



**Ministry of Earth Sciences (MoES)
Government of India
Indian Institute of Tropical
Meteorology (IITM)**



Monsoon Mission - III

Call for Research Proposals for the refurbishment and deployment of flux buoy in the Arabian Sea under the programme Monsoon Mission-III

Enhancing Knowledge of the Arabian Sea Marine environment through Science and Advanced Training (EKAMSAT) is planned as a joint research initiative between India and USA to study boundary layers and ecological processes in the Arabian Sea. The Indian component of the EKAMSAT project is sanctioned under monsoon mission-III objective-b “*understanding the physical processes field/observational campaigns*” vide administrative order number MoES/ACROSS/EFC-CCEA/2021 (dated 07/02/2022). The main goal of this program is to enhance our understanding of the air-sea interaction over the Arabian Sea to a level that would support the reduction of the systematic errors stemming from the misrepresentation of ocean boundary layer dynamics in models used for the prediction of monsoon rainfall. Sustained observations and process studies to understand the boundary layer processes in the ocean and atmosphere will be the central theme of this collaborative program. New access to the Arabian Sea for scientific activities presents an opportunity for India-USA collaborative scientific process experiments. A combination of resources from India and the USA, with a collaborative team-based approach combining in-situ process and large-scale remote observations, multi-scale modelling, cross-scale synthesis, innovative training, and capacity building is envisaged to make a quantum jump in our knowledge of processes related to oceanic boundary layers in the Arabian Sea. More details of the program, timeline, goals, and objectives are available EKAMSAT science implementation plan (EKAMSAT_Science_Implementaiton_Plan.pdf).

Several scientific questions were proposed under the EKAMSAT project are planned to address through scientific field campaigns in the Arabian Sea. However, the following science questions on (i) how does the Arabian Sea attain high SST during the pre-monsoon months? (ii) what controls the barrier Layer formation in the Southeastern Arabian Sea? and (iii) at what rate does the mixing influence the upper ocean structure in the Arabian Sea? are to be addressed through the one-year deployment of a flux mooring in the northeastern and southeastern Arabian Sea between 2022 and 2026. As part of the maintenance of mooring, it is proposed to collect the complete annual cycle of near-surface meteorological and oceanographic parameters and the upper-ocean hydrographic structures. To address the above-mentioned scientific objectives, the mooring should be equipped with a direct covariance flux system (DCFS), meteorological sensors, the high-resolution vertical profile of near-surface current, and temperature and salinity measurements.

In contrast to other available mooring networks with coarse vertical resolution available in the north Indian Ocean, the flux mooring should have the capability to measure high-temporal resolution atmospheric parameters and high-temporal near-surface hydrographic conditions in approximately 2 m vertical resolution to understand air-sea exchanges of heat, freshwater, and momentum at the air-sea interface, ocean mixing characteristics, upper ocean response to atmospheric forcing and its impact on the upper ocean vertical structures. The DCFS facilitates direct estimates of fluxes over the wave boundary layer using the eddy covariance method. It provides an unprecedented opportunity to validate the widely used bulk flux algorithm to estimate turbulent and momentum fluxes at the air-sea interfaces and improve the transfer coefficients used in these schemes. These measurements will help understand the source model biases in the climate models used for seasonal and extended-range prediction and are well-versed with the overall objective of the monsoon mission.

The project proposals are invited from national and international organizations/Universities/Institutes to refurbish, deploy, and recover the existing flux mooring available with INCOIS. In addition, it is also expected that successful PIs should take care of the quality control of the data from this mooring (sub-surface, near-surface

meteorological, and DCFS measurements) and knowledge transfer on these topics to INCOIS scientists with dedicated training, documentation, and software. The calibration of sensors and providing ship-time for the deployment are under the INCOIS's responsibilities. The successful PIs should also collaborate with INCOIS scientists to achieve the scientific question addressed above under EKAMSAT.

It is proposed that interested PIs who wish to participate in the Call for Proposals may submit the Proposals along with all essential endorsements and certificates in the prescribed format. The proposals should be forwarded through the proper channel and must be sent in a closed cover to the office of “**The Director**, Indian Institute of Tropical Meteorology (I.I.T.M.), Dr. Homi Bhabha Road, Pashan, Pune – 411008, **INDIA**”. The envelope should be clearly superscripted “EKAMSAT PROPOSAL”. The soft copy version of the same should be submitted to the Monsoon Mission Directorate at the e-mail: monsoon_mission@tropmet.res.in by 15.01.2023
