

## Project Endorsement Form

### 1. PROJECT TITLE

Full title	Enhancing knowledge of the Arabian Sea Marine environment through Science and Advanced Training (Indian Component)
Acronym	<b>EKAMSAT</b>
Website	Nil
Keywords (up to 10, describing the project research)	Arabian Sea, Indian Summer Monsoon, Mixed Layer Processes, Diapycnal Mixing, Air-Sea Interaction, Planetary boundary Layer dynamics, Primary Productivity, Oxygen Minimum Zone
New initiative or continuing programme?	New Initiative

### 2. APPLICANTS

#### Lead applicant / Project Leader/ key research contact person: Indian component of EKAMSAT.

First name	Dr. Girishkumar
Last name	Madathil Sivasankaran
Affiliation	Scientist-E
Postal address	Indian National Centre for Ocean Information Services (INCOIS) (Ministry of Earth Sciences, Government of India), "Ocean Valley", Pragathi Nagar, Nizampet Hyderabad - 500 090
Country	India
Telephone	+91-40-23886094
Email address	<a href="mailto:girish@incois.gov.in">girish@incois.gov.in</a>
Institutional or personal website	<a href="https://incois.gov.in/hrd/employeeprofile.jsp?uid=057">https://incois.gov.in/hrd/employeeprofile.jsp?uid=057</a>

#### Other key participants/research team leaders: (repeat as needed)

First name	Dr. Aneesh	Dr. Pattabhi Rama
Last name	Lotliker	Rao
Role in the project	Principle Investigator	Principle Investigator
Affiliation	Scientist-F	Scientist-G
Country	India	India
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Institutional or personal website	<a href="https://incois.gov.in/hrd/employeeprofile.jsp?uid=024">https://incois.gov.in/hrd/employeeprofile.jsp?uid=024</a>	<a href="https://incois.gov.in/hrd/employeeprofile.jsp?uid=">https://incois.gov.in/hrd/employeeprofile.jsp?uid=</a>

*N.B.: Please note that all these names and contact details will be added to the IIOE-2 membership database.*

### 3. ABSTRACT– Brief description of the project: (1/4 page maximum)

*This will be placed on the IIOE-2 Website after endorsement.*

The EKAMSAT is an India-USA collaborative scientific processes-specific observation campaign project to study ocean and monsoon interactions in the Arabian Sea. The air-sea interaction processes in the Arabian Sea

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are crucial for the onset of the Indian Summer Monsoon and its progress through the season. 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-specific studies to understand the boundary layer processes in the ocean and atmosphere will be the central theme of this collaborative program. A combination of resources from India and the USA, with a collaborative team-based approach combining *in-situ* processes 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. Aside from documenting the physical characteristics of the ocean and atmosphere in the Arabian Sea, another topic proposed to be covered by this programme is the modulation of ecosystem dynamics in connection to these physical processes.

#### **4. LINKS TO IIOE-2 SCIENCE PLAN: (1/2 page maximum)**

How do you anticipate your project to contribute to the IIOE-2 strategy and science delivery, with reference to which (either one or more) of the six IIOE-2 Science Plan themes that your project responds. Please state the specific issues and questions addressed by your project in the context of the IIOE-2 Science Plan themes and key issues.

The objective proposed under the EKAMSAT programme matches well with IIOE-2 Scientific Theme 3, Monsoon Variability and Ecosystem Response. Precisely, the following vertical under theme 3, such as, What factors control present monsoon variability? How does this variability impact ocean physics, and biogeochemistry in the Indian Ocean? What are the effects on ecosystems? are well matched with the EKAMSAT project.

The Arabian Sea has a vital role in shaping climatic patterns in the Indian Ocean region's in various spatiotemporal scales. According to recent research, this body of water is experiencing faster warming and regional climate shifts, which could intensify extreme weather occurrences like tropical cyclones, and it may also significantly impact the marine ecosystem and fisheries. Recognising the growing scientific importance of the Arabian Sea, a joint research initiative was formulated between India and the United States of America, titled "Enhancing Knowledge of the Arabian Sea Marine Environment through Science and Advanced Training" (EKAMSAT). Under the EKAMSAT programmes, it is proposed to conduct several field campaigns in the Arabian Sea by Indian and US teams to collect fine-scale oceanographic and atmospheric measurements, focusing on examining surface mixed layer/interior ocean processes and marine atmospheric boundary layer processes and their representations in numerical models. These unprecedented fine-scale measurements from the Arabian Sea aim to improve our understanding of the small-scale mixing processes in the ocean surface boundary layer, interior ocean, and air-sea interaction processes. These measurements will also aid in investigating how these processes are best represented in existing parameterisation schemes in ocean and atmospheric coupled models, thereby improving the accuracy of physical process representations and reducing systematic errors in monsoon predictions. In addition, it is also proposed to collect *in-situ* biogeochemical parameters as part of these proposed scientific expeditions to elucidate the role of primary production in influencing fluctuations in the Arabian Sea Oxygen Minimum Zone (OMZ) and the denitrification status.

