DBCP Capacity Building Workshop on Ocean Observations for Operational Services in the Indian Ocean Region

National Reports

INDIA

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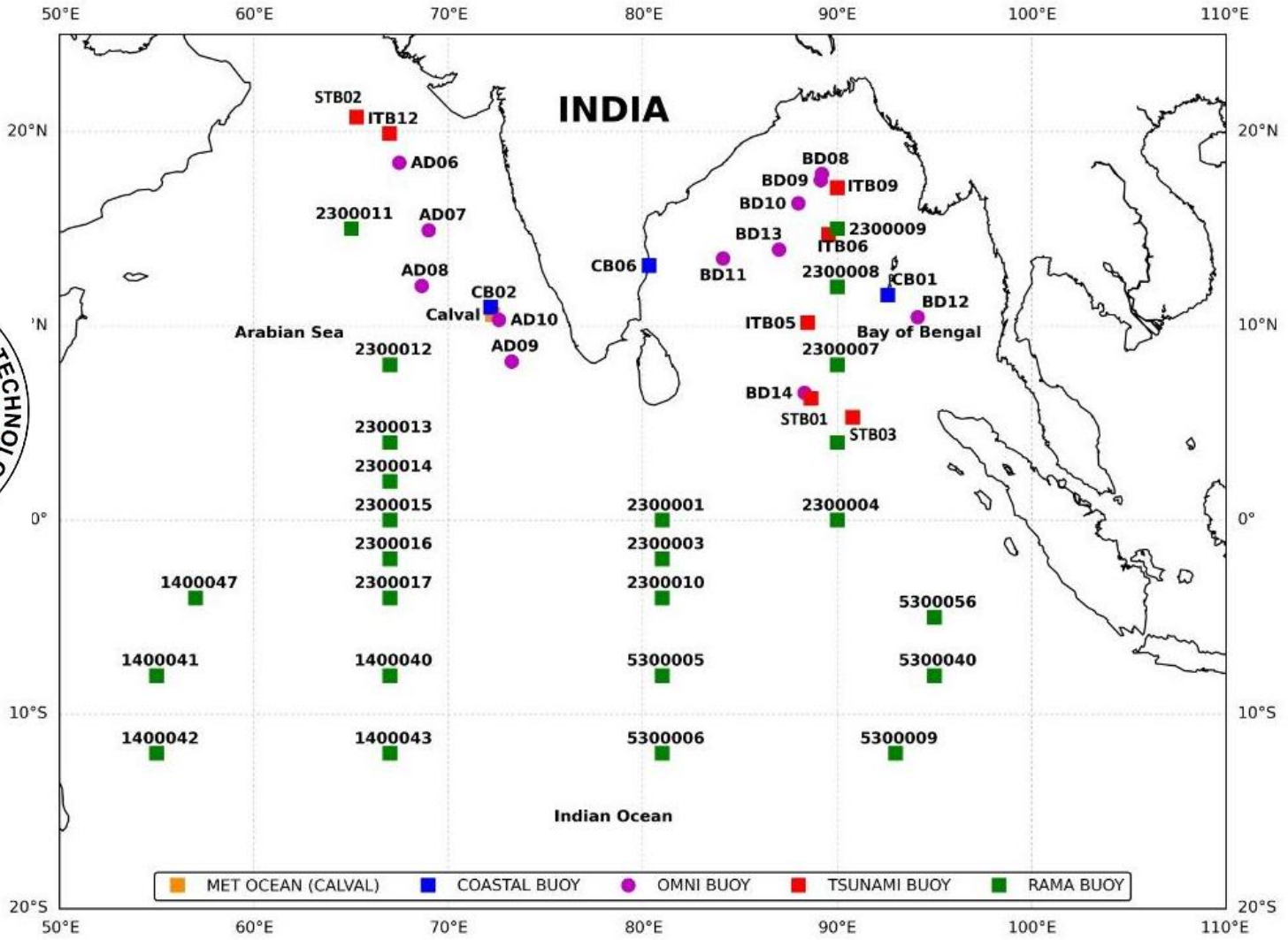
05 - 07 August 2025
Hyderabad, India

