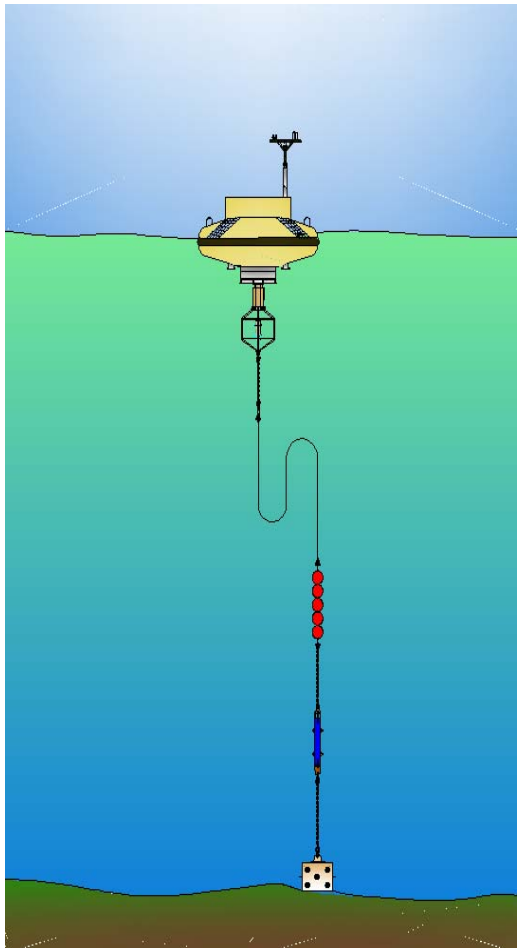
# Country report - India
# NATIONAL INSTITUTE OF OCEAN TECHNOLOGY



