The Second International Indian Ocean Expedition (2015-2020)

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.





Why We Need an IIOE-2

- The need for an improved understanding of the oceans has never been greater.
- Surrounded by 22 countries and almost one third of the world's population, the Indian Ocean has a profound effect on the environments and economies of neighbouring countries as well as climate globally.
- It is warming faster than any other ocean and this warming has been linked to major natural phenomena such as flooding in east Africa, and droughts and wildfires in Indonesia and Australia.
- The Indian Ocean Dipole (IOD) is critical to ocean and weather processes, for the Indian Ocean and globally.
- The IOD influences the evolution of the El Niño Southern Oscillation (ENSO) in the Pacific Ocean. Similarly, the Madden-Julian Oscillation, modulates rainfall and tropical cyclone activity across the tropics.
- A better understanding of this important and under-researched ocean is critical for achieving the sustainable development and human well-being of Indian Ocean societies and beyond.
- Our capacity to gain this critically need understanding has grown exponentially since the first IIOE, across observations, data and information management, modelling and applications for societal utility and benefit.

IIOE-2's Six Science Themes

HUMAN BENEFITS & IMPACTS

BOUNDARY CURRENTS & UPWELLING

MONSOON VARIABILITY

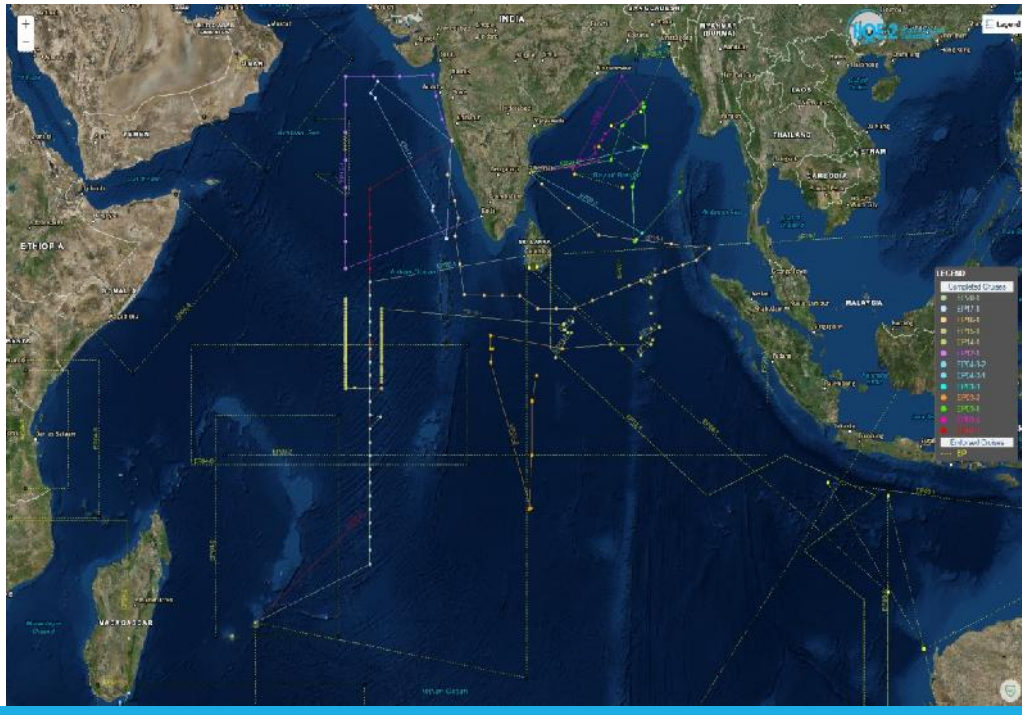
CIRCULATION & CLIMATE CHANGE

EXTREME EVENTS

DISCOVERY

IIOE-2 is a Truly Global Effort

Australia
Austria
Begium
Canada
Chile
China
Denmark
France
Germany
India
Indonesia
Iran
Israel
Japan
Kenya
Korea
Mauritius
New Zealand
Norway
Pakistan
Russia
Saudi Arabia
Singapore
South Africa
Tanzania
Thailand
UK
USA



As at March 2019

28 countries

are represented in the IIOE-2 community as highlighted in the map above.