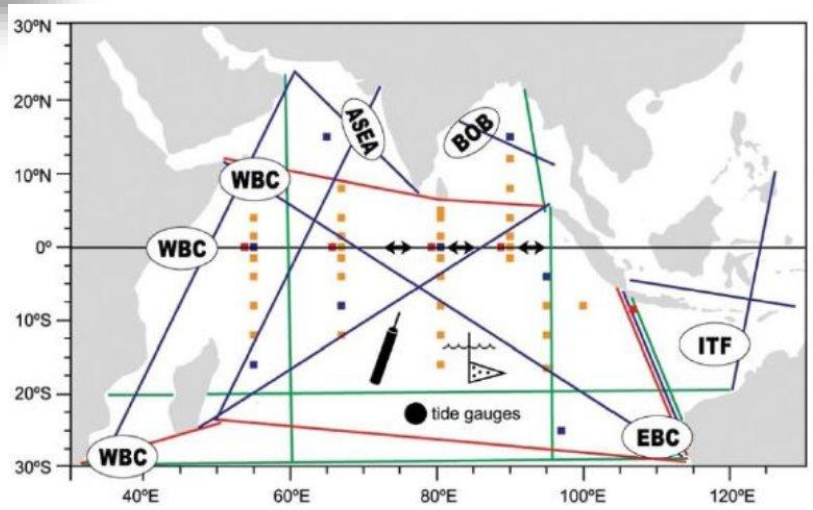
- INCOIS, Hyderabad, India
- NIOT, Chennai, India
- IMD, New Delhi, India
- Indian Navy

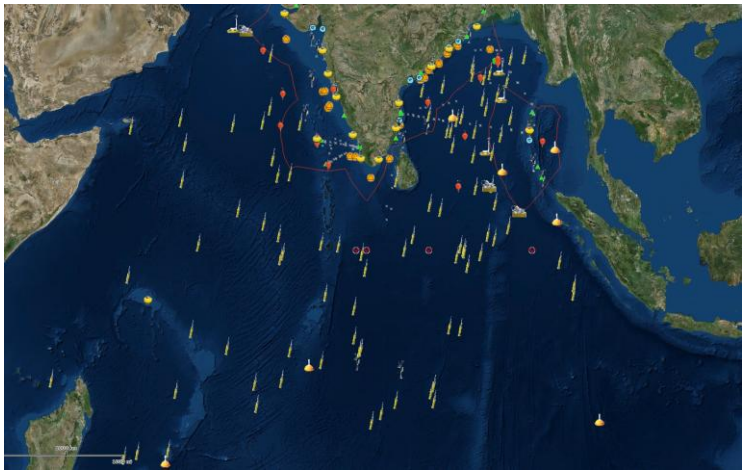
1. Existing Capacities/Activities for Observation /Forecasting