XXVI DBCP meeting
28 September 2010

# Acknowledgement

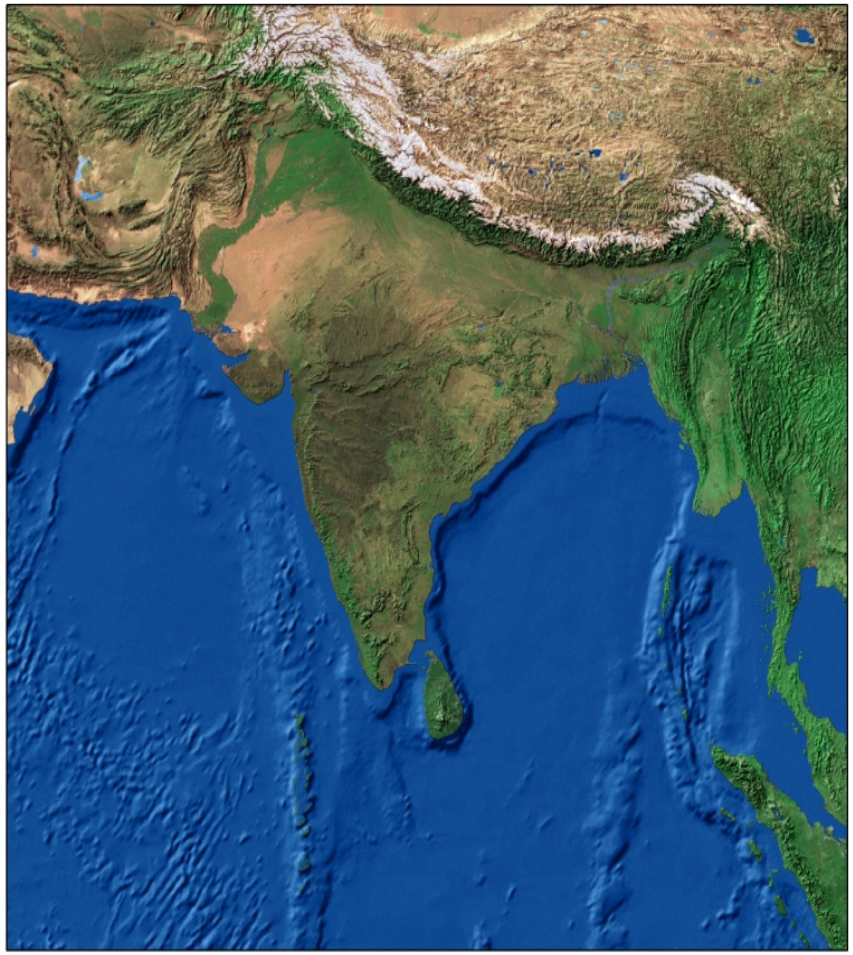
Mr Premkumar

Former Vice Chair Asia



Trichy

# FOCUS



**1/5 of world population**

**50 % living along the coast** *UN HABITAT 2008*

**6 Mega Coastal cities**

**Unique Coral reef, mangroves, Sea Gras ecosystem**

***Climate Change Bangladesh, Maldives***
***Himalayan Glaciers***
***Tsunami, Cyclones, Delayed Monsoons, Unprecedented Rain***
***Flash Floods, Sea Level Rise***

**60 % Oil Tanker Traffic**

**Fishing: Artesian, Mechanized**

# Coastal Population and ocean observations




Region is characterized by very low per capita income

1.3 billion people approx which is 22 per cent (more than one-fifth) of the world's total population.

Nearly half of the world's **poorest** people live in this region.

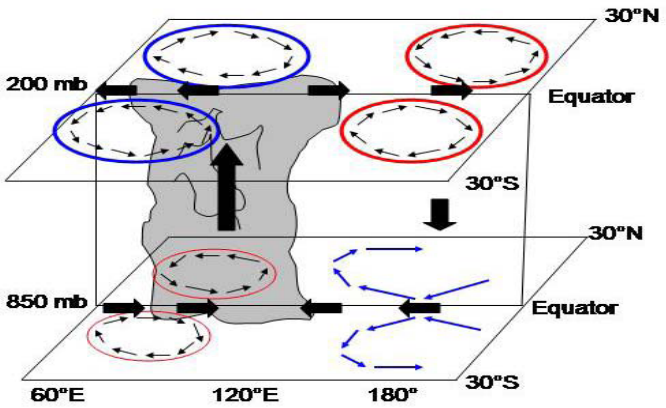
The excessive population burden puts serious pressures on the limited natural resources causing adverse impacts on the environment

GDP -Agriculture Monsoon

# Scientific interest

- Climate change
- Monsoon
- MJO
- CTCZ
- Equatorial current

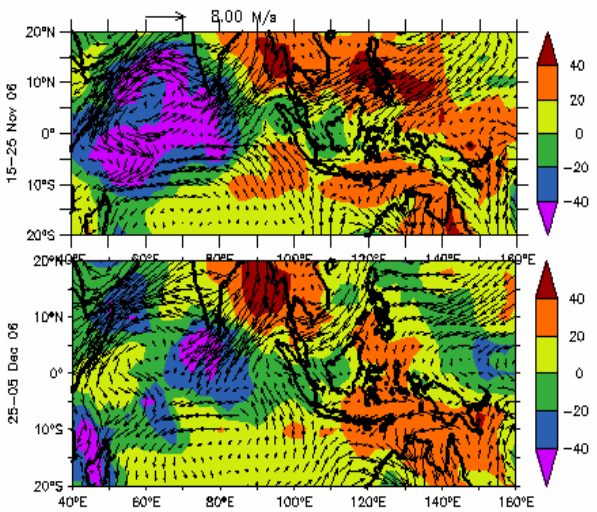
Tsunami has brought more focus




3-D structure of MJO (Rui and Wang (1990)

# Indian Ocean Observation Programme

**Moored buoys**




**INCOIS**

**Argo profiling floats**

- 16 India and 14 more others proposed  51 in one year
- 69 floats are active out of 184 floats deployed

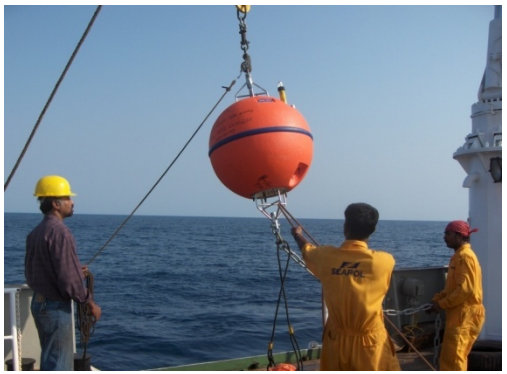
**NIO**

**Drifting Buoys**

- 23 deployed  25 SVP B drifters to be deployed
- to study monthly climatology of surface currents on 2 x 2 grid

