

ESSO-Indian Institute of Tropical Meteorology, Pune 411 008
Monthly Summary for the Cabinet
Period: 25 July – 24 August 2018

- ***Mumbai Weather Live (MWL) Mobile App and Multilingual and Voice enabled SAFAR-Air Mobile App were unveiled***

Both the Mobile Apps were released by Secretary, MoES during the Foundation day of MoES, 27 July 2018. **Mumbai Weather Live (MWL) Mobile App** is developed by collating measurements from India Meteorological Department (IMD), SAFAR-Mumbai (IITM) and MCGM measurements to provide live location specific information on rainfall. Presently, it covers about 100 sites spread across Mumbai city, suburban areas, Navi Mumbai and surrounding areas. An **upgraded version of Multilingual (Hindi, Gujarati and Marathi, besides English) and Voice Enabled, SAFAR-Air MobileApp** for air quality services is released.

- ***IITM launched new website for better visibility***

Institute's new website has been made live on 24 August 2018 (www.tropmet.res.in), after performing the web security audit by CDAC. This newly developed dynamic website achieves the Guidelines for Indian Government website (GIGW) by using Content Management System (CMS), adding responsive features, inbuilt customized modules, implementing security audit measures. The website has more than 30 admin modules, 79 sub modules and ~500 static web-pages. This new version of website incorporates improvised navigation, with a better user experience for both mobile and desktop users and introduced many additional features to showcase the R&D of institute.

Monsoon Mission

- Project Extension letter to Dr. G. Mrudula was sent for the Indian project “Development of standalone Boundary Layer Module for National Monsoon Mission”.
- Project Extension letter was issued to Dr. Ruby Krishnamurthy.
- Sanction Orders of MM-II projects were finalized and sent to the respective PIs.

- **Seasonal Prediction**

- The operational seasonal forecast runs (using Monsoon Mission Climate Forecast System) are being carried out at ESSO-IMD. The latest seasonal forecasts are made available at the link: http://imd pune.gov.in/Clim_Pred_LRF_New/Models.html. IITM researchers provided necessary assistance to IMD scientists on this activity.
- CFS forecast data is being evaluated by assessing the skill in simulating observed flow at catchment outlet of Mula reservoir, Maharashtra. This will provide an insight into the quality of the CFS forecast product for hydrological applications. Data required for hydrological modelling are collected from various agencies. Additionally, satellite data was collected for studying land use/land cover dynamics. From Digital Elevation model (DEM) data, watershed delineation and stream definition produced followed by flow direction and accumulation due to which stream network and outlets were created. The model is setup and model run was performed on daily and monthly time step.

- **Extended Range Prediction**

The extended range prediction products for research/scientific use based on **22nd August 2018** initial condition have been made available at <http://www.tropmet.res.in/erpas/>. These forecast products are based on the real time weekly operational forecast generated by IMD using the Multi Model Extended Range Prediction System developed at IITM. Rainfall, Maximum & Minimum temperatures, MJO forecast, soil moisture (0-10cm), Relative humidity, cyclogenesis, **MISO** predictions are also made available at the same link. The MME forecasts are prepared using CFS (T126 & T382) and GFS (T126 & T382). Each resolution of CFS and GFS is having 4 ensemble members. The IMD operational products are made available at http://nwp.imd.gov.in/erf_outlook.php

- **Real time Global Forecast System for Short Range Deterministic Forecast**

The forecast based on Global Ensemble Forecast System (GEFS) T1534 is operationally run by IITM and Global Forecast System (GFS) T1534 is being run by IMD operationally. World’s highest resolution (12km) Ensemble Prediction System (EPS) with 21 ensemble members for short range forecast system based on GEFS (T1534) has been put in place by IITM and handed over to IMD for operational implementation. On 1 June 2018, the high resolution short range EPS was operationalized at IITM. IITM team assisted IMD forecasters by developing various new model diagnostics and products. Experimental forecast rainfall probability for all the blocks were generated and the same were shared with IMD forecasters. Initiatives were taken to share the forecast with the Agrimet division of IMD for generating block level Agro Advisories. The rainfall probability plots were modified based on the feedback of IMD forecasters.