#### **5. INTERNATIONAL COLLABORATION(S):**

Is the project part of a related multi-national activity? **YES**

If No, would you welcome international collaboration in your project? **NA**

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## 6. REGION(S) OF STUDY

Provide a description of ‘where’ the research is to be conducted (for field-based activities) and/or the region or regions to which the research pertains (you are encouraged to consider providing either the coordinates of the area of studies or the coordinates of the planned cruise tracks, as well as a figure as an addendum to your proposal).

Arabian Sea. Primarily to the east of 65°E-79°E and 6°N-21°N (Both in open and coastal ocean regions of the eastern Arabian Sea).

## 6. TIMETABLE OF THE PROJECT

Start date: 1 April 2022

End date: 31 March 2026

## 7. LINKAGES WITH OTHER PROJECTS / PROGRAMMES / INITIATIVES

Is the project part of a related national or multi-national activity? Yes

If yes, provide the related activity title and website for reference, if available:

Yes. The Indian component of this project is sanctioned under the MoES Monsoon Mission-III programme. This project is part of an India (MoES)-USA (ONR) collaboration.

Is your project part of, or affiliated to, another SCOR, IOC or IOGOOS activity or project? No

If “yes”, please indicate which activity or project:

NA

## 8. DATA MANAGEMENT AND SHARING

1. Will new data be collected as part of this project (yes or no?)

Yes. The data sharing can be carried out as per the MoES data sharing policy.

2. Contact information if any, of the person in charge of the data management from whom the metadata can be accessed by interested IIOE-2 stakeholders.

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*Please note that for all IIOE-2-endorsed projects, IIOE-2 will have developed its own metadata portal. Once the project is endorsed, the project leader will be asked to provide the metadata information of the project.*

Dr. Pattabhi Rama Rao, Scientist-G, Group Director ODICT, INCOIS. Email: pattabhi@incois.gov.in

3. Recognising the need for an initial period of exclusive data use, would you be willing to provide timely access to all data generated under this project and associated metadata in accordance with relevant national and funding agency data sharing policies? **YES**

## 9. FUNDING

*Please note that IIOE-2 strongly encourages funded/resourced projects. However, IIOE-2 may endorse projects yet to receive funding/resourcing if IIOE-2 endorsement can be clearly shown to significantly aid in prospects for funding/resourcing.*

Has funding and resources to successfully achieve and undertake the project been obtained? Indicate the sources of funding and resources that have been approached and/or secured.

Yes, the Indian component of EKAMSAT is funded by MoES, India and US component of EKAMSAT is funded by ONR, USA.

## 10. BENEFITS FROM IIOE-2 ENDORSEMENT (1/4 page maximum)

Specify why you are seeking endorsement and how the activity would benefit from endorsement, and how the IIOE-2 SC could assist in the implementation of your project.

The endorsement can facilitate more effective collaboration among researchers, institutions, and countries working with similar scientific objectives proposed under EKAMSAT. It provides a platform for scientists from various earth-system science domains to work with the EKAMSAT team, share expertise, and contribute to a collective understanding of the Arabian Sea air-sea interaction processes and ecosystem dynamics. Further, the endorsement is expected to raise awareness of the EKAMSAT project among scientists and others. This recognition can attract attention from other researchers, policymakers, and stakeholders interested in the research outcomes. Moreover, the endorsement is expected to combine the findings under the EKAMSAT programme with other programmes, and it may facilitate a more comprehensive understanding of Indian Summer Monsoon Dynamics.

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**11. OPTIONAL: OTHER COMMENTS/INFORMATION/MATERIAL** (*length and detail may be at the discretion of and as deemed necessary by the applicant*)

Please feel free to provide any other comments, information or materials that you feel relevant to your proposal for the IIOE-2 Steering Committee's information and benefit. You may provide this as general information or provide the additional comments/information/materials as relevant to any of the specific Sections above.

Nil

Dr. Girishkumar M. S.

(Signature of the PI)

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