**Expendable Bathythermographs (XBTs)**

- 567 XBT and 141 XCTD profiles



**Current meter arrays**

- 7  equatorial  are operational Proposed to enhance to 9

**ADCP moorings**

- Deployed in 6 locations in eastern Indian coast

# Indian Nation Centre for Ocean Information Centre

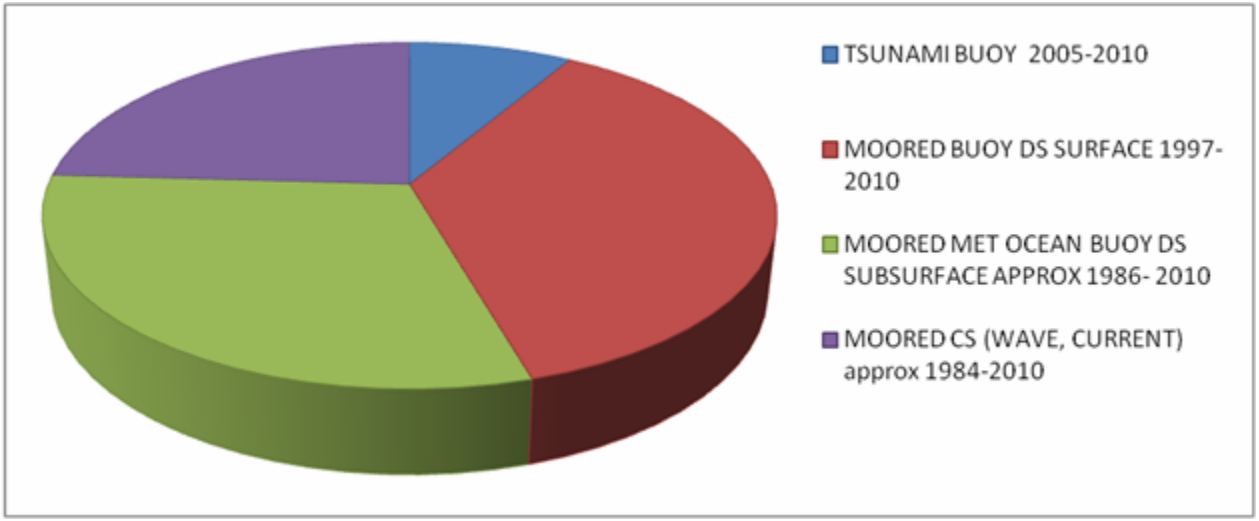
Tsunami warning system
Tide gauge network
Seismic stations
Ocean State Forecast
Wave data
HF radar
GIS maps
Satellite data
Weather forecast
Capacity building

OOS Indian Government yearly budget 60 million USD
Ship time 5 million USD

IOGOOS
Collaboration MoES & NOAA - RAMA
India – Indonesia
South Asian Seas Programme UNEP – India, Bangladesh, Pakistan Maldives Sri Lanka

# India - Moored buoy Programme

| BUOY TYPE | DURATION | DEPLOYMENT | RETRIEVAL | TOTAL OPERATIONS |
|---|---|---|---|---|
| TSUNAMI BUOY | 2005-2010 | 71 | 35 | 106 |
| MOORED BUOY DEEP SEA SURFACE | 1997-2010 | 306 | 177 | 483 |
| MOORED BUOY DEEP SEA SUBSURFACE approx | 1986- 2010 | 252 | 230 | 482 |
| MOORED COASTAL (WAVE, CURRENT) approx | 1984-2010 | 200 | 180 | 380 |
| GRAND TOTAL | | | | 1451 |