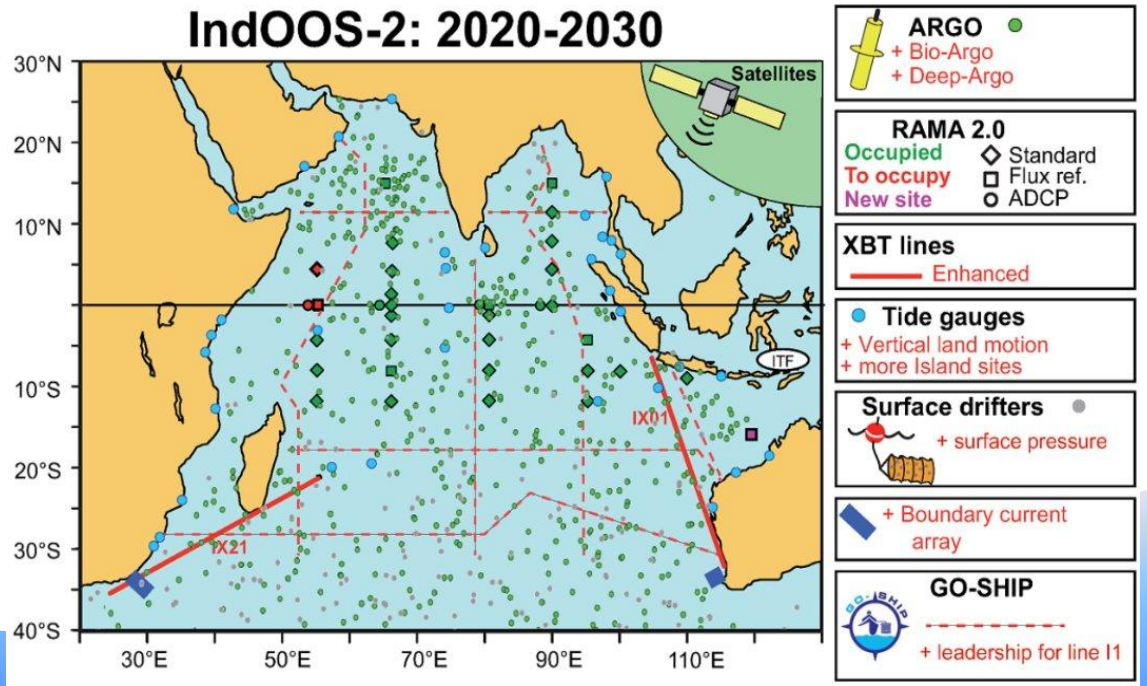
1. Existing Capacities/Activities for Observation /Forecasting

UN Ocean Decade Challenge 7 'Expand the global ocean observing system'





INCOIS



2. Gaps and Needs for Observation /Forecasting

GAPS

- Need dense observations in the upper ocean layers and lower atmosphere. – tackle increasing number of high intensity cyclones
- The low power self calibrating smart sensors which can work long time in the harsh marine environment

Challenges

- To maintain functioning of buoy systems at sea, called for extensive planning, effective coordination and precise execution. Innumerable unforeseen challenges such as ship time availability, vandalism, piracy, marine growth on sensors, data loss due to satellite communication issues, network failure, bad weather, large inventory, skilled man power and many more.

2. Gaps and Needs for Observation /Forecasting

INCOIS forecast services – blue economy

- Requires accurate forecast of sea state, drift, SUB-SURFACE CURRENTS, along the Indian coast line of ~11000km
- **Present challenge** : not very accurate forecast obtained by state-of-the-art ocean models.
- **Gaps** : low resolution forcing (atmospheric winds, etc), lack of observations (river influx, etc)
- **Necessity of observations**: To validate model outputs, to understand specific processes interacting at the coast, to finally get induced into data assimilation.
- **Systematic need of observations** : simulataneous obs. of atmospheric forcing fields like winds, temperature and salinity profiles along the existing and new ADCPs, etc, to cover the coast line in total.

2. Gaps and Needs for Observation /Forecasting

GAPS

- The density of buoys is to be increased over central BoB, central Arabian Sea, southern parts of north BoB and north Arabian Sea.
- Number of tide gauges are to increased for the better estimation and validation of storm surge heights.
- Automatic Weather Station is to be installed at Each tide gauge station.
- Precipitation modelling is quite tough – more observations are required
- Once the buoys, tide gauges and proposed AWS stations are increased, the data to be assimilated real-time in the models.

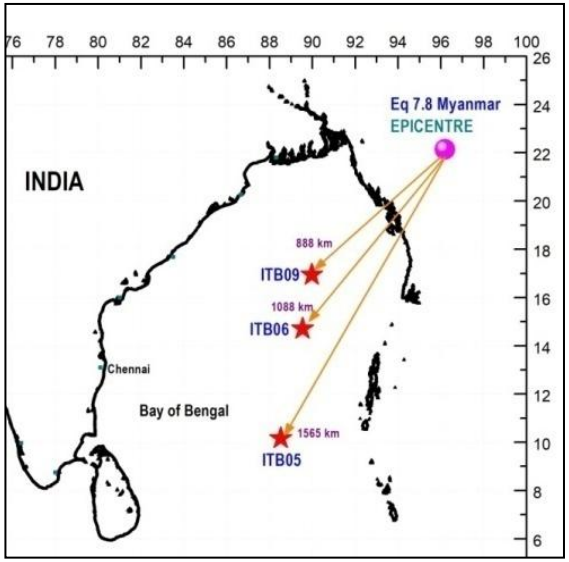
2. Gaps and Needs for Observation /Forecasting