IITM Monsoon Discussion Forum (IMDF) 2018

The **Third** IITM Monsoon discussion seminar with a focus on “Progress of monsoon and future evolution” was held on 7 August 2018. Following are the details of the talk delivered by IITM Scientists:

Lead Speakers	Topic/ Theme
Ms. J. S. Deepa	Oceanic Conditions
Dr. Prasanth Pillai	Seasonal Prediction
Mr. Raju Mandal	Extended Range Prediction
Mr. Tanmoy Goswami	Short Range Prediction

Important Events

- ***Launch of Mumbai Weather Live (MWL) Mobile App***

Mumbai Weather Live (MWL) Mobile App is developed by collating measurements from India Meteorological Department (IMD), SAFAR-Mumbai (IITM) and MCGM measurements to provide live location specific information on rainfall. This mobile app was released during MoES Foundation day on 27 July 2018. Currently, it covers about 100 sites spread across Mumbai city, suburban areas, Navi Mumbai and surrounding areas. A Distrometer has been installed at IMD, Santa Cruz, Mumbai for analyzing microphysical

characteristics during heavy rainfall events in Mumbai. The data will also be helpful for calibrating the Doppler Weather Radar of Mumbai.

- ***Launch of Multilingual and Voice enabled SAFAR-Air Mobile App***

An upgraded version of Multilingual (Hindi, Gujarati and Marathi, besides English) and Voice Enabled, SAFAR-Air MobileApp for air quality services is released by Secretary, MoES on its foundation day 27 July 2018.

- ***IITM participation in Mega Exhibition***

IITM participated in the MoES stall at the Aavishkaar Exhibition "**Vision Maharashtra Pune 2018**" Mega Exhibition, held at Auto Cluster Exhibition Centre, Chinchwad, Pune during 3-5 August, 2018. The MoES stall comprised of IITM team and IMD team. MoES received a shield for its enthusiastic participation and good quality of scientific representation.

- ***International workshop on cloud dynamics, microphysics and small scale simulation (IWCMS 2018)***

Indian Institute of Tropical Meteorology (IITM), Pune organized an International Workshop on Cloud Dynamics, Microphysics and Small Scale Simulation (IWCDMSS) during 13-17 August 2018. It was aimed to bring together talented young scientists, senior scientists and students across the world to exchange ideas and improve the understanding on the physics of clouds and their numerical simulations. Main theme of the workshop was to emphasize importance/application of small scale simulations in large scale models. Extensive discussions on the state-of-the-art small scale simulation models under Direct Numerical Simulation (DNS) and Large Eddy Simulation (LES) paradigms and their link to large scale models was conducted. About 28 speakers and 70 participants attended this workshop including 9 delegates from countries USA, Canada, South Korea and Japan.

- ***Green Skill Development programme (GSDP)_in Air and Water pollution and Emissions:***

Under Government of India's Priority Scheme "Green Skill Development programme (GSDP)" implemented by ENVIS-Secretariat, Ministry of Environment, Forest And Climate Changes (MoEF & CC), IITM-ENVIS centre has started 2 courses based on theme (1) Emission Inventory and (2) Pollution Monitors: Air and Water. The Training Program was inaugurated on 20 August 2018 by the Prof (Dr.) Nitin R. Karmalkar, Vice Chancellor of S.P. Pune University in presence of Mr. Jayanrao Sahasrabuddhe, National Secretary, VIBHA and Course coordinator Prof. Gufran Beig, SAFAR Project Director. This IITM course was attended by 60 participants from all around India having age group of 20 to 60 years. This training comprises of practical hands-on session for 25-45 days in Air and water Pollution and Emission Inventory of Pollutants. Trainees will be collecting baseline data on the emission sectors like transport, biofuel, suspended dust, etc. during the course work. They will also get figures and numbers of pollution emitting sources. These courses will also enable them learning of effects of pollution on human health, major environmental issues, and community conservation issues and finally leading to formulate mitigation strategies. After successful completion of training, participants will get "Certificate" from Ministry of Environment and Forest and Climate Change which will help them for employment.

- ***Launch of IITM new website***

Institute's new website (www.tropmet.res.in) has been made live on 24 August 2018. This newly developed CMS based dynamic website provides a fresh look with additional features to showcase R&D activities of the institute in efficient manner along with social media posts. The website achieves the Guidelines for Indian Government website (GIGW) by using Content Management System (CMS), adding responsive features, inbuilt customized modules, implementing security audit measures. Before launching a web security audit was performed by CDAC. The website contains more than 30 admin modules, 79 sub modules and ~500 static web-pages. This new version of website incorporates improvised navigation, with a better user experience for both mobile and desktop users. The old website is also linked to newly launched website for reference. The Hindi version of the website is under construction.