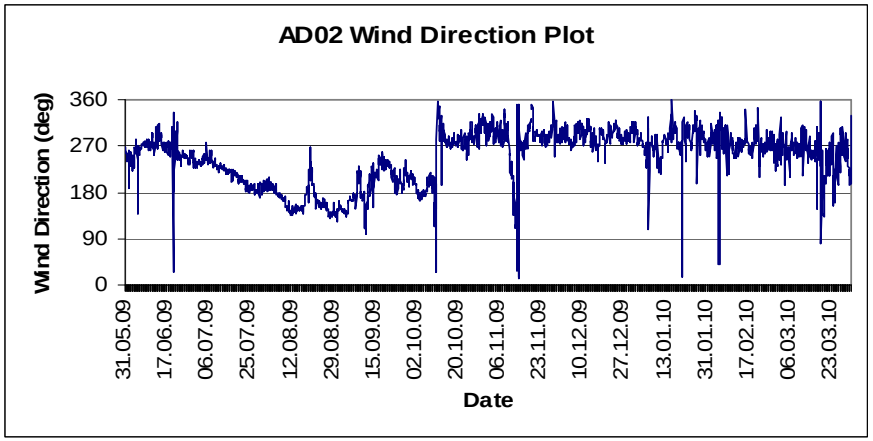



*COLLOBORATION WITH NOAA, WHOI usa & GERMANY*

# Significant finding Stored data

AD 2 $15^0$N $69^0$E

- Surface sensors recorded continuous measurements.
- Though the buoy stopped transmission in November 2009, measurements were recorded in the DAS.
- Wind direction plot clearly shows the reversal of winds from south west monsoon to north east monsoon



## ROAD MAP

- 12 buoy net work activity

**Proposed to establish by March 2011**

- 2 OMNI buoy (Ocean Moored buoy Network in Indian ocean)

