

Joint WMO-IOC Technical Commission for  
Oceanography and Marine Meteorology (JCOMM)

Fourth In-Region Western Indian Ocean (WIO-4)  
Capacity Building Workshop  
Of the WMO/IOC Data Buoy Cooperation Panel (DBCP) and Partners

“Implementation and Operation of Indian Ocean Data Buoy Networks and their Socio-  
Economic Applications for Enhancing Regional Predictive Capability”

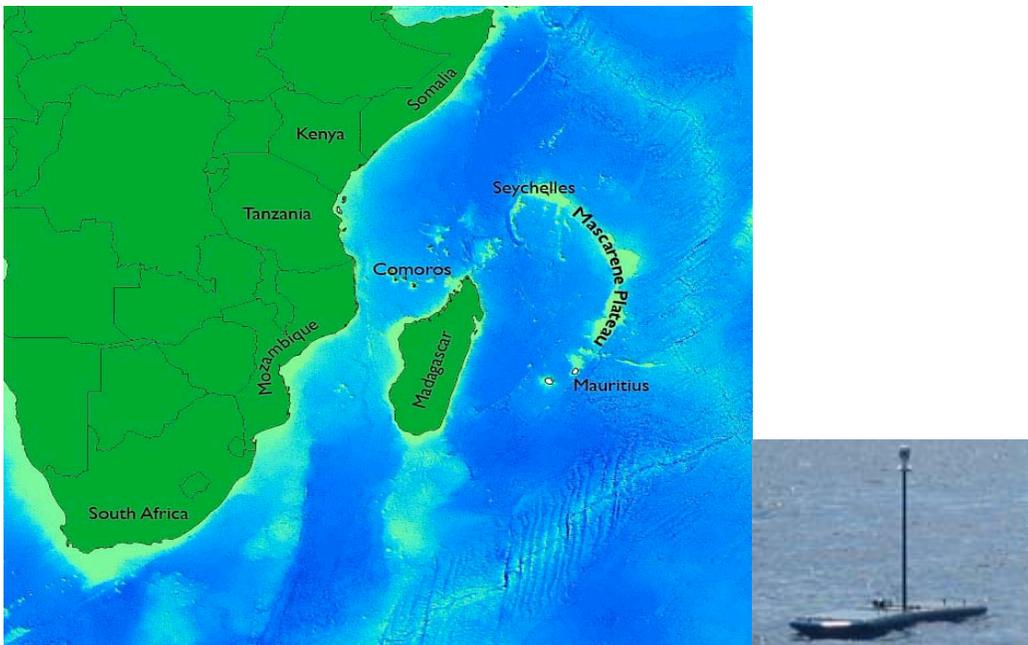
29 April – 3 May 2013

Venue: Zanzibar Ocean View Hotel

<http://ocean.co.tz/ogh/zov/zov-about/>

Zanzibar, Tanzania

Remote participation available via GoToWebinar



Hosted By the Tanzania Meteorological Agency (TMA)  
Dr. Agnes Kijazi, WMO Permanent Representative

Tanzania Institute for Marine Sciences (IMS)  
Prof Desiderius CP Masalu, Director

A JCOMM PANGAEA Workshop  
[www.jcomm.info/pangea-concept](http://www.jcomm.info/pangea-concept)  
[www.jcomm.info/wio-dbc1](http://www.jcomm.info/wio-dbc1)  
[www.jcomm.info/wio-dbc2](http://www.jcomm.info/wio-dbc2)  
[www.jcomm.info/wio-dbc3](http://www.jcomm.info/wio-dbc3)  
[www.jcomm.info/dbcp-cb-asia1](http://www.jcomm.info/dbcp-cb-asia1)  
[www.jcomm.info/wio-dbc4](http://www.jcomm.info/wio-dbc4)  
[www.jcomm.info/NPOMS-2](http://www.jcomm.info/NPOMS-2)

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Goals of the Fourth DBCP Western Indian Ocean (WIO-4)  
Capacity Building Workshop

