Megha-Tropiques Satellite Mission of ISRO

Inviting proposals for scientific research using Megha-Tropiques Data

Purpose of the Announcement of Opportunity

Through this Announcement of Opportunity (AO), Indian Space Research Organization (ISRO) solicits Proposals from the Indian Scientific Community for scientific research with Megha-Tropiques Data. The range of opportunities available to researchers includes:

1. Development of retrieval algorithms
2. Preparation and implementation of calibration/validation plans
3. ‘Basic Research on Clouds and Climate’
4. Basic Research on Cloud-Aerosol interaction

Preamble

The successful implementation of science payloads on SROSS-C2, IRS-P3, IRS-P4, SAT-2 in the last decade and current activities on upcoming dedicated science missions such as Chandrayaan-1, ASTROSAT and Megha Tropiques, have resulted in significant interest from scientific groups on space science mission opportunities. The main purpose of these missions is to develop space borne experimental techniques and carry out systematic observations and research to meet the defined scientific objectives.

MEGHA-TROPIQUES (MT) is an ISRO-CNES joint collaborative project. The objective of the project is to study the convective systems and their influence on tropical weather and climate. The MT satellite payloads are high-technology sensors, viz. Microwave Analysis and Detection of Rain and Atmospheric Structures (MADRAS), a millimeter wave humidity profiler, SAPHIR, and an optical-IR radiometer for radiation budget (ScaRAB). Most of the sensors will be integrated with IRS platform. The launch is scheduled for late 2008 by ISROPSLV.

The major challenge of the project is the retrieval of geophysical parameters from MT sensors. The MT data utilization programme is planned to be executed in two phases, namely: pre-launch and post-launch. During pre-launch phase developmental studies with respect to parameter retrievals and definition of application models are envisaged while in the post-launch phase calibration and validation of MT data and application of actual data along with supporting data from other satellites has been emphasized. The major emphasis of MT observations is on providing all season capability for high resolution data fields using MW sensors.

The major themes of the research proposals could be as follows:
1. Geo-physical retrievals and calibration-validation,
2. Synergy of data from different sources and value addition
3. Science studies
   • Study of convective/precipitating systems
   • Cloud radiation interaction studies
   • Study of severe convective systems like tropical cyclones
   • Assimilation of the data in numerical models (atmosphere and ocean)
   • Study of air-sea exchanges
4. Applications in weather, ocean, land and environment
   • Synoptic analysis of weather and forecast on operational scale for short range
   • Applications in near real time data usage for medium range forecast
   • Fine structure analysis and short range forecast for marine weather and estimate of ocean state

Some of the specific problems, which can be addressed with the data available during the study, are:
1. RT Simulations for MADRAS and SAPHIR MW channels for geophysical parameter retrieval
2. RT Simulations for ScaRAB for Radiation flux estimation
3. Calibration and validation of MT data
4. Relationship of cloud radiative forcing and cloud evolution
5. Role of cloud ice particles in radiation budget
6. Role of deep convection in negative cloud albedo feedback
7. Diurnal variation in clouds and impact on cloud evolution
8. Vertical moist instability and evolution of meso-scale and Macroscale cloud clusters
9. Air-sea interaction/Atmospheric boundary layer studies
10. Radiation energy budget studies for monsoon with observation and model
11. Estimation of convective heating/cooling rates from observation and model
12. Assimilation of MT data products in numerical atmospheric and ocean models.

Contd...
The proposal should be submitted in the prescribed Format given in Annexure-A

Selection Approach

The submitted proposals will be reviewed by an ISRO Committee and short-listed on the basis of these criteria.

1. Science objectives
2. Compatibility with MT satellite program requirements
3. Research feasibility, expertise and experience of proposing team
4. Commitments/contributions from institution or university
5. Nature of collaboration (if any)
6. Developmental plans and delivery schedule

Short-listed proposal teams may be invited by ISRO to make a detailed presentation to obtain additional inputs towards making the final selection. Proposals at the conceptual stage may also be reviewed for eligibility for seed funding towards demonstration of the concept. Proposals selected under this category for seed funding have a unique opportunity to be directly short-listed for future flight opportunities and AOs on the basis of successful development.

Important Deadlines

• Last Date of submission of proposals : 10 February 2007
• Short-listing of proposals : 28 February 2007
• Final selection of proposals : 15 March 2007

Mode of submission

Two hard copies of the proposal signed in original in the prescribed format should be submitted along with the proposal in PDF or Microsoft Word format on a CD, through the concerned university/institution, to the address given below. In addition, the information should also be submitted via email to the two addresses gbp@isro.gov.in along with an attached file containing the proposal.

Submittal Address:

Dr C. B. S. Dutt
Dy Programme Director, ISRO-GBP & Member-Secretary, JSWG-MT-ISRO
Room No. 141, ISRO Headquarters
Antariksh Bhavan, New BEL Road
Bangalore 560 094
e-mails: gbp@isro.gov.in and pkpal25@hotmail.com

Annexure-A

ANNOUNCEMENT OF OPPORTUNITY (AO) Proposal Format

The total proposal should not exceed 40 pages (A4 size; 12 point size). It must include all the mandatory sections listed below with adequate clarity to assist the review team in short-listing.

1) Cover Page should include the following:
   Complete Title of the Proposal
   Name and address of Principal Investigator (include e-mail, telephone/fax numbers)
   Name of Co-Pis their addresses, e-mails, etc. Original signed hard copy of the cover page should be submitted. The Head of the Institution should forward the proposal.

2) Executive Summary of the proposal (~Two A4 size pages in 12 point font) (A brief description of the proposal stating the broad scientific objectives)

3) The main proposal should have the following sections