AGENDA

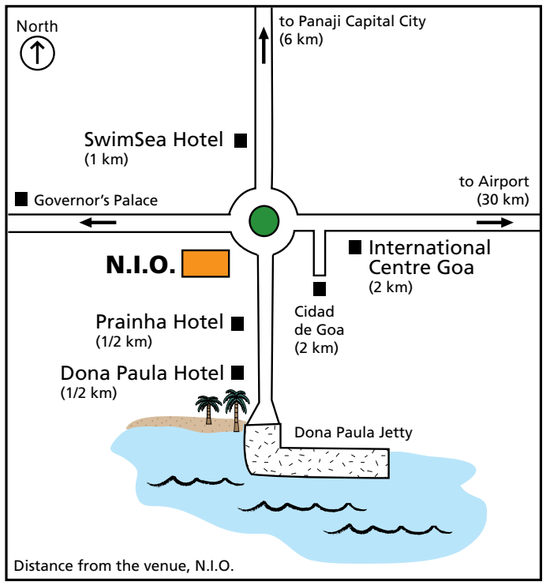
DAY 5 - SATURDAY, 7 October

08:00 - 13:00 Local field trips and group activities for workshop participants (optional)

09:00 - 12:00 **Convene Scientific Steering Committee Meeting**

The Steering Committee will be charged with generating the final products from this workshop. These products will include initiating the development of a plan for future research in the Indian Ocean and organizing a special journal issue based upon the presentations communicated at this workshop. With regard to the research plan, the SSC will recommend members for a new international steering committee that will be specifically tasked with developing a research plan. This document will consolidate all of the information, questions and recommendations that were put forward by the working groups and it will articulate a comprehensive plan for implementing an Ecological/Biogeochemical research program in the Indian Ocean that substantially leverages the planned CLIVAR/GOOS Indian Ocean observing system. A target journal will also be identified for a special issue and guest editors chosen.

Adjourn SSC Meeting



SIBER Workshop Organizing Committee

USA: Raleigh Hood, Chair (University of Maryland), Lou Codispoti (University of Maryland), Jay McCreary (University of Hawaii), Ajit Subramaniam (Lamont-Doherty Earth Observatory, Columbia University), Jerry Wiggert (Old Dominion University)
International: Wajih Naqvi, co-Chair (National Institute of Oceanography, Goa, India), Satish Shetye (Director, National Institute of Oceanography, Goa, India), Dileep Kumar (National Institute of Oceanography, Goa, India), Prasanna Kumar (National Institute of Oceanography, Goa, India), V.S.N. Murty (National Institute of Oceanography, Goa, India)

SIBER Workshop Contact Persons

USA: **Jane Hawkey**
Integration & Application Network (www.ian.umces.edu)
University of Maryland Center for Environmental Science
P. O. Box 775, Cambridge, MD 21613 USA
Email: hawkey@umces.edu

INDIA: **Rajaram Patil**
National Instituite of Oceanography (www.nio.org)
Dona Paula - 403 004, Goa, India
Email: rajaram@nio.org

SPONSORS

National Science Foundation

NDO-US Science and Technology Forum

National Institute of Oceanography, Goa, India

Scientific Committee on Oceanic Research

Intergovernmental Oceanographic Commission of UNESCO, Perth

Global Ocean Observing System for Indian Ocean

IMBER / IGBP (Integrated Marine Biogeochemistry and Ecosystem Research / International Geosphere-Biosphere Programme);
WIOMSA (Western Indian Ocean Marine Science Association);
CLIVAR / GOOS (An International Research Programme on Climate Variability and Predictability/The Global Ocean Observing System)
IOCCP (International Ocean Carbon Coordination Project)

Indian Ocean chlorophyll (boreal winter/austral summer). SeaWIFS/NASA.

SIBER: A Workshop on Sustained Indian Ocean Biogeochemical and Ecological Research

3-6 October, 2006

AGENDA

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AGENDA

DAY 0 - MONDAY, 2 October

18:00 - 20:00 **Reception (optional) and Welcome Desk (registration, agenda, and abstracts)**

DAY 1 - TUESDAY, 3 October

08:00 - 09:00 **Welcome Desk open (registration, agenda, and abstracts)**
09:00 - 09:05 Saraswati Vandana: Prayer for the Goddess of Learning
09:05 - 09:10 S.R. Shetye: Welcome to NIO
09:10 - 09:20 R. R. Hood: Introduction & Background of SIBER
09:20 - 09:25 Traditional Lighting of Lamps
09:25 - 09:40 Inaugural Address by His Excellency S.C. Jamir, the Governor of Goa
09:40 - 09:45 S.W.A. Naqvi: Vote of Thanks
09:45 - 10:10 **Tea Break**
10:10 - 10:25 Workshop Sponsors: Comments
10:25 - 10:40 Raleigh Hood & Wajih Naqvi: Overview of the agenda, goals and charge to workshop participants

Session 1: Review the state of our knowledge – Atmosphere-ocean interactions, physics and climate

Presentations focusing on recent discoveries in the Indian Ocean related to atmosphere-ocean interaction, linkages to global climate and the physical response of the IO to variability spanning seasonal to decadal and longer time-scales.