The Following Goals and associated Actions reflect the needs of this 4th Workshop and of the long-term Ocean Monitoring Capacity in the region:

1. Review and Advance Resolutions and Recommendations from the 3<sup>rd</sup> DBCP Workshop in Mombasa, Including National and Project Updates, and any relevant African Ministerial Conference on Meteorology (AMCOMET-2) Action Items,
2. Demonstrate the Crucial Role of Indian Ocean Observations, such as IndOOS and RAMA ([www.pmel.noaa.gov/tao/rama/](http://www.pmel.noaa.gov/tao/rama/)), for Understanding and Predicting Regional Weather, Ocean and Climate using CFS, SINTEX and other Models,
3. Build Regional and National Human (Mentoring Network), Institutional and Infrastructure Capacity Needed to Acquire, Process and Deliver Socio-Economic Benefits From Ocean Observations,
4. Continue to Learn Practical Implementation Skills for the Deployment of Operational Data Buoys at Sea, the Collection of Buoy Data, and Related Data Management,
5. Coordinate Regional Institutes for Increasing in-situ Western Indian Ocean Observations to Include Closer Coordination with DBCP International Buoy Program for the Indian Ocean (IBPIO),
6. Explore Ways to Mitigate Deployment Constraints Due to Piracy to Include Potential Recommendations from AMCOMET-2, and by Using Gliders,
7. Continue to Align with Objectives of the Global Framework for Climate Services (GFCS) to Deliver Ocean Data to the End-User,
8. Provide an Update on Regional New Research Vessels Entering into Service,
9. Utilize advances in Information and Communication Technology (ICT) such as Webinar to Facilitate More Effective Outreach and Capacity Building Activities on a Larger Scale,
10. Continue to Find Synergy between DBCP and Agulhas-Somali Current Large Marine Ecosystem (ASCLME) in-situ Ocean Observations and Satellite Observations of the Regional Africa Monitoring of the Environment for Sustainable Development (AMESD),
11. Enhance Coordination and Cooperation between the DBCP Task Team for Capacity Building (TT-CB), WMO Regional Associations (RA-I/II) and the IOC Sub Commission for Africa.

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**AGENDA**

Day 1: Monday 29 April 2013

TIME	SUBJECT	LEAD
Opening Day Remarks, Updates and Workshop Objectives		
8:30-9:00	Workshop Registration	TMA/IMS
9:00-9:30	<p>Welcome, Greetings and Opening Remarks Hon. Minister of Infrastructure and Communication in Zanzibar, Mr. Rashid Seif Suleiman.</p> <p>Workshop Perspective: Agnes Kijazi, Director-General TMA Al Wallace, Chair DBCP Mika Odido, IOC Africa Sub-Commission Johan Stander, JCOMM Co-President David Meldrum, WMO Representative</p>	Sidney Thurston (DBCP) and TMA
9:30-9:45	<p>Workshop Facilitation:</p> <ol style="list-style-type: none"> <li>1. Resolution Development</li> <li>2. Workshop Agenda</li> <li>3. Webinar Broadcasts (W)</li> </ol>	James Shambaugh (NOAA) and TMA
9:45-10:00	Update on Piracy and Resolutions Since WIO-3	Sidney Thurston (DBCP)
10:00-10:30	Keynote Address: TBD	Ministerial Level, Tanzania/TMA
10:30-11:00	Morning Tea Break and Group Photograph	All Participants
11:00-11:30	Host Institute Address: TMA's Operational Services Using Ocean Observation	Dr. Kijazi (TMA)
<p>Session 1: Regional Developments Since the 3rd DBCP Workshop in Mombasa Chair: Johan Stander, Rapporteur: James Shambaugh</p>		
11:30-12:00	IOC and the Development of Oceanography in the Western Indian Ocean Region	Mika Odido (IOC Sub-Commission, Nairobi)