- ***72nd Independence Day Celebrations***

72nd Independence Day was celebrated at Indian Institute of Tropical Meteorology, Pune and New Delhi Branch Office.

- ***Observance of "Sadbhavana Diwas"***

The "Sadbhavana Diwas" was observed at IITM on 20 August 2018. All the employees of the Institute took a Sadbhavana Pledge administered by the Director on this day at IITM.

- **Program for Development of Skilled manpower in Earth System Sciences (DESK)**

Meeting of Expert Committee for workshops and trainings under DESK was held on 7 August 2018.

Ongoing Developmental Activity

- **Thunderstorm Dynamics:** As a part of expansion of Lightning Location Network, new sensors have been installed at three stations in Kerala namely Allapuzha, Kozhikode and Kasarkode and integrated with Central processor at IITM.
- **CAIPEEX Phase IV Campaign:**
 - Aircraft observations of clouds, aerosols and trace gases are in progress as part of CAIPEEX Phase-IV. These observations are being carried out using both seeder and research aircrafts. Randomization experiment was carried out with a specific focus on hygroscopic seeding. Few aircraft measurements were carried out from Aurangabad airport and the base was shifted to Solapur airport due to operational advantage. C-band radar was used for identifying and tracking the target cloud systems. All ground based observations including in situ measurements of aerosols and trace gases, profiling of meteorological parameters using Radiosonde, Radiometers Wind profilers and Ceilometer are being carried out at Solapur and Tuljapur used for identifying suitable environmental conditions. IITM team is at Solapur for conducting daily met-briefing, planning and aircraft measurements. 114 flying hours have been completed as on 23 August 2018.

- The installation of all the instruments on the 50-m micrometeorological tower at Solapur has been successfully completed. The instruments are fully functional and providing the continuous data.

Field Campaigns/Tours

- IITM scientists were on tour to Aurangabad and NBNSCoE Solapur for the CAIPEEX Phase IV program and aircraft observations conduct during 28 July- 2 August 2018 and 14-28 August 2018 respectively.
- IITM scientist visited INCOIS, Hyderabad during 13-15 August 2018 to finalize a suitable location for relocating MAPAN station in their premises.
- In connection with site selection for installation of Lightning sensors, IITM scientists were on tour to New Delhi, Amritsar during 22-24 August 2018.

Honors and Awards

- **Dr. G. Beig** was invited by Mohanlal Sukhadia University (MLSU), Udaipur as an expert for the scientific audit of environmental science research of the department on 24 August 2018.
- **Dr. S. Chakraborty** was invited as an External Examiner for the project work presentation by the participants of the Advanced Meteorological Training Course (AMTC), Batch No. 178, Semester-II held at MTI, IMD, Pune on 17 August 2018.
- **Dr. Thara Prabhakaran** as WMO nominee attended 'ASEAN Workshop on Weather Modification 2018' in Thailand during 6-9 August 2018. She was also invited as International Centre for Theoretical Studies (ICTS) Senior Associate.
- **MoES Annual Awards 2018 to IITM employees**
 - **Dr. Vinu Valsala** was awarded the Certificate of Merit for the year 2018 for his outstanding contribution in the field of Atmospheric Science and Technology. The award carries a trophy, a citation and a cash prize.
 - **Shri. V.H. Sasane** under category 'Group B'
 - **Shri. Y.J. Pawar** under category 'Group C'
 - **Shri M.S.Waghela** under the category 'Multi Tasking Staff' from the Institute got the MoES Annual Award for Best Employees for the year 2018.

The awards were presented at the hands of Dr. M. Rajeevan, Secretary, MoES on the occasion of Foundation Day celebrations held on 27th July 2018 at New Delhi.

IITM Participation in Important Meetings

- A meeting at AAS Division, IMD, New Delhi during 23-24 August 2018 to discuss the issues related to organizing weather data from agromet services for farmers through selected 55 AMFUs on pilot basis and use of such network services being provided by IMD and develop improved model/technology.

