

Indian Institute of Tropical Meteorology (IITM)

## **Press release (3 June 2024)**

INTERNATIONAL WORKSHOP ON

Stratosphere-Troposphere Interactions and Prediction of Monsoon weather EXTremes  
(STIPMEX)

Dates: 2-7 June 2024

Venue: Indian Institute of Tropical Meteorology, Pune

### **Highlights from STIPMEX:**

- This International workshop addresses following:
  - Linkages of Stratosphere-Troposphere Interactions and challenges of prediction of Monsoon weather Extremes
  - How to further improve the Prediction of Monsoon Extremes?
  - New approaches such as AI/ML, cloud resolving model etc. to improve localized extreme events
  
- Supported by Ministry of Earth Sciences, Govt. of India, WMO, WWRP, WCRP, APARC and Forschungszentrum Jülich, Germany
- Around 300 participants from India and 30 different countries of Asian, European, American, and African continents are attending the International workshop.
- Release of online Compendium of Abstract
- Live video link: <https://www.youtube.com/watch?v=xczvZR-BeuU>

*Meghdhoot Hall, IITM; 3.6.2024:* Stratosphere-Troposphere Interactions and Prediction of Monsoon weather EXTremes (STIPMEX) Workshop is inaugurated on 3 June 2024 by Dr. M. Ravichandran, Secretary, MoES, Government of India, and Chief Guest, Dr. Rolf Müller, Director APARC, IPO, Guest of Honor, Dr. Estelle De Coning, Head WWRP, WMO, Guest of Honor Marc von Hobe, Member APARC SSG, and Dr. R. Krishnan, Director of IITM and the Co-Convener of the STIPMEX workshop, Dr. Suvarna Fadnavis & Co-Convener of the Monsoon extreme theme, Dr. P. Mukhopadhyay.

Dr R Krishnan, Director, IITM, extend a warm welcome to all the distinguished delegates and to the conference participants from 30 different countries. Dr R Krishnan stated the importance of the conference as it is integrating the scientific community of weather and climate. He also focused on new initiatives and insights for future pathways of forecasting extreme events. Further he has highlighted that this workshop will serve as a forum for discussing the dynamical, chemical, radiative, and convective processes occurring in the atmosphere during the Asian summer monsoon, and Interaction and feedback of the Asian summer monsoon with large scale atmospheric patterns such as Brewer-Dobson Circulation, QBO and ENSO, etc.

Dr M Ravichandran, Secretary MoES, Govt of India, in his inaugural address (virtual) as a Chief Guest, highlighted the advancements in technology & techniques offering promising solutions in forecasting extreme weather events & also apprised the event's focus on stratospheric chemistry & monsoon extremes. He emphasized on the recent changes/trends in stratosphere-troposphere coupling process, Asian summer monsoon and stratospheric chemistry and also highlighted challenges in forecasting extreme weather and the need of accurate and timely prediction of extreme weather events. Finally, he conveyed his best wishes for success of the conference.

Chief Guest, Dr. Rolf Müller, Director - Atmospheric Processes And their Role in Climate (APARC), IPO highlighted the importance of this workshop is to bring the younger generation closer to the scientific question. He mentioned about the importance of interaction between stratospheric chemistry and dynamics and tropospheric processes. Models are used for projections and forecasts and such models need to be continuously improved through a better understanding of atmospheric processes.

Guest of Honor Marc von Hobe, Member APARC SSG endorsed the growing involvement of institutes and scientists from Asia in research of the tropopause region and thanked IITM and MOES for organizing a landmark event like STIPMEX in India. He also stressed the need for more observations and encouraged engagement in aircraft or balloon campaigns as well as long term ground based monitoring of trace gases. He also congratulated IITM to be a part of collaborative work with Forschungszentrum Jülich for about 10 years. He invited the participants of the workshop to submit their papers for publishing in the Special issue of "Atmospheric Chemistry and Physics" Journal.

Guest of Honor Dr. Estelle De Coning, Head, WMO World Weather Research Programme (WWRP) in his inaugural address said "the World Weather Research Programme, WMO plays a crucial role to advance our understanding of weather phenomena, their predictions such as monsoon as well as the interaction in the entire Earth systems." She mentioned that the WWRP works for the scientific capacity building of developing countries through training and workshops for the improvisation of global weather prediction capacity. She also announced the hosting of upcoming International Monsoon Workshop (IWM-8) in collaboration with IITM in March 2025.

Dr. Suvarna Fadnavis presented the Vote of Thanks to Chief Guest Secretary MoES, Guests of Honours, Director, all delegates, participants, Local Organizing Committee members for success of the workshop.