16 research cruises

have already been completed as part of the IIOE-2 with more to come.

34 projects

have been endorsed by the IIOE-2 Steering Committee, which oversees the Expedition.

28 scientific papers

are soon to be published in two special IIOE-2 issues of Deep Sea Research II plus dozens more in other high-impact scientific journals.



IIOE-2 National Committees

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

IIOE-2 Early Career Scientists Network

Connecting emerging scientists and practitioners, across the developing and developed ocean science worlds

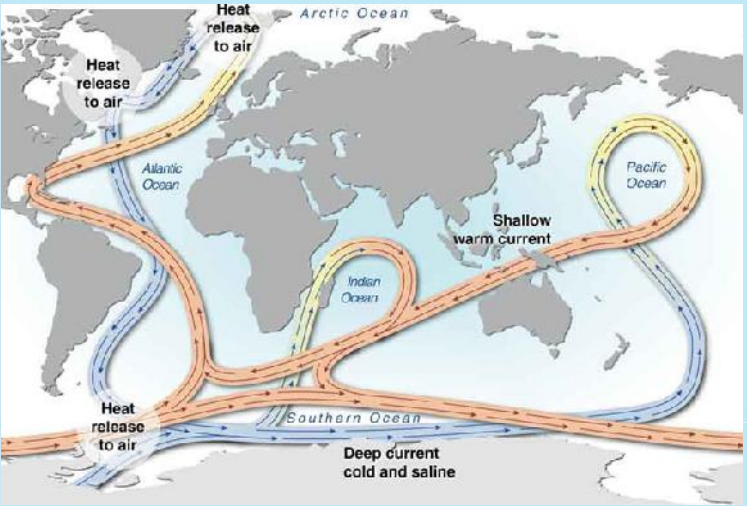
IIOE-2 projects thus far cover a broad spectrum of topics across all of the IIOE-2 six themes, such as:

- Evolution of heat uptake and its impact on the global ocean and climate.
- Physical-biological coupling and biogeochemistry in the western Equatorial Indian Ocean.
- Ecosystem impacts of meteorological and oceanographic conditions in upwellings of the East African Coastal Current system.
- Indian Ocean variability and monsoon prediction through the Indian Ocean Observing System including the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction.
- Major boundary currents around the Indian Ocean rim.
- Biogeochemistry-Atmosphere processes in the Bay of Bengal.
- Physical and biogeochemical aspects of upwelling systems in the Indian Ocean.
- Nitrogen fixation rates, primary production and oxygen minimum zones of the Arabian Sea, comparative to the Bay of Bengal.
- Mesoscale vortices, currents and dynamical features in the Northwest Indian Ocean.
- Phytoplankton blooms in the northwestern Arafura Sea during the southeast monsoon.
- Sustained ocean observations along the east coast of Africa
- Ecosystem function on seamounts and the effects of environmental stressors.

What Difference is IIOE-2 Making?

Advancing our understanding of climate change

Through the Western and Eastern Indian Ocean Upwelling Research Initiatives (WIOURI & EIOURI), IIOE-2 has enhanced our understanding of heat and mass transport in and around the Indian Ocean, which is vital for predicting climate variability and change.



Building research capacity in the Indian Ocean region

Through the IIOE-2 Early Career Scientists Network, students and early career scientists from developing and developed counties are being mentored by experts in a vast array of fields from fundamental physical oceanography to biogeochemistry.



Supporting sustainable development

IIOE-2 endorsed initiatives link science and socio-economic analysis to inform policy-making across the Indian Ocean region. The £8,000,000 collaborative project Sustainable Oceans, Livelihoods and food Security Through Increased Capacity in Ecosystem research in The Western Indian Ocean (SOLSTICE–WIO) is just one example.



Improving monsoon prediction

The IIOE-2-endorsed Bay of Bengal Boundary Layer Experiment (BoBBLE) has revealed new knowledge on factors regulating monsoonal variability and its implications for ocean ecosystems and the billions of people affected by the monsoons. This knowledge is critical for securing water sources and sustaining agricultural economies.



Join the IIOE-2 Community!









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