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12:00-12:20	Marine Climate Data System: WMO/IOC/JCOMM Response for Global Framework for Climate Services (GFCS)	Johan Stander (JCOMM)
12:20-12:40	Predictions and Monitoring for the Indian Ocean Basin using the NOAA NCEP Climate Forecast System (CFS Overview)	Wassila Thiaw (NOAA/NCEP)
12:40-1:00	Update on Glider Operations in the Western Indian Ocean: Scientific Goals and Objectives	Walt McCall (NOAA/NDBC)
1:00-2:00	Buffet Lunch Provided	All Participants
<p>Session 2: Lead Presentations by Tanzanian Institutions on the Use of Climate, Weather and Oceanographic Data and Knowledge In-Country Chair: Al Wallace, Rapporteur: James Shambaugh</p>		
2:00-2:20	Status of Western Indian Ocean Observing System (IndOOS), RAMA, XBT, Argo, Gliders, Drifters - Discussion	M. Ravichandran (Co-Chair CLIVAR Indian Ocean Panel)
2:20-2:40	Impacts of Weather and Oceanographic conditions on Port Operations	Tanzania Ports Authority (TMA)
2:40-3:00	Requirements for Data and Information on Weather and Ocean Conditions for Marine Safety	Tanzania Navy (TMA)
3:00-3:20	Observational Requirements for Maintaining a Healthy Marine Ecosystem	National Environmental Management Authority (TMA)
3:20-4:00	Afternoon Tea Break	All Participants
4:00-4:20	Enhancing Collaboration between Oceanographers and Climate Experts in the Greater Horn of Africa Region in Order to Improve Forecasts of Regional Climate and its Impact on Coastal Zones	Mika Odido (IOC), Julius Francis (WIOMSA)
4:20-4:30	Country Questionnaire feedback on oceanographic and meteorological capabilities within countries"	Tammy Morris (BCRE)
4:30-5:00	Part I - Country Updates (Conveyed to Organizers in Advance With Emphasis on Current/Future Observations Capacity and Future Requirements)	Five Minutes Each Country
5:00-5:20	Questions and Discussion on Use of Climate, Weather and Oceanographic Data and Knowledge In-Country	All Participants. Facilitator – Dr. Kijazi

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5.20 – 5:30	Daily Wrap-up & Tomorrow's Plans	Yohanna Shaghude (IMS) James Shambaugh
6.30-8:00	Social Evening	Host: IMS

Day 2: Tuesday 30 April 2013

TIME	SUBJECT	LEAD
<b>Session 3: Delivering the Data to the End-User and Enhancing Regional and National Capacity to Deliver Results from Ocean Observations</b> Chair: Mike Roberts, Rapporteur: James Shambaugh		
8.45-9:00	Daily Planning Objectives: Review from Yesterday, Classroom Setup for Demonstrations and Training, Wi-Fi, Webinar Broadcasts	Sidney Thurston (DBCP)
9:00-9:20	JCOMM in-situ Observing Platform Support Centre (JCOMMOPS)	Kelly Stroker (JCOMMOPS)
9:20-10:00	A Strategic Action Programme for the Western Indian Ocean Region	Lucy Scott (ASCLME)
10:00-10:30	Introduction to Descriptive Physical Oceanography – An Introductory Level Course Teaching the Basics Needed	Tammy Morris (BCRE)
10.30-10.45	Science-to-Governance and the ‘Weight-of-Evidence’ Approach - What the Managers and the Decision-Makers Need	Magnus Ngoile (ASCLME)
10.45-11:00	Morning Tea Break	All Participants
11:00-11:30	Update on the latest ASCLME Alliance Research Cruise in the Western Indian Ocean	Tommy Bornman (ASCLME)
11:30-12:30	Operational Ocean Forecasting: BLUELink Advancements and Coordination with Regional Needs – Model Demonstration/Training	Gary Brassington (BoM)
12:30-1:30	Buffet Lunch Provided	All Participants
1:30-2:00	Monsoonal Near-Surface Circulation of the Arabian Sea: Benefits and Challenges of Maintaining a Drifting Buoys Array in the Northwestern Indian Ocean	Luca Centurioni (Scripps)
2:00-2:30	Update on Regional New Research Vessels Entering into Service	Mike Roberts (Ocean Africa)
2:30-3:00	Training Opportunity: NOAA/NCEP “Africa Desk”	Wassila Thiaw (NOAA/NCEP)

