2nd Ocean Observers Workshop
Sharing international marine science educational resources
29-30 Nov & 1 Dec 2021
#OceanObserversWorkshop
2021 2030 United Nations Decade of Ocean Science for Sustainable Development

A New Approach on Capacity Development

Interactive Mentor based Science Workshop on Moored Buoy Data Analysis – A new Approach on Capacity Development for Early Career Researchers

R.Venkatesan[1], K. J. Jossia[1], Amit Tandon[2]
[1]National Institute of Ocean Technology Ministry of Earth Sciences Chennai India
[2]Professor, University of Massachusetts Dartmouth, Dartmouth MA 02747, USA
Corresponding author email id venkat@niot.res.in

Presented by Dr. R Venkatesan

Group Head National Institute of Ocean Technology Ministry of Earth Sciences, India
Chair GOOS RA Council UNESCO IOC
Vice Chair WMO SG OOIS
Co Chair Sub - Group on Capacity Development WMO SC -N

14th WMO Symposium on Education and Training 22 to 25 November 2021

Sharing the knowledge on Oceans – WMO's Earth System approach for Early Warning

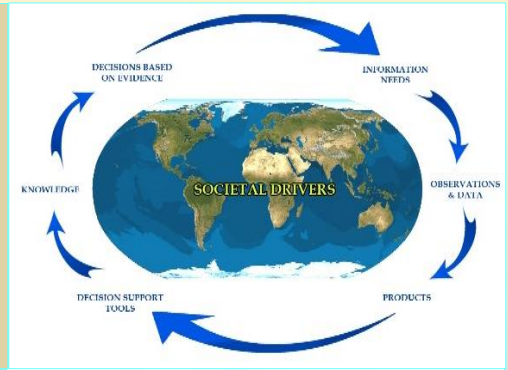
R Venkatesan Sid Thurston

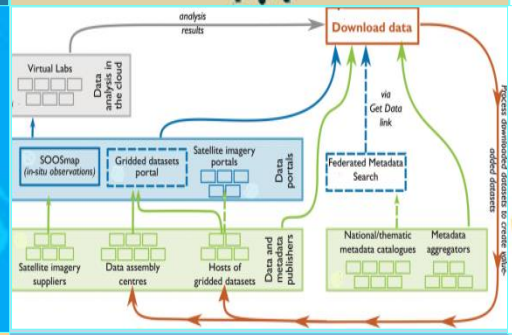
Earth System approach - Oceans plays a crucial role

Focus: Role of WMO in ocean varied from research, obs, data, forecasting to services and CAPACITY DEVELOPMENT

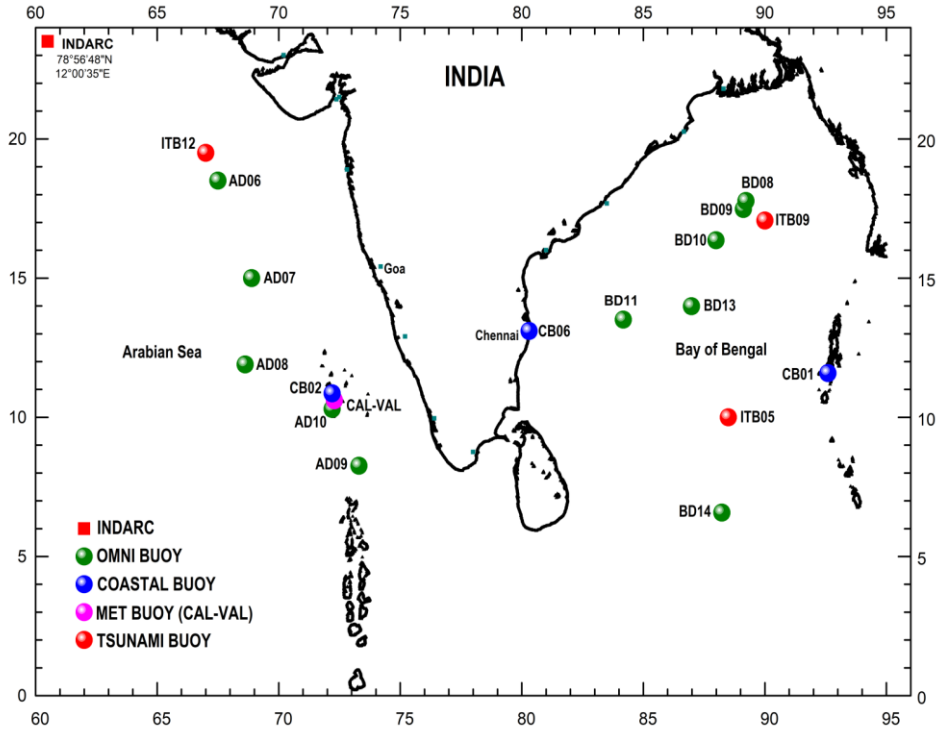
Opportunity: UN Ocean Decade IPCC report, Paris agreement