- 10 Met Ocean Buoy

**OMNI**

Fugrooceanor 14 million NOK

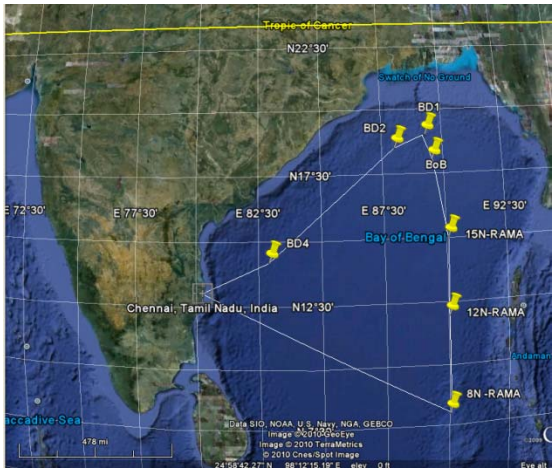
Additional 25 million NOK  by 2011

Excluding ship time

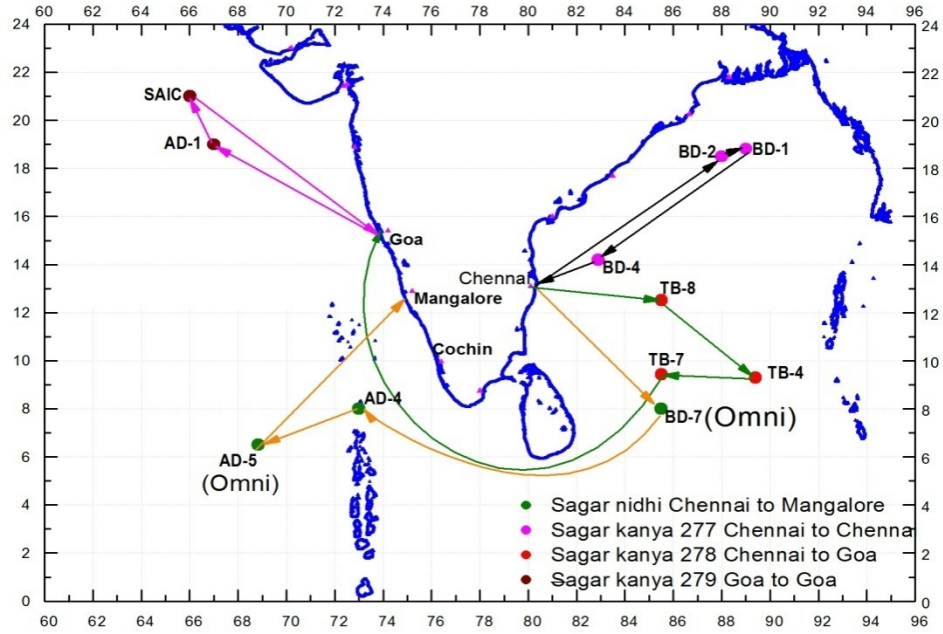
**NIOT MET OCEAN BUOYS**

Budget 2010-2011

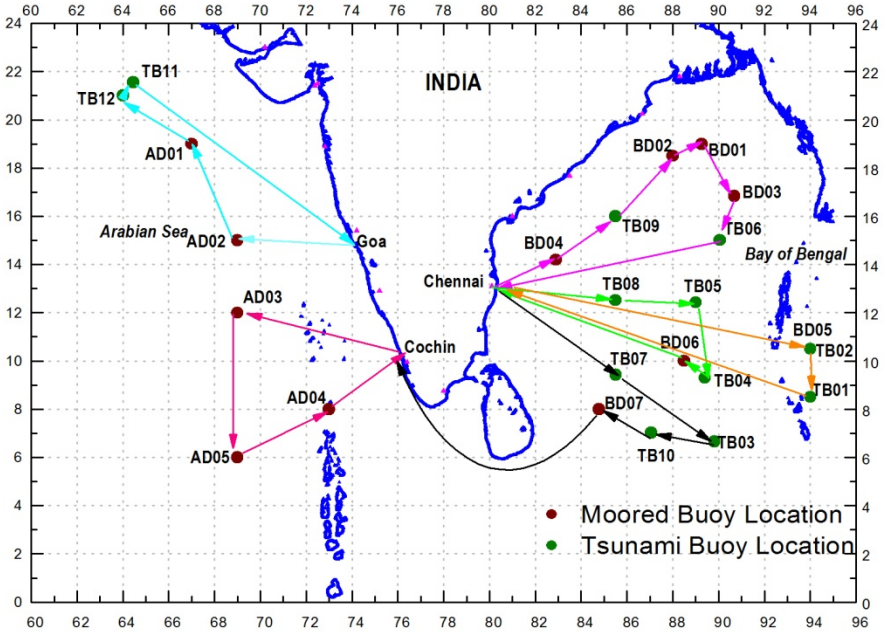
**RAMA BUOY NETWRK**



Cruise Plan from October 2010 to November 2010

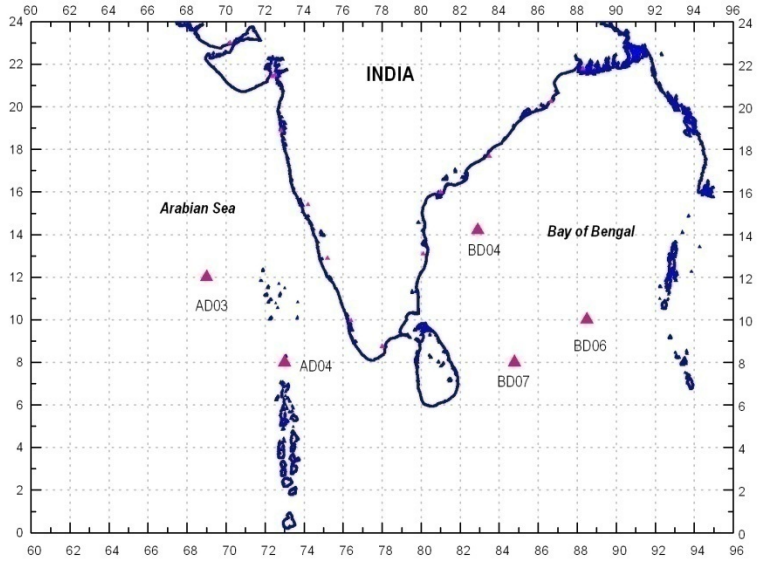



Cruise Plan from April 2011 to March 2012

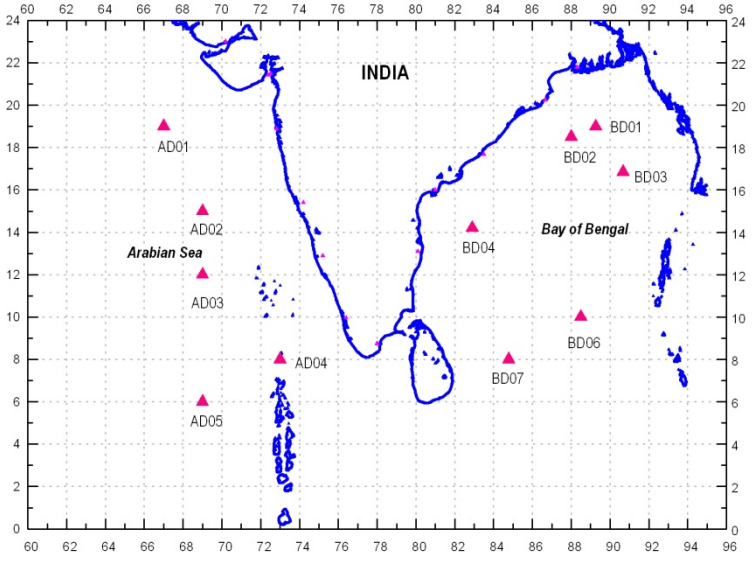


# OOS- WORKING BUOY NETWORK

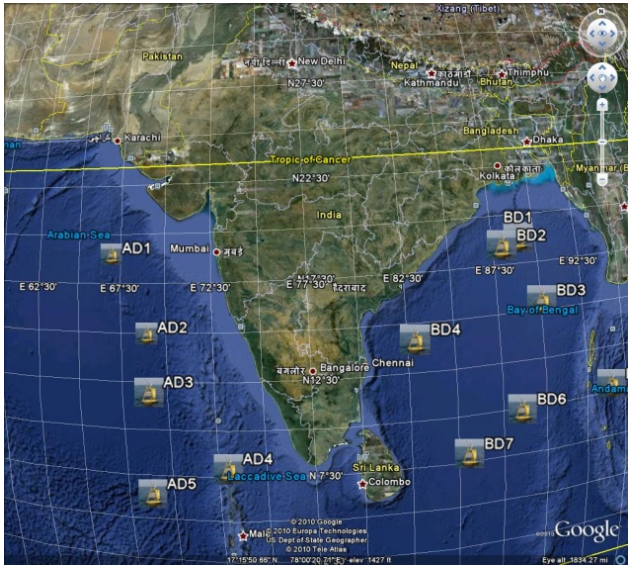
## by October 2010




## by January 2011




## by March 2011



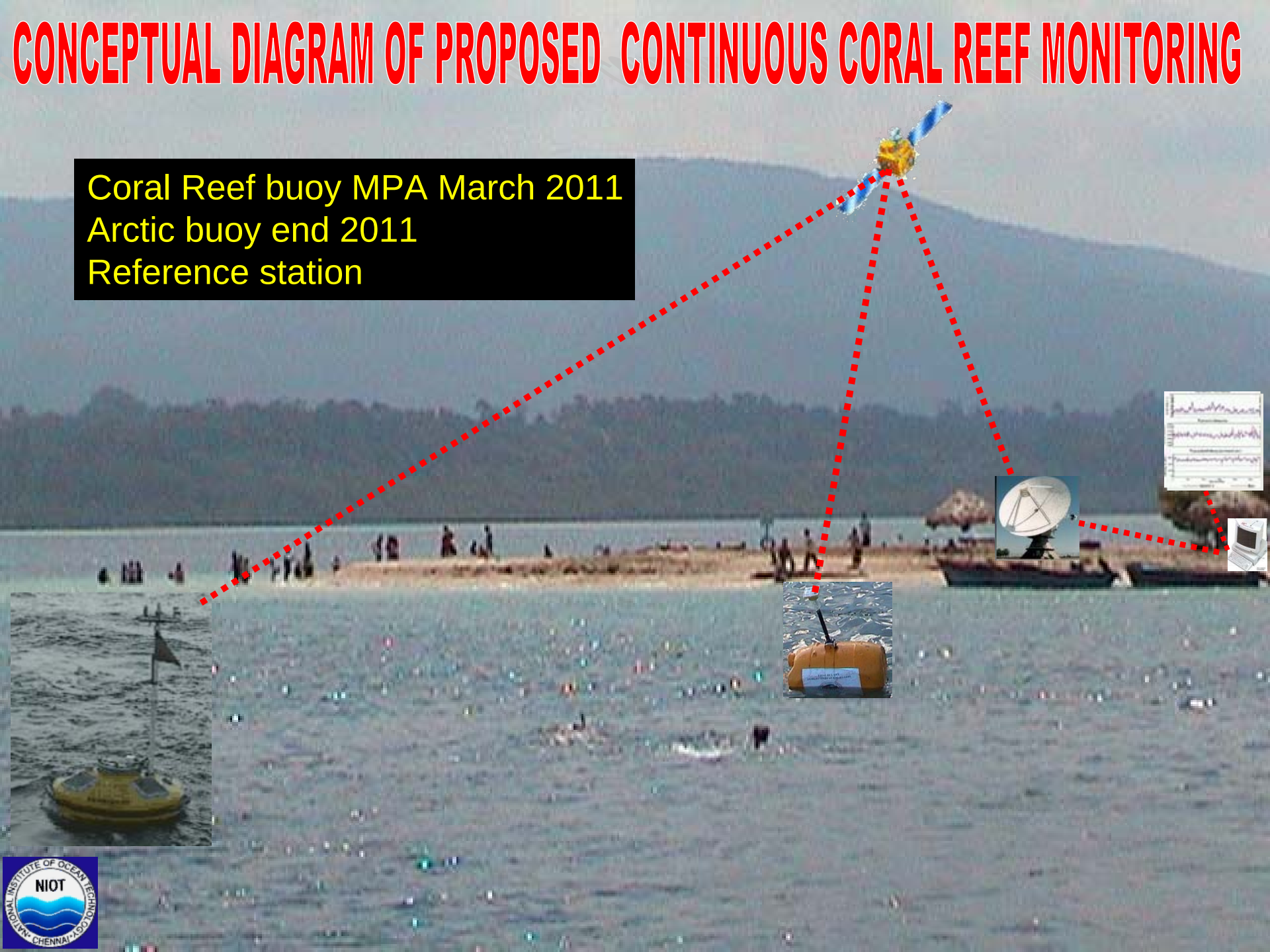
# PRESENT BOUY BD06

| Parameter | Reporting Range | Sample Interval | Total System Accuracy |
|---|---|---|---|