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3:00-3:30	Afternoon Tea Break	All Participants
3:30-4:00	Operations of Gliders in Western Indian Ocean Region - Mission Objectives, Intended Duration, Data Quality	Walt McCall (NOAA/NDBC)
4:00-4:30	Applied Physical Oceanography Instrumentation for Oceanographers and Technicians	Tammy Morris (BCRE)
4:30-5:00	Part II - Country Updates (Conveyed to Organizers in Advance With Emphasis on Current/Future Observations Capacity and Future Requirements)	Five Minutes Each Country
5.00 – 5:15	Daily Wrap-up & Tomorrow's Plans	Augustine Kanemba & Hazla Masoud (TMA) James Shambaugh

Day 3: Wednesday 1 May 2013

<p>Session 4: Improving and Sustaining Coordination and Cooperation for Regional Ocean Observations, Forecasting and Associated Governance Decision-making Chair: Johan Stander, Rapporteur: James Shambaugh</p>		
8:45-9:00	Daily Planning Objectives: Review from Yesterday, Classroom Setup for Demonstrations and Training, Wi-Fi, Webinar Broadcasts	Sidney Thurston (DBCP)
10:00-11:00	Predictions and Monitoring for the Indian Ocean Basin using the NOAA NCEP Climate Forecast System (CFS Continued)	Wassila Thiaw (NOAA/NCEP)
11:00-11:30	Morning Tea Break	All participants
11:30-12:00	Observing Parameters, Data Accessibility, Status of WIO Surface Drifting Buoys	Santjie du Toit (for IBPIO)
12:00-1:00	Automated Quality Control Development Part 1: <input type="checkbox"/> Determining Quality Control Method	Walt McCall (NOAA/NDBC)
1:00-2:00	Buffet Lunch Provided	All Participants
Afternoon	Workshop Side Meetings	

Day 4: Thursday 2 May 2013

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TIME	SUBJECT	LEAD
8:45-9:00	Daily Planning Objectives: Review from Yesterday, Classroom Setup for Demonstrations and Training, Wi-Fi, Webinar Broadcasts	Sidney Thurston (DBCP)
9:00-9:30	Automated Quality Control Development Part 2: □ Coding, Modification, Hazards	Walt McCall (NOAA/NDBC)
9:30-10:00	BaiLong Buoy Technology and Atmospheric Weather Stations, FIO Training Opportunities	Sidney Thurston for Weidong Yu (FIO)
10:00-10:30	ONR Investments in Africa	Augustus Vogel (ONR)
10:30-11:00	Morning Tea Break	All Participants
<b>Session 5: Formulation and Promotion of a Long-term Scientific Work Programme and Associated Capacity-building and Training (CB&amp;T) Road-map</b> Chair: Lucy Scott, Rapporteur: James Shambaugh		
11:00-11:30	Progress on Resolution 1 from DBCP WIO-3 (Development of the WIO Alliance)	Lucy Scott (ASCLME)
11:30-12:00	Synergies and Long-Term Needs Resulting From the ASCLME-SWIOFP	Rondolph Payet (SWIOFP)
12:00-1:00	An Integrated Long-term Monitoring Programme for the WIO Region	Lucy Scott (ASCLME)
1:00-2:00	Buffet Lunch Provided	All Participants
1:00-1:30	Discussion: Priorities for Long-Term Monitoring at the National & Regional Levels	Tommy Bornman to Facilitate
1:30-2:00	CB&T requirements by countries in their MEDAs and summary of priorities for regional CB&T Programme under the WIO Alliance	Warwick Sauer and Lucy Scott (ASCLME)
2:00-3:30	Road-Map to Develop 1. Long-Term Ocean-Climate and Ecosystem Monitoring Programme and 2. Associated Long-term CB&T Programmes for Adoption by the WIO Alliance Partners	All Participants, Facilitated by Lucy Scott
3:30-4:00	Afternoon Tea Break	All Participants
4:00-5:00	Demonstration: Wave Glider Deployment and Operations	Walt McCall (NOAA/NDBC)
5.00 – 5:15	Daily Wrap-up & Tomorrow's Plans	Augustine Kanemba & Hazla Masoud (TMA) James Shambaugh