Awareness: Use of available data products and the need to collect real time data in coastal waters - Earth system approach



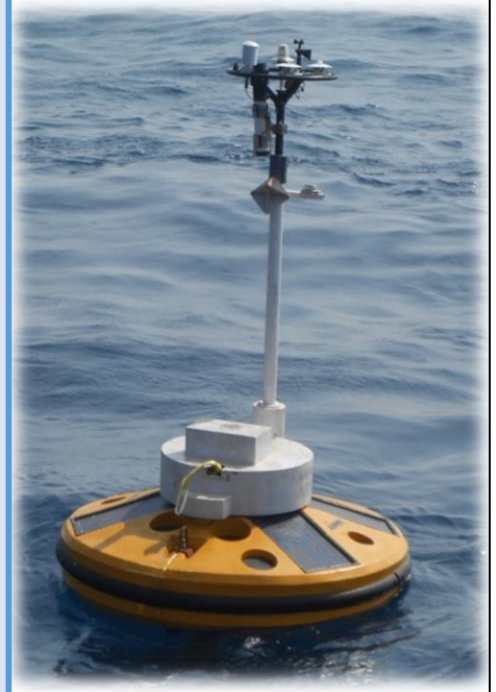


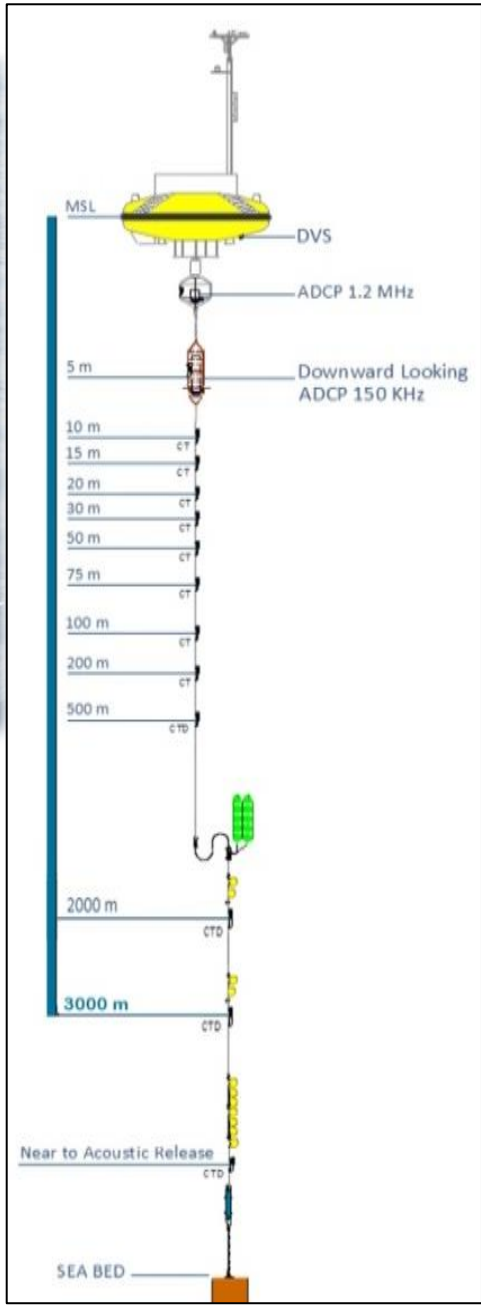
In-situ Time Series Oceanographic and Meteorological Data from North Indian Ocean



The OMNI buoys measure

- Air-temperature
- Relative-humidity
- Sea level pressure
- Wind
- Short wave radiation
- Long wave radiations
- Precipitation
- Wave
- Salinity and temperature profile up to 500 m
- Current profile in top 200 m





- The buoy measurements are widely used both by operational and scientific communities and brought out many new insights.
- However this unique data set need to be utilized more to bring out many unexplored aspects of upper ocean dynamics.
- Mere sharing of data to students and early researchers may not yield the intended result. Hence organised an extensive training to analyze and interpret the moored buoy data.