| Air Pressure | 990 to 1020 hPa | 3hr | ±0.1 hPa |
| Air Temperature | 10 to 38°C | 3hr | ±0.3 °C |
| Wind Direction | 0 to 360 deg | 3hr | ±1 deg |
| Wind speed | 0 to 40 m/s | 3hr | ±0.3 m/s |
| Wind gust | 0 to 40 m/s | 3hr | |
| CM_SST | 15 to 35°C | 3hr | ±0.16°C |
| Humidity | 30 to 100% | 3hr | ±1% |
| Current speed | 0.01 to 600 cm/s | 3hr | ±1 cm/s |
| Current Direction | 0 to 359 deg | 3hr | ±5 deg |

# OMNI BOUY NETWORK Fugro Oceanor

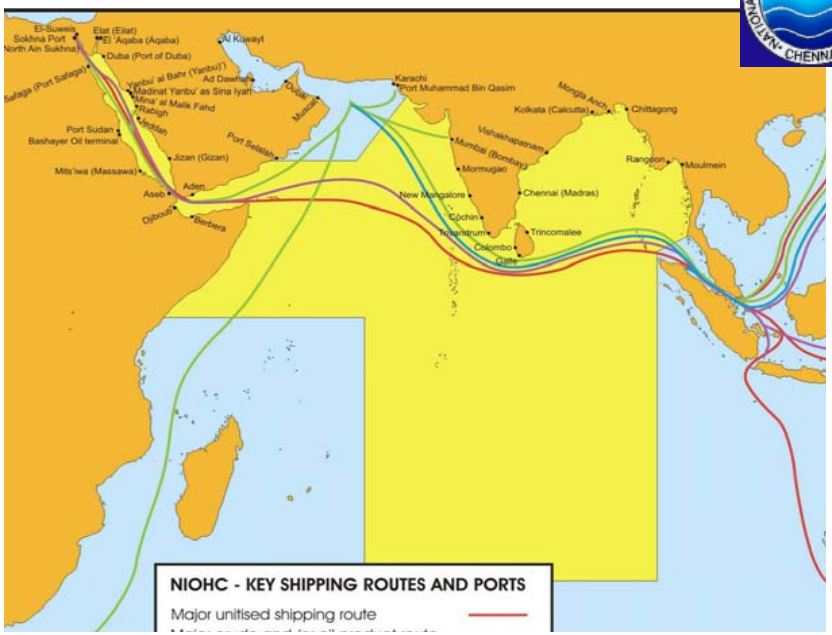
| Parameter | Reporting Range | Reporting Resolution | Sample Interval | Sample Period | Total System Accurac |
|---|---|---|---|---|---|
| Wind Speed | 1 - 20m/s | 0.2 m/s | 3hr. | 10 min | ±0.3 m/s |
| Wind Direction | 0 - 355 deg | 1.4 deg | 3hr. | 10 min | 5-8 deg |
| Air Pressure | 800 - 1100 hPa | 0.1hPa | 3hr. | 90 sec. | 0.01% |
| Air Temperature | 14 - 32°C | 0.01°C | 3hr. | 10 sec | ±0.2°C |
| Rainfall | 0 - 50mm | 0.2 mm/hr | 3hr. | 15 min | ±0.4 mm/hr |
| Relative Humidity | 0 - 100% | | 3hr. | 10 min | |
| Ocean Current profile<br>Single point | 0 - 256 cm/s<br>0-600 cm/s | 0.1 cm/s<br>Dir: 2.5 deg | 3hr. | 10 sec(on every hour basis) | ±5 cm/s |
| Downwelling long wave radiation | 200 $W/m^2$ | 0.1/0.2 $W/m^2$ | 3 hr. | | ±0.1% |
| Downwelling short wave radiation | 200 -1000 $W/m^2$ | 0.4 $W/m^2$ | 3hr. | | ±0.1% |
| Sea Temperature & Conductivity with press. sensor | -5 to 35°C<br>0 – 70S/m | T: 0.002°C<br>C: 0.0003 mS/cm<br>P:0.1% | 3 hr. | 10 seconds | |
| Directional wave spectra | ±15m<br>2 – 30 sec | Heave, Pitch and roll | 3 hr. | 17.5 min | (<10 cm accuracy) |