Day 5: Friday 3 May 2013

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TIME	SUBJECT	LEAD
9:00-9:15	Daily Planning Objectives: Review from Yesterday, Classroom Setup for Demonstrations and Training, Wi-Fi, Webinar Broadcasts	Sidney Thurston (DBCP)
9:15-10:00	JCOMM Capacity Development Initiatives, Invite Participants to Identify Viable Activities that can be Undertaken Within the Developing Countries	Johan Stander (JCOMM)
10:00-10:30	Road-Map to Develop 1. Long-Term Ocean-Climate and Ecosystem Monitoring Programme and 2. Associated Long-term CB&T Programmes for Adoption by the WIO Alliance Partners (continued)	All Participants, Facilitated by Lucy Scott
10:30-11:00	Morning Tea Break	All Participants
11:00-11:30	Workshop Assessment and General Discussions	All Participants, Facilitated by James Shambaugh
11:30-12:00	Workshop Wrap-Up: Workshop Report and Resolutions for DBCP-29	Sidney Thurston (DBCP)
12:00-	Workshop Concluding Remarks	Al Wallace, (Chair, DBCP)
12:00-	Workshop Conclusion	All Participants

Note: Each Presentation Will Be Allocated Five Minutes to Facilitate Conversation with Participants for Key Areas of Interest and Follow-up.

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Participating Organizations (alphabetical order)

- Agulhas-Somali Current Large Marine Ecosystem (ASCLME)
- African Monitoring of the Environment for Sustainable Environment (AMESD)
- CLIVAR - The Variability of the African Climate System (VACS) Panel
- China - First Institute of Oceanography (FIO)
- France - Institute of Research & Development (IRD)
- Germany - Leibniz Institute of Marine Sciences at a (IFM-GEOMAR)
- Global Learning and Observations to Benefit the Environment (GLOBE-Africa)
- Intergovernmental Oceanographic Commission (IOC)
- India - Ministry of Earth Sciences (MoES)
- Japan - Agency for Marine-Earth Science and Technology (JAMSTEC, TBC)
- Kenya - Kenya Meteorological Department (KMD)
- Mozambique National Institute for Fish Inspection (INIP-TBC)
- South Africa
  - South Africa Weather Service (SAWS)
  - Department of Environmental Affairs-Ocean Africa
  - Bayworld Centre for Research and Education (BCRE)
  - South African Environmental Observation Network (SAEON)
- South West Indian Ocean Fisheries Project (SWIOFP-TBC)
- Tanzania Meteorological Agency (TMA), Institute for Marine Sciences (IMS)
- United Kingdom - Scottish Association of Marine Sciences (SAMS)
- USA
  - Office of Naval Research (ONR)
  - National Oceanic and Atmospheric Administration (NOAA):
    - Climate Program Office - Office of Climate Observation (OCO)
    - National Weather Service (NWS)
      - National Center for Environmental Prediction/Climate Prediction Center (NCEP/CPC)
      - National Data Buoy Center (NDBC)

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- WMO/IOC Data Buoy Cooperation Panel (DBCP)

Participating World Meteorological Organization (WMO)  
Regional Association I, II NMHS and Intergovernmental Oceanographic Commission  
(IOC) Institutes  
(Alphabetical Order, TBC)

- |                                     |                                 |
|-------------------------------------|---------------------------------|
| 1. Angola                           | 7. Mozambique                   |
| 2. Democratic Republic of the Congo | 8. South Africa                 |
| 3. Egypt                            | 9. Sri Lanka                    |
| 4. Ethiopia                         | 10. Sudan                       |
| 5. Kenya                            | 11. United Republic of Tanzania |
| 6. Morocco                          | 12. Togo                        |