GAPS

- Coastal buoy data – to increase the density – to understand land and sea breeze effects
- More density of wind observations at 10m
- Drift (surface currents, winds and waves) observations for search and rescue
- More observations within EEZ

3. Case sharing (if have)

Myanmar Earthquake (2025)

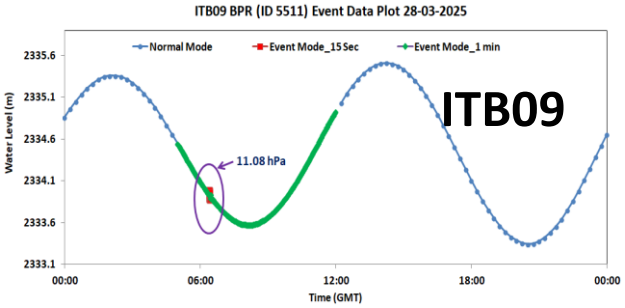


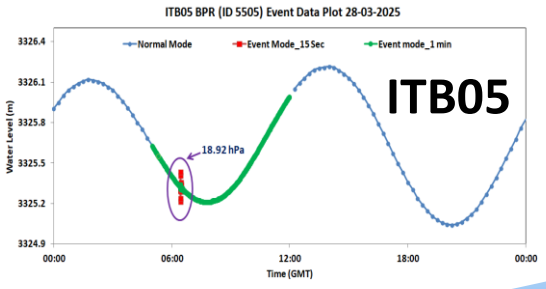
SALIENT ACHIEVEMENTS:

- INMARSAT TO IRIDIUM MIGRATION
- PLACING ANTENNA INSIDE THE HOOD
- SMART POWER SWITCHING

ONGOING

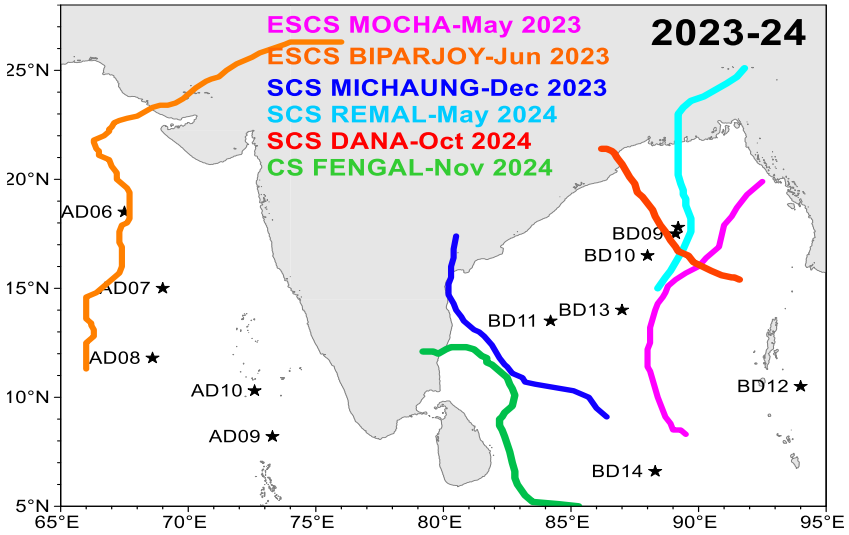
- DEVELOPING LIDAR BUOY UNDER MISSION MAUSAM
- DEVELOPMENT OF SUBSURFACE TSUNAMI BUOY SYSTEM
- NEXT GENERATION BUOY SYSTEM - OMNI 2.0