# CONCEPTUAL DIAGRAM OF PROPOSED CONTINUOUS CORAL REEF MONITORING



# Challenges

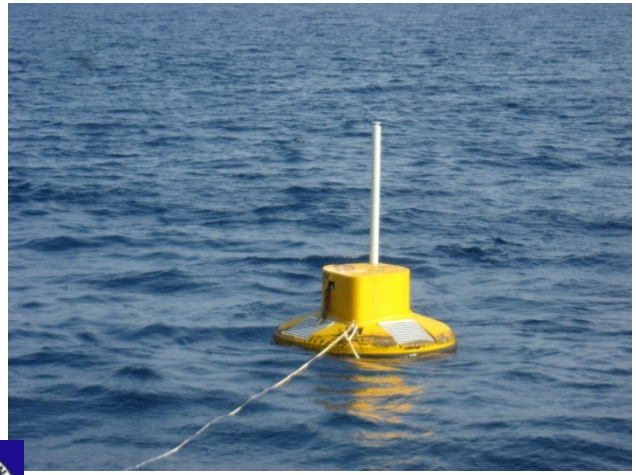
Shipping traffic
oil tankers




Deep sea fishing

- Reduced coastal fishing resources
- Enhanced deep sea fishing
- Tuna gill nets, trawl nets, long voyage vessels
- Interest region for many countries for fishing
- Well equipped fishing vessels
- Port developments

# Vandalism



# Buoy Vandalism

**DBCP has prepared a document on VANDALISM**

**WMO has taken up this issue to UN General Assembly**

**in order to preserve the integrity of monitoring systems that are so essential to preserving life and property in coastal communities around the world.**

***–calls upon [UN] Member States to take appropriate steps under their national law to prohibit damage of or interference with ocean and coastal observing systems, institute incentives to reward those who supply information that supports enforcement of such prohibitions, develop procedures to facilitate retrieval of non-functioning ocean and coastal observing systems, and educate local communities.***

**Discussed during a side meeting during UNICPOLAS New York May 2009**

**Request to consider to forward this message to FAO and IMO**

# Where do we go

Data : Priority programme  Most expensive data

Moored buoy
- Once tested and deployed no guarantee on performance
- What is life time
- System tested in lab may fail at sea

Dynamics: Any surface buoy is subjected to wave dynamics

Shiiping/fishing : chances of getting tampered/disturbed by passing vessels

# Suggestions

Instrumentation

sensors, CPU
Black box
Product Standardization - IEEE
Requirement is low volume product
How do we bring standardization

Community of best Practices

Discussed during MB task meeting on 28 Sept Thanks to Bill & Jon

Suggestion to evolve a model to develop risk factor map with sites of shipping route, trawling, drift nets, spawning ground

- Surveillance Camera?
- Economics on moored buoy data?

# THANKS FOR YOUR ATTENTION

dr.r.venkatesan@gmail.com