10:40 - 11:05 B.N. Goswami: Increasing trend of extreme rain events over India: Role of Indian Ocean SST
11:05 - 11:30 Jay McCreary: The monsoon circulation in the Indian Ocean, and its impact on biological activity
11:30 - 11:55 Raghu Murtugudde: Indian Ocean climate at intraseasonal to decadal time-scales
11:55 - 12:10 **Tea Break**

Session 2: Review the state of our knowledge – Nutrient cycling and limitation

Presentations that will provide a review of the state of our knowledge of the IO basin as it relates to nutrient cycling and limitation.

12:10 - 12:35 M. Dileep Kumar: Nutrients in the Indian Ocean
12:35 - 13:00 Doug Capone: Nitrogen fixation in the Indian Ocean N cycle
13:00 - 14:00 **Lunch**
14:00 - 14:25 Margie Mulholland: N_2-fixation
14:25 - 14:50 Jim Moffett: Is the Arabian Sea Fe limited?
14:50 - 15:15 Mitsuo Uematsu: Atmospheric dust and Fe transport and deposition variability
15:15 - 15:30 **Tea Break**
15:30 - 15:55 Jerry Wiggert: Modeling IO biogeochemistry: Fe limitation and IODZM impacts
15:55 - 17:00 **Convene first round of breakout sessions**

Working groups will be broken out and charged with summarizing the information that has been presented and specifically identifying prominent gaps in our understanding and making recommendations for future research and observations to fill these gaps: Potential working groups: Atmospheric processes and climate, physical variability and circulation, nutrient cycling, N2-fixation, Fe and trace metal cycling and limitation.

17:00 - 18:30 **Poster presentations and refreshments**
Dinner on your own

DAY 2 - WEDNESDAY, 4 October

08:30 - 09:20 Convener Guidance and Working Group Reports

Session 2 (continued)

09:20 - 10:45 Karl Banse: Observations in the central Arabian Sea using historic hydrographic data
09:45 - 10:10 Lou Codispoti: The NW Indian Ocean's N cycle in relation to a changing planet and changing concepts
10:10 - 10:35 Rajesh Agnihotri: Past records of denitrification in the Arabian Sea, ETNP, ETSP: Implications for atmospheric N_2O variability
10:35 - 11:00 Tom Anderson: Modeling denitrification
11:00 - 11:15 **Tea Break**

Session 3: Review of the state of our knowledge – Biological production and remineralization of organic matter

Presentations reviewing of the state of our knowledge of the IO basin as it relates to biological production, export flux variability and remineralization.

11:15 - 11:40 Jorge Sarmiento: The role of Sub-Antarctic Mode Water in global biological production
11:40 - 12:05 Helga Gomes: Algal blooms in the Arabian Sea - are they changing?
12:05 - 12:30 John Marra: The effects of vertical mixing on phytoplankton productivity in the Arabian Sea
12:30 - 12:55 Prasanna Kumar: What drives the biological productivity of the Bay of Bengal and Arabian Sea?
12:55 - 14:00 **Lunch**
14:00 - 14:25 Rengaswamy Ramesh: Nitrogen assimilation and f-ratios in the Indian Ocean
14:25 - 14:50 Mike Landry: Zooplankton grazing and secondary production in the Indian Ocean
14:50 - 15:15 Sharon Smith: Mesozooplankton dynamics and ecosystem impacts
15:15 - 15:30 **Tea Break**
15:30 - 15:55 Ramaiah Nagappa: Bacterial abundance and production in the Arabian Sea and Bay of Bengal
15:55 - 17:00 **Convene second round of breakout sessions**

Working groups will be broken out and charged with summarizing the information that has been presented and specifically identifying prominent gaps in our understanding and making recommendations for future research and observations to fill these gaps. Potential working groups: denitrification and OMZ processes, chlorophyll and primary production, zooplankton and secondary production, bacteria and microbial ecology.

17:00 - 18:30 **Poster presentations and refreshments**
Dinner on your own

DAY 3 - THURSDAY, 5 October

08:30 - 09:20 Convener Guidance and Working Group Reports

Session 3 (continued)

09:20 - 09:45 Farooq Azam: Marine microbes and global habitability
09:45 - 10:10 Bess Ward: Diversity and dynamics of denitrifying bacteria in the Arabian Sea from analysis of nitrite reductase genes
10:10 - 10:35 Joe Montoya: Nitrogen isotopes and particle dynamics in the Arabian Sea
10:35 - 11:00 Maren Voss: Isotopic studies of N and O in nitrate to understand sources and sinks of nitrogen in the Arabian Sea
11:00 - 11:15 **Tea Break**
11:15 - 11:40 Alan Devol: Excess nitrogen gas in oxygen deficient zones
11:40 - 12:05 Tim Rixen: Monsoonal and ENSO impacts on the biological pump in the Indian Ocean
12:05 - 12:30 Man Mohan Sarin: Thorium-based upper ocean particle export fluxes in the seas around India

Session 4 (Review the state of our knowledge – Pelagic carbon cycling and air-sea exchange)

Presentations that will provide a review of the state of our knowledge of the IO basin as it relates to carbon cycling and CO2 exchange.