3. Case sharing

- Rapid mode transmission
- Real-time data dissemination to IMD during cyclones

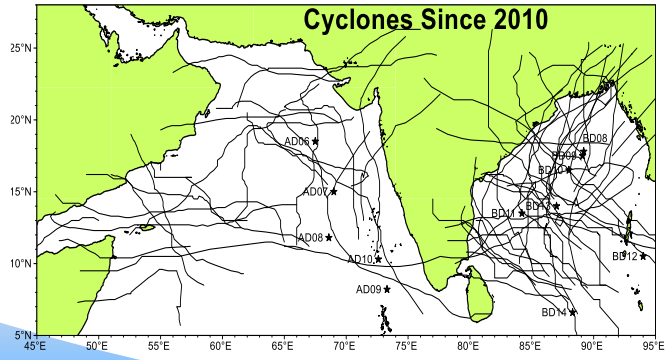


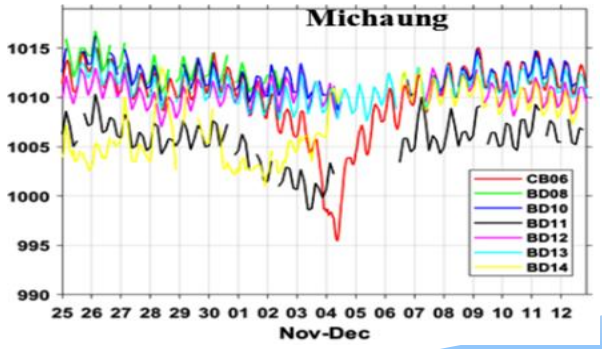
AS

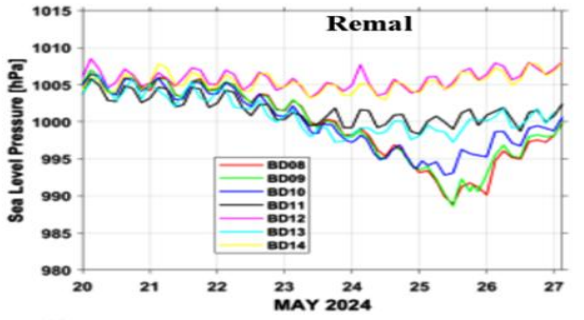
Min SLP (hPa)	Max U3 (m/s)	Max Hs (m)	Max Hmax (m)	Min Track Dist (km)
Biparjoy	Ockhi	Biparjoy	Biparjoy	Ockhi
AD06	AD08	AD06	AD06	AD07
975	26.3	9.0	13.0	8.0

BoB

Min SLP (hPa)	Max U3 (m/s)	Max Hs (m)	Max Hmax (m)	Min Track Dist (km)
Phailin	Nivar	Yaas	Amphan	Phailin
BD10	CB06	BD08	BD08	BD10
920.6	34.8	9.5	14.6	7.4