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Resolutions from the Third DBCP Western Indian Ocean  
Capacity Building Workshop, Mombasa 16-20 April 2012

Workshop Resolutions

Resolution 1

The DBCP workshop participants recognise the growing partnerships within the WIO region in terms of Ocean-Atmosphere observations and the importance of effective coordination and sharing of resources to achieve the mutual aims and objectives in terms of data collection, analysis and its application for management and governance. The participants also recognise the role of the ASCLME Project in facilitating the development of a WIOSEA at both the scientific/technical level as well as the management and policy level. The participants therefore encourage ASCLME to further the development of such an Alliance in the WIO which will help to coordinate and integrate scientific effort and activities in the region with the ultimate aim of delivering end-products for management and governance in support of the social and economic needs of the countries.

Primary: ASCLME

Secondary: UNDP

Resolution 2

Recognizing the importance of collecting ocean and weather observations in data sparse areas such as the coast of Somalia where piracy precludes the security of research cruises and the placement of moorings, and currents and onshore winds prohibit drifter placement during some seasons, the Observation Development Team (ODT) recommends that appropriate glider technology be used in a pilot project to see if real-time weather observations can be collected within this data sparse area.

Primary: Ali Mafimbo (KMD)

Secondary: Walt McCall (NOAA/NDBC)

### Resolution 3

Recognizing the importance of links between remote sensing and in-situ observations, for long term monitoring, and modelling purposes, the UNDP/GEF ASCLME Project and the Mauritius Oceanography Institute (MOI) will pursue a collaborative agreement building on ASCLME activities in the WIO, AMESD and the proposed AMESD follow-on projects.

Primary: ASCLME

Secondary: Mauritius Oceanography Institute (MOI)

### Resolution 4

Recognizing the importance of collecting ocean and weather observations in data sparse areas such as the Indian Ocean as well as the fact that members indicating willingness to become part of the International Buoys Deployment community, the ODT recommends that drifting weather buoys be supplied to African countries as a pilot project and results be provided during the next Capacity Building Workshop. Interested participating African Met/Ocean Institutes will please provide a brief deployment plan to Primary and Secondary to include with their delivery address for the drifters shipment of when and how these drifters will be deployed.

Primary: Johan Stander (JCOMM)

Secondary: Shaun Dolk (NOAA AOML)

### Resolution 5

During the first DBCP In-Region Western Indian Ocean Capacity Building Workshop in Capetown South Africa April 2010, representatives of Regional Met/Ocean Institutes put forward a Resolution to enhance ocean observations off the East coast of Africa to include five (5) Ocean Moored Buoys (Please see Figure 1). This resolution carried forward in Mauritius so is being included in this Second Workshop summary. Scientific justification for these additional in-situ observations off the East coast of Africa will help to better understand the following:

1. Intra-seasonal variability of the Somali jet over the East African coast and the Mascarene pressures,
2. The response of the Somali current to the intraseasonal variability of the Somali Jet,
3. The dynamical and thermal feedback mechanisms between the cool temperatures in the filament and the modified wind stress,
4. The characteristics of the atmospheric convergence and divergence over the upwelling region and their influence on the climate of the East African coast,
5. Specifically investigate how the SST and surface wind coupling affect vertical profile of the atmospheric boundary layer.

Primary: Kenya Meteorological Agency

Secondary: Tanzania Meteorological Agency (DFS, MIA, DZMZ)