12:30 - 12:55 Dennis Hansell: DOM in the Indian Ocean: review and assessment of our knowledge and needs
12:55 - 14:00 **Lunch**
14:00 - 14:25 Daniela Unger: Biogeochemistry of particulate organic matter from the Northern Indian Ocean
14:25 - 14:50 Chris Sabine: Inorganic carbon distributions and air-sea CO_2 exchange in the Indian Ocean
14:50 - 15:15 Catherine Goyet: Anthropogenic CO_2 in the Indian Ocean
15:15 - 15:30 **Tea Break**
15:30 - 15:55 V.S.S. Sarma Vedula: Net community production in northern Indian Ocean
15:55 - 17:00 **Convene third round of breakout sessions**

Working groups will be broken out and charged with summarizing the information that has been presented and specifically identifying prominent gaps in our understanding and making recommendations for future research and observations to fill these gaps. Potential working groups: export and remineralization variability and controlling processes, carbon cycling and air-sea exchange, and impact of climate and human activities on the IO.

17:00 - 18:30 **Poster presentations and refreshments**
19:00 - 20:00 **Cultural Programme (NIO Auditorium)**
20:00 - 22:00 **Dinner to be hosted by Director NIO**

DAY 4 - FRIDAY, 6 October

08:30 - 09:20 Convener Guidance and Working Group Reports

Session 5: Review the state of our knowledge – Impact of climate and human activities on biogeochemistry and ecosystems

Presentations reviewing some recent findings related to anthropogenic impacts in coastal and open ocean regions of the Indian Ocean.

09:20 - 09:45 Joaquim Goes: Climate change and its impact on biological production in the Arabian Sea
09:45 - 10:10 Wajih Naqvi: Seasonal anoxia over the western Indian continental shelf
10:10 - 10:35 Sybil Seitzinger: Nutrient transport from watersheds to Indian Ocean coastal systems: Amount, forms and sources

Session 6: Review the state of our knowledge – Benthic biogeochemistry and ecology

10:35 - 11:00 Greg Cowie: In situ and shipboard studies of benthic biogeochemical processes across the Arabian Sea oxygen minimum zone
11:00 - 11:15 **Tea Break**
11:15 - 11:40 Baban Ingole: Pattern of macrobenthic diversity along the eastern margin of the Arabian Sea

Session 7: Future plans and technologies

Presentations reviewing the current status of the CLIVAR/GOOS IO observing system and plans for making use of several different types of observational platforms, including satellite remote sensing, moored sensors, survey cruises and ship-of-opportunity measurements.

11:40 - 12:05 Gary Meyers: The role of the Indian Ocean in the climate system-implementation plan for sustained observations
12:05 - 12:30 Mike McPhaden: Development of an Indian Ocean moored buoy array for climate studies
12:30 - 12:55 Horoshi Kitazato: Investigation on biogeochemical cycles and sedimentary processes at sediment-water interface under oxygen depleted environments: Dive cruise at Indian Margin of the Arabian Sea
12:55 - 14:00 **Lunch**
14:00 - 14:25 Marina Levy: Linking seacolor to near-surface ocean dynamics in the Indian Ocean.
14:25 - 14:50 P.V. Sundareshwar: Establishing IndoFlux: A long-term biogeochemical monitoring network in India
14:50 - 15:15 Wade McGillis: Ocean atmospheric carbon dioxide fluxes, the Indian Ocean, and SOLAS
15:15 - 16:15 **Convene fourth round of breakout sessions**

Working groups will be broken out and charged with summarizing the information that has been presented and specifically identifying prominent gaps in our understanding and making recommendations for future research and observations to fill these gaps. Potential working groups: anthropogenic impacts, benthic biogeochemistry and ecology, leveraging the CLIVAR/GOOS IO observing system for biogeochemical and ecological studies, moored sensor technologies and possibilities.

16:15 - 17:00 **Convene final group discussion**

A general discussion will be convened where the participants will be asked to provide recommendations on how to formulate a plan to address the outstanding research questions that they have identified in the preceding days that substantially leverages the planned CLIVAR/GOOS Indian Ocean observing system.

Adjourn Workshop
20:00 - 22:00 **Complimentary Dinner on board "Santa Monica" off Panjim (Mandovi Estuary)**

(Note: All speakers will be allocated a 25 minute time slot and will be asked to leave 5 min. of questions)

AGENDA