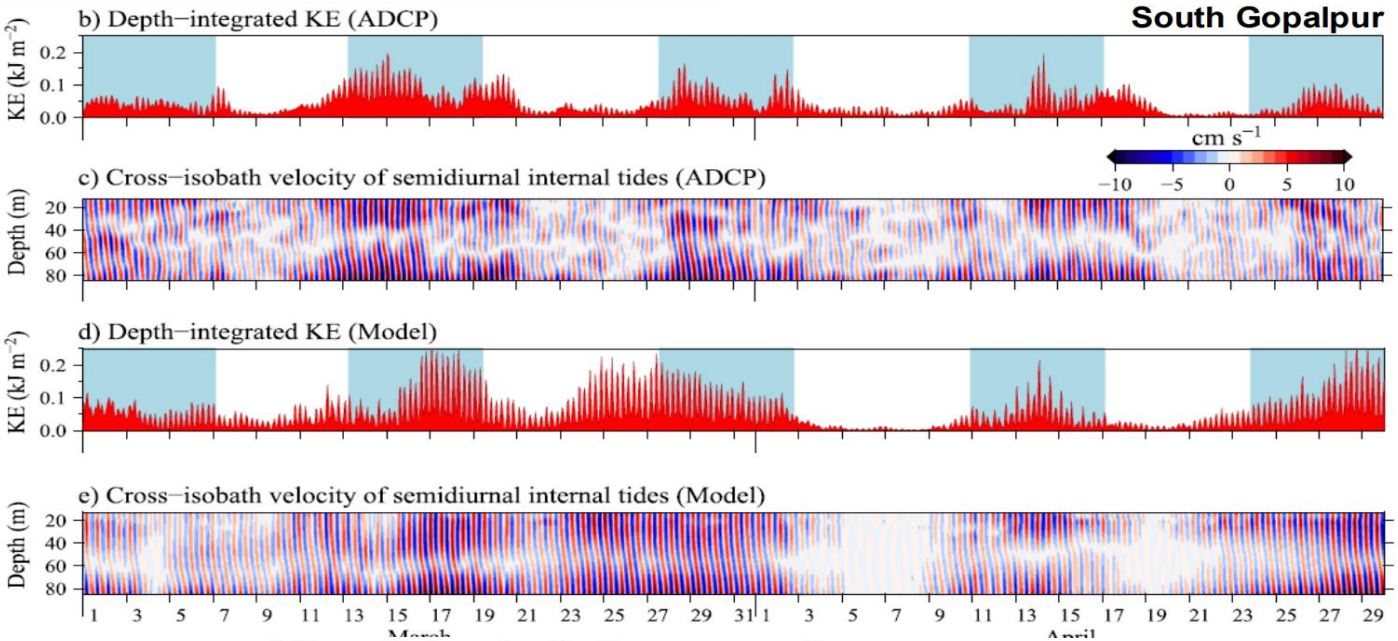


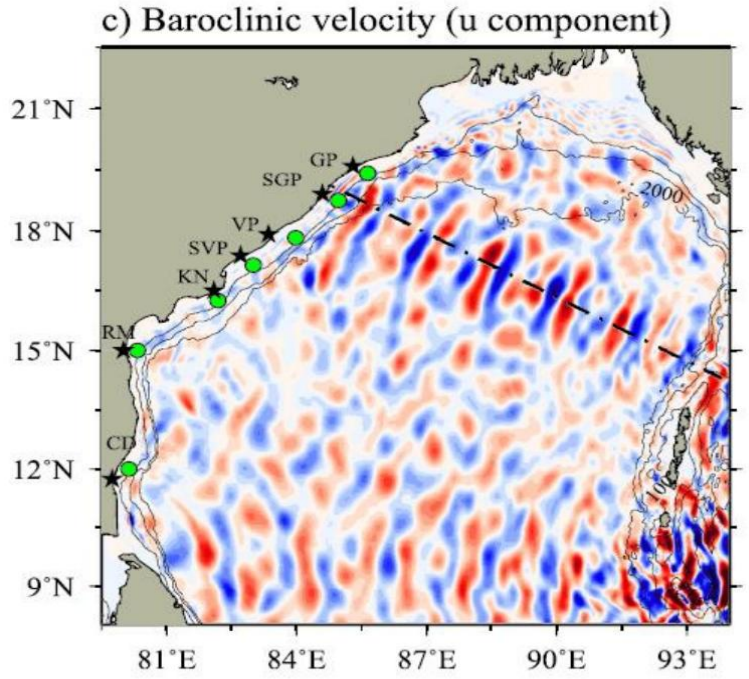




3. Case sharing (if have)

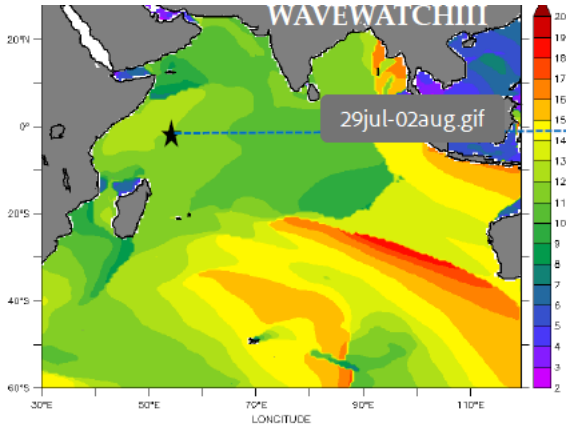
- **Variation of internal tides in WBoB**