Introduction

Gurukul

- Gurukul system of education is in existence from ancient times in South Asia.
- The students reside with or close to Teacher (Guru), who is expert in a particular subject.
- The science workshop on moored buoy data analysis was conducted similar to the ancient GURUKUL system under the guidance of a dedicated mentor.
- The modern pedagogical style of group study, latest communication platforms and collective project work were also part of the workshop.

Structure of the Workshop

- The workshop was envisaged with a specific theme, addressed through sub-groups working on selected sub-themes, which symbolizes collective thinking to achieve a common goal.
- The theme of the workshop was "**Upper ocean response to cyclones in the Northern Indian Ocean**" considering its significant impact on the life and property of the densely populated coastal states of Indian sub-continent.

The different groups were given the names of cyclones (**Phailin, Hudhud, Jal, Gaja and Vardah**), which enabled the participants to get connected more to the themes and also made the communications easier.

Sub-themes and Subgroups

Thermohaline response during cyclones (Hudhud)

Ocean current response during cyclones (Jal)

One-dimensional modeling study for Cyclone analysis (Vardah)

Air-sea interaction during cyclones (Phailin)

Utilization of Remote sensing data for Cyclone analysis (Gaja)

Lectures and Training

- The mentors detailed the theoretical back ground of the assigned themes through lectures and direct interactions.
- The quality controlled data sets along with metadata were provided to the mentors in advance, which enabled them to analyze the data before the commencement of the workshop.
- The mentors were suggested to focus on the relevant data sets during the cyclone Titli, which helped the different groups to investigate the various aspects of the response generated by the same cyclone.

- The participants were suggested to bring laptops. Their own system equipped with necessary data, supporting software and analysis tools was envisaged to inspire the participants to continue to work on the assigned task even after the closure of the workshop.

Question Bowl

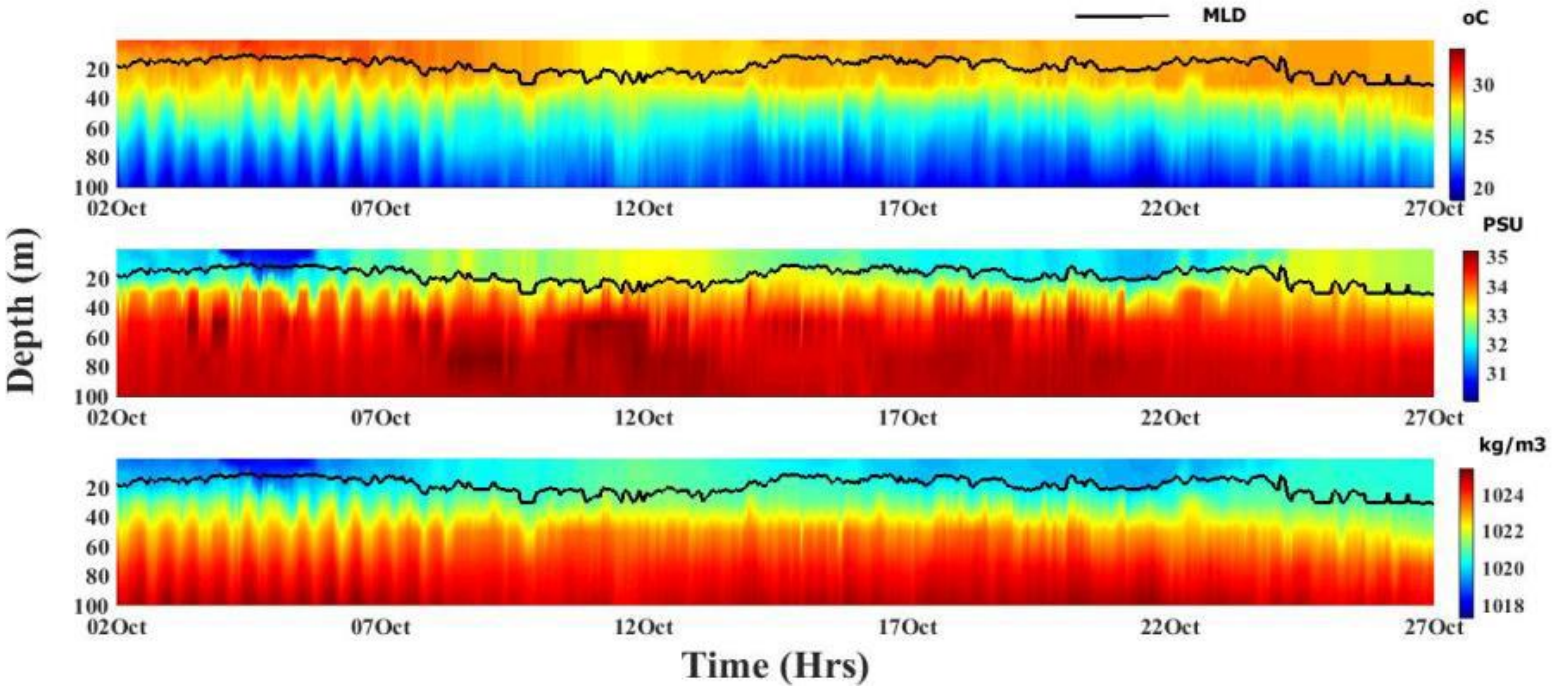
- The workshop was made more interactive by suggesting the participants to drop the questions in a ‘Question Bowl’ kept outside the meeting room.

