and planned (Masumoto, Honda, JAMSTEC)

**Germany:** IIOE-2 Organizational Meeting Convened, National Committee formed and active, science plan published, multiple cruises now funded (Visbeck, Bange, Gaye, et al.)

**Indonesia:** Delegation sent to the USA with strong emphasis on IIOE-2, LIPI ship support committed to the effort, hosted 2nd IIOE-2 SC meeting, leading IIOE-2 capacity development efforts (Arifin, Susanto, et al.)

**China:** Hosted and Convened RG-2 meeting, and co-leading EIOURI effort, EIOURI and WIOURI research cruises undertaken and planned (Weidong Yu, SOA)

**Australia:** IOC Perth Office hosting JPO secretariat (D’Adamo), National Committee formed and active, science priorities developed and published, 110E repeat line cruise completed (Beckley), strong backing from UWA/IOMRC, hosted first IIOE-2 SC meeting and symposium

**Mauritius:** Hosted and Convened RG-3 meeting with strong SWIO representation including South Africa (Badal, Roberts, D’Adamo)

**UK:** IIOE-2 Organizational meeting convened and proto-national committee formed, proposals submitted, Solstice project funded (Burkill, Cowie, Roberts, et al.)

**Thailand:** Hosted EIOURI science plan writing workshop and engaged in IIOE-2 through SIBER (Khokliattiwong, Yu, et al.)

**South Africa:** WIOURI underway, ASCA completed, Solstice project ongoing, strong engagement by Dept. of Environmental Affairs, Agulhas II cruises completed, Huggett appointed SA IIOE-2 lead (Beal, Hermes, Huggett, Roberts et al.).

**Kenya and other eastern African countries:** Engaged through IOC, expressed strong desire to participate, promotion video developed, hope to motivate capacity development and equip/deploy a new research vessel (M. Odido and IOC Africa)

**Pakistan:** Engaged through IOC and have expressed strong desire to participate. Submissions to DSR II Special Issues on IIOE-2 (Kidwai et al., NIO Pakistan)

**Iran:** Engaged through IOC, planning research in the northern Arabian Sea with new vessel

**France:** Engaged through IOC, SIBER and IORP, cruises ongoing and planned in the northwestern Indian Ocean and in the southern hemisphere (Vialard, Marsac, et al.)

**Norway:** Cruises undertaken and planned, EAF-Nansen, Mauritius Workshop, 21-13 Aug 2017, Negotiations with FAO and Norway research leaders for EAF-Nansen / IIOE-2 linkages and collaboration (T. Stromme, N. D’Adamo)
2021 meetings and upcoming events

4th IIOE-2 Steering Committee Meeting (IIOE-2 SC4) during 12 - 15 April, 2021

Virtual over 4 days (hosted by IIOE-2 JPO Australia & India)
OUTREACH: Helping INCOIS with the THE INDIAN OCEAN BUBBLE

Bi-annual informal newsletter providing short articles contributed by scientists with a sustained interest in the Indian Ocean studies. To date, 13 issues have been published, with the eversions reaching out to nearly 1000 people.

OUTREACH: The IIOE-2 monthly newsletters

e-newsletter started in March 2017 and published on the last working day of each month highlighting the various activities in IIOE-2. As on date, 50 issues of this Monthly Newsletter have been released and mailed to nearly 900 people.
IIOE-2 Metadata & Data Portal
Catalog of projects, cruises, moorings, datasets ...
Hosted at INCOIS (Hyderabad, India)

- IIOE-2 Metadata Portal enables search and discovery of metadata of completed expeditions.
A Joint OMNI-RAMA data portal (since early discussion in Jakarta 2018)

Joint OMNI-RAMA Data Portal developed by @ESSO_INCOIS, @MoesNiot and @noaapmel launched during the Signing of NOAA @moesgoi RAMA Moored Buoy Implementing Arrangement. Dr. Ashutosh Sharma, Secretary MoES launched the portal in the presence of Mr. Craig McLean, NOAA.

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