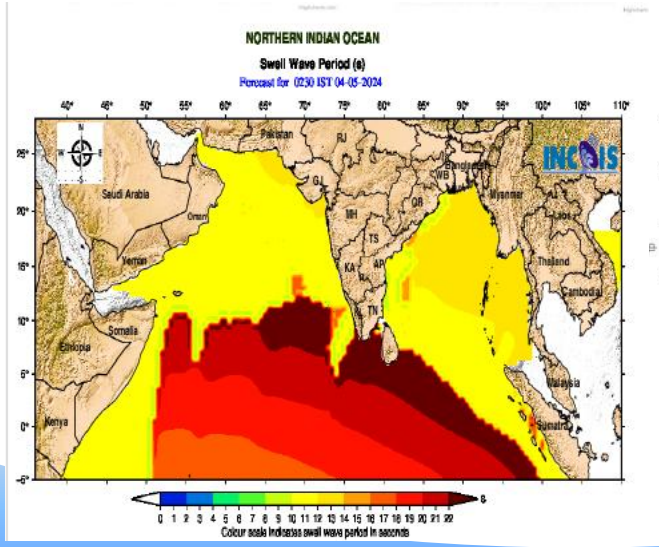
3. Case sharing (if have)

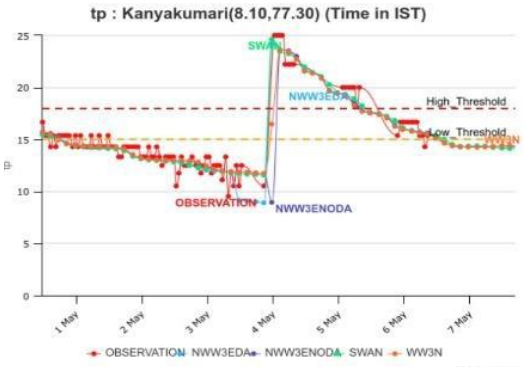
Swell Surge Warning

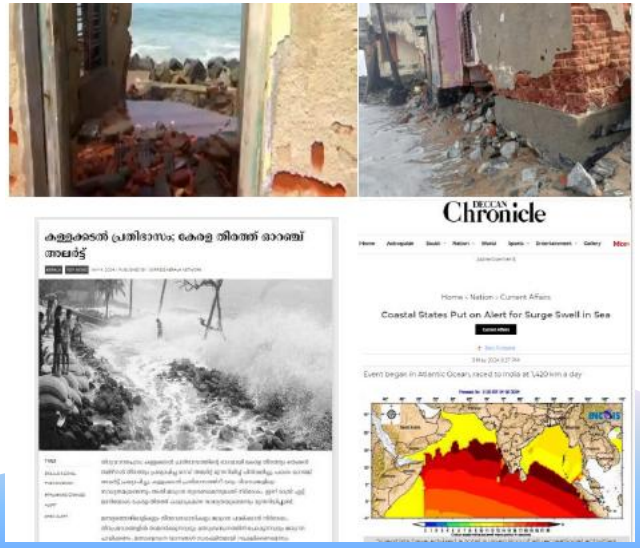


Feed back from users

The Kollam District administration (DMD) :Wave surge was reported in coastal regions of Alappad Village of Karunagapally Taluk on on 1st and 2nd of August, 2016







3. Case sharing (if have)

INCOIS role in Mission Mausam

In-situ:

- state of the art AWS with upper air obs.
- Ocean research station in BoB

Data Management

- Centralized data assembly
- Real time data access with digital twin

Thank you