- The participants who were reluctant to raise the questions directly or those who did not get an opportunity during the open discussions were directed to drop the questions in question bowl.

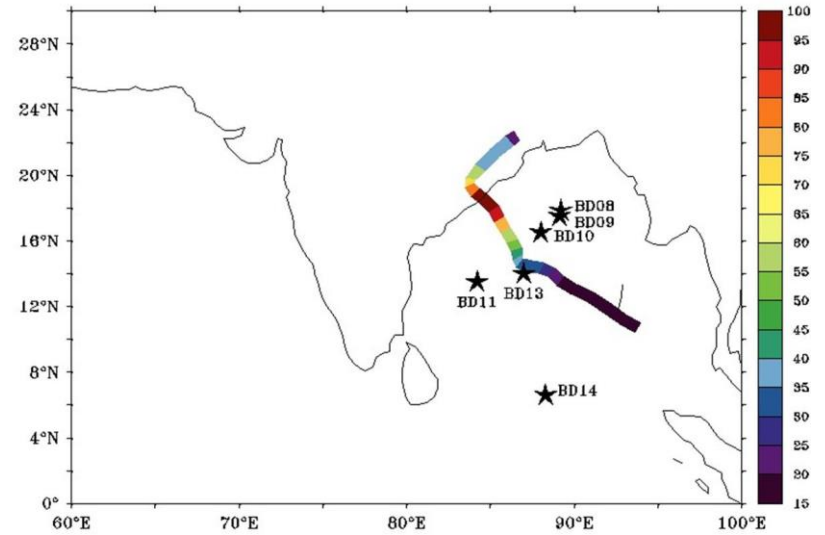
- This encouraged the students to raise many interesting research questions.
- It also led to many intense discussions during the workshop

Upper Ocean Response to Tropical Cyclone Titli

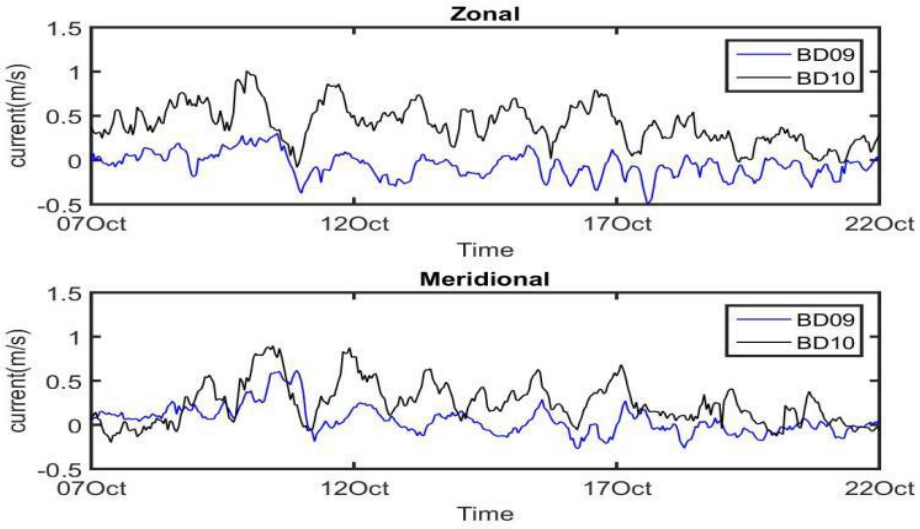
The different groups focusing on various aspects of the upper ocean response during cyclone Titli provided an opportunity to bring out the consolidated picture of the response generated by cyclone.