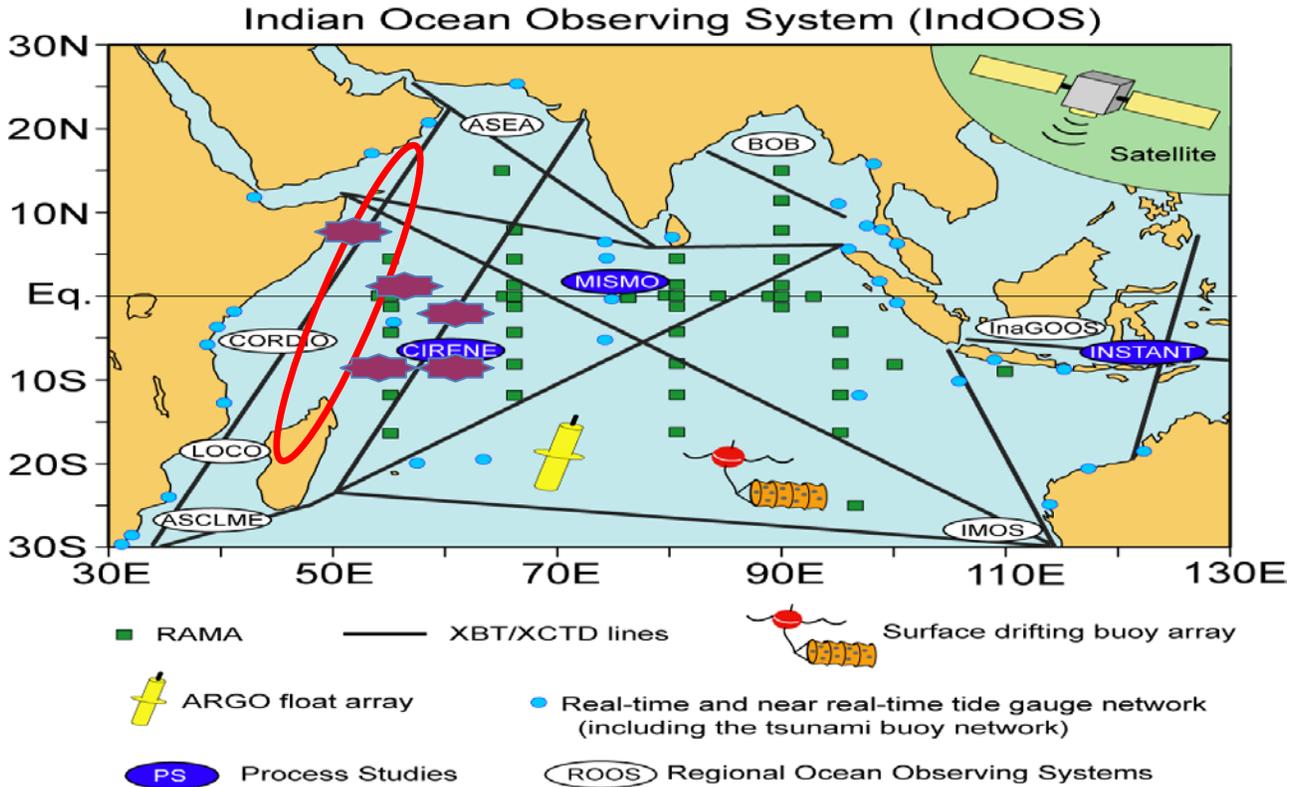


Figure 1 Proposed Western Indian Ocean Moored Buoys  
To Augment the Indian Ocean Observing System IndOOS &  
Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA) Moored Array

## Resolution 6

### WIO JCOMM Ship Observation Team (SOT) Pilot Project

Noting the marginal or worse coverage of the data streams required for met/ocean applications and the limited deployment opportunities of observing equipment in the Western Indian Ocean (WIO) region. Noting also that Voluntary Observing Ships (VOS) and Ships of Opportunity (SOOP) Programmes and meteorological and oceanographic moored buoys provide observations of acceptable frequency globally, the third DBCP Western Indian Ocean Capacity Building Workshop recommends the development of a JCOMM Ship Observations Team (SOT) Pilot Project to act as co-operative venture among countries within the Indian Ocean to enhance the provision of marine meteorological and oceanographic data in support of a diversity of national, regional and global programmes. This Pilot Project will establish a pool of ships to provide the opportunity for deployment of drifters (DBCP) and Argo floats in the WIO Region. VOS-DBCP Donation Program could provide hardware in support of the Pilot Project.

Lead KMD & TMA