Over the next five days, several experts from around the world will deliberate on these and related topics and lead to exchange of knowledge across different institutions globally. The detailed schedule is available at <https://sparc-extreme.tropmet.res.in/schedule>

Know more about **details of the STIPMEX:** <https://sparc-extreme.tropmet.res.in/>

The Live streaming links (3-7 June 2024) are as below:

Day 1:- <https://youtube.com/live/xczvZR-BeuU>

Day 2:- <https://youtube.com/live/KpzfeQ-tai4>

Day 3:- <https://youtube.com/live/Mn7hFgsRdNc>

Day 4:- <https://youtube.com/live/iBMHwtVjIVQ>

Day 5:- <https://youtube.com/live/Mlfn7jQECy0>

The workshop and its themes have a global importance and hence it is supported by Ministry of Earth Sciences, Govt. of India, WMO, WWRP, WCRP, APARC and Forschungszentrum Jülich, Germany

As a part of this event, on **2<sup>nd</sup> June 2024**, a **training session** of the international workshop on Stratosphere-Troposphere Interaction and Prediction of Monsoon Weather Extremes (STIPMEX) was successfully conducted with a large participation of ~120 national and international students. In the stratosphere-troposphere interaction training session, hands-on high-altitude specialized balloonsonde measurements of ozone, water vapor, and aerosol backscatter and chemistry-climate modeling were conducted. Students were also given hands-on chemistry-climate models, reanalysis, balloon-borne, and satellite data processing. The international and national experts delivered this training.

In the training sessions on “Prediction of monsoon weather extremes”, practical on predicting extreme events using ECMWF products, operational wildfire smoke forecast, NCEP Forecasting system, UKMO Forecast diagnostic, and information on atmospheric urban digital twins were delivered by international experts. Students participated in STIPMEX training with great inquisitiveness and enthusiasm.

For **STIPMEX related clarifications**, please contact: Dr. Suvarna Fadnavis, Sc-F, IITM ([suvarna@tropmet.res.in](mailto:suvarna@tropmet.res.in)) and Dr. P. Mukhopadhyay, Sc-F & Project Director Monsoon Mission, IITM ([mpartha@tropmet.res.in](mailto:mpartha@tropmet.res.in))

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**Photographs** are available at IITM Photo-gallery: <https://www.tropmet.res.in/234-gallery>

### **Background Information about STIPMEX:**

Over the past few decades Asia including the Indian region has been experiencing extreme weather systems causing unprecedented damage to public property and loss of life such as the unprecedented heavy rainfalls in Kerala during Aug 2018 and 2019, extremely heavy rainfall over Tamil Nadu in December 2023 etc. The current major concern of our society has become to find ways to manage the enhanced frequency of extreme events affecting human lives and property. The NWP models have shown significant improvement in skill over past few decades but predicting a localized extreme event with longer lead, still remains an open question.

Recent research reveals that the stratospheric processes are important for improving the predictability of the troposphere including monsoon. However, the complexities of the underlying mechanisms of stratosphere-troposphere coupling processes are difficult to

incorporate in the model. Stratospheric chemistry controls the magnitude and distribution of many important forcing agents in the troposphere. Influence of stratospheric variability such as sudden stratospheric warmings and their subsequent impact on the troposphere or the quasi-biennial oscillation and its associated teleconnections show an association on Indian summer monsoon rainfall variability. The impact of stratospheric aerosols, and, water vapor are also important for the Indian summer monsoon due to their contributions to radiative forcing. The deliberation in the STIPMEX workshop by the experts from the stratospheric and tropospheric community will bridge the gap of inclusion of stratospheric and tropospheric processes in the model for better prediction of monsoon extremes.

To emphasize this aspect, the workshop will focus and deliberate on all aspects of extreme weather prediction and the latest state-of-the-art model from the leading operational centres of the world such as ECMWF, Germany, NCEP, USA, JMA, Japan, etc. The researchers/experts on the chemistry of stratosphere-troposphere modeling, and observations e.g. aircraft, Lidar, and Radars measurements in the high altitude regions over the monsoon region from the USA, parts of Europe, Japan, and India will discuss the improvement of the model and predictions. The deliberation will bring out the gaps in the current prediction systems and also provide the much-needed pathways for addressing the issue of the prediction of extremes in coming years. The understanding of stratospheric and tropospheric processes will throw insights which may further be helpful in making the NWP models more realistic prototype of the real atmosphere and may help in improving its prediction skill.

The reason for conducting the International workshop on stratosphere-troposphere interactions and Prediction of Monsoon weather Extremes was to make the most of the expertise from two communities (1) stratosphere-troposphere interactions and (2) Prediction of Monsoon weather Extremes attending the STIPMEX workshop and discuss the way forward for the improvement of predictions of weather extremes.

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