Observations showed asymmetric SST cooling and chlorophyll blooms with a higher response on the right side of track.



Near inertial oscillations excited by cyclones were observed in the data



Interaction onboard US Research vessel R/V Sally Ride

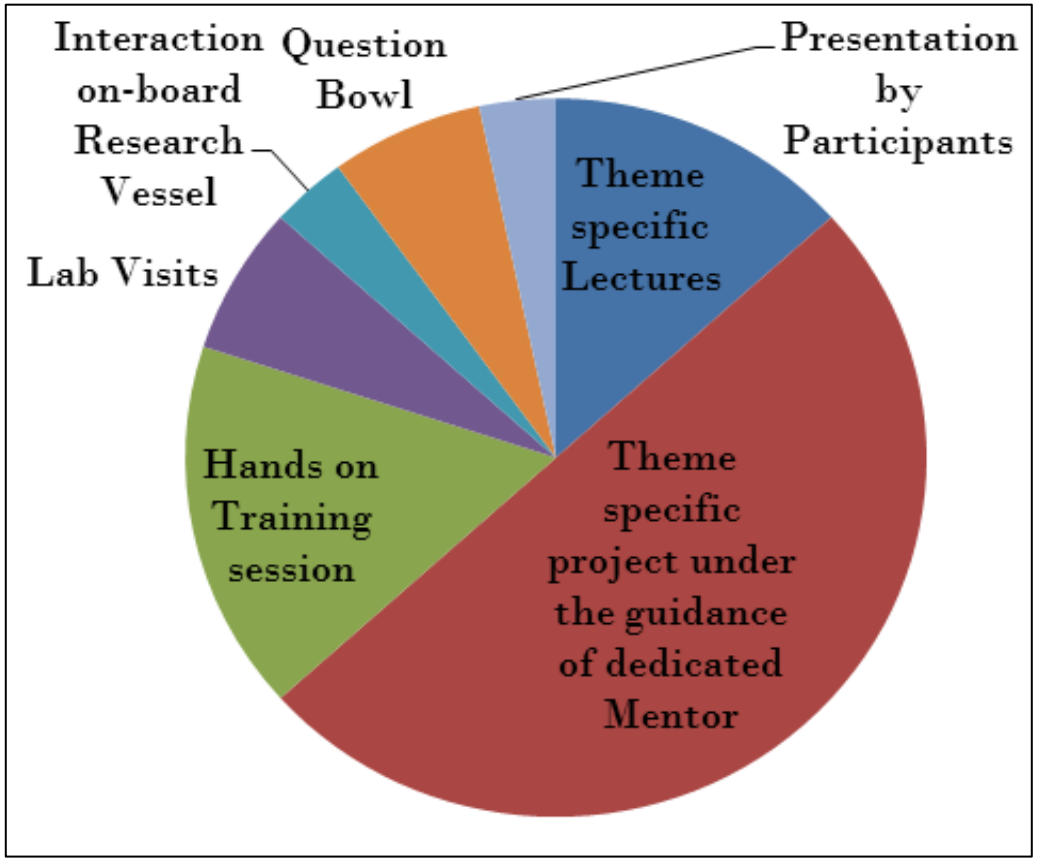
- The participants availed of a unique opportunity to witness the practical demonstration of the advanced measuring techniques and state of the art oceanographic instruments onboard the research vessel (Fig. 5).
- The instruments such as wire-walker, FCTD, sea-glider, etc. were displayed and explained in detail by respective experts on-board.
- The participants also interacted with the US students onboard the vessel engaged in setting up the laboratory.

Salient features of the workshop

- 15 mentors from premier oceanographic institutions
  - NIOT, IITM-Pune, IIT-Madras, SAC-Ahmadabad, IMD-Chennai,
  - UMass – Dartmouth, Oregon State University, Scripps Inst of Oceanography, etc.
- 30 participants from 15 institutions
- 15 lectures focusing on the workshop theme.
- Five teams working on specific themes related to cyclone Titli.
- Discussions on-board US research vessel R/V Sally Ride and interaction with US experts and students.

Outcome of the workshop

- Moored buoy data shared with 15 institutions.
- 30 students from various institutions trained on analysis of the moored buoy data and interpreting the results.
- This workshop resulted in new ties between institutions and individuals.
- Success of this workshop led to the adaptation of the same format in the next science workshop at Space Application Centre SAC-Ahmadabad.



Questions?

Thank You for your kind attention