Visitors

- **Shri. B. Anand**, AS & FA, MoES, New Delhi visited IITM during 21-22 August 2018. During the meeting, Acting Director, IITM presented an overview on IITM activities. He also interacted with Project Directors and Administrative Officer on various issues.
- **Prof. Toru Terao**, Faculty of Education, Kagawa University, Japan, co-leading the launching process of the Post-MAHASRI project, visited IITM on 21 August 2018 and discussed with IITM scientists about the possibilities of collaboration with IITM on better understanding of Asian land precipitation over diverse hydroclimatological conditions for better prediction, disaster reduction and sustainable development.

Targets relating to key programmes/ projects along with the performance against the targets during and up to the month in respect of each program/project

Programmes	Target	Unit	Achievement during 25 July – 24 August 2018
Monsoon Mission	<ul style="list-style-type: none"> • To build a working partnership between the Academic R & D Organizations and the Operational Agency to improve the monsoon forecast skill. 	No. of proposals approved	<ul style="list-style-type: none"> ○ Project Extension letter to Dr. G. Mrudula was sent for Indian project “Development of standalone Boundary Layer Module for National Monsoon Mission”. ○ Project Extension letter was issued to Dr. Ruby Krishnamurty. ○ Sanction Orders of MM-II projects were finalized and sent to the respective PIs.

	<ul style="list-style-type: none"> To set up a state of the art dynamical modeling frame work for improving prediction skill of <ul style="list-style-type: none"> (i) Seasonal & Extended range prediction system, (ii) Short & Medium range prediction system 	<p>Issuing of real time experimental forecast to IMD</p>	<ul style="list-style-type: none"> Seasonal Prediction: <ul style="list-style-type: none"> The operational seasonal forecast runs (using Monsoon Mission Climate Forecast System) are being carried out at ESSO-IMD. The latest seasonal forecasts are made available at the link: http://imdpune.gov.in/Clim_Pred_LRF_New/Models.html. IITM researchers provided necessary assistance to IMD scientists on this activity. CFS forecast data is being evaluated by assessing the skill in simulating observed flow at catchment outlet of Mula reservoir, Maharashtra. This will provide an insight into the quality of the CFS forecast product for hydrological applications. Data required for hydrological modelling are collected from various agencies. Additionally, satellite data was collected for studying land use/land cover dynamics. From Digital Elevation model (DEM) data, watershed delineation and stream definition produced followed by flow direction and accumulation due to which stream network and outlets were created. The model is setup and model run was performed on daily and monthly time step. Extended Range Prediction: <ul style="list-style-type: none"> The extended range prediction products for research/scientific use based on 22nd August 2018 initial condition have been made available at http://www.tropmet.res.in/erpa/. These forecast products are based on the real time weekly operational forecast generated by IMD using the Multi Model Extended Range Prediction System developed at IITM. Rainfall, Maximum & Minimum temperatures, MJO forecast, soil moisture (0-10cm), Relative humidity, cyclogenesis, MISO predictions are also made available at the same link. The MME forecasts are prepared using CFS (T126 & T382) and GFS (T126 & T382). Each resolution of CFS and GFS is having 4 ensemble members. The IMD operational products are made available at http://nwp.imd.gov.in/erf_outlook.php
	<ul style="list-style-type: none"> To set up the infrastructure 	<p>Date of Procurement</p>	<p>---</p>

	<ul style="list-style-type: none"> To develop manpower required to improve the prediction skill at all time scales 	No. of scientists undergone training	---
Short Term Climate Prediction and Variability	<ul style="list-style-type: none"> To conduct basic research in all aspects of atmosphere-ocean-land system with special reference to the tropics required to improve weather and climate forecasts of tropics To develop a system for seasonal and extended range prediction of active/ break spells of Indian monsoon and improve its skills 	No. of papers published with Total Impact Factor (IF)	<p style="text-align: center;">2 (Impact Factor: 3.760)</p>
Centre for Climate Change Research	<ul style="list-style-type: none"> To generate reliable answers to all science questions related to regional climate change in the back-drop of global climate change 	No. of papers published with Total Impact Factor (IF)	<p style="text-align: center;">10 (Impact Factor: 31.283)</p>

Metropolitan Air Quality and Weather Services	<ul style="list-style-type: none"> • Development of Chemical-transport modelling capability to understand the linkages of atmospheric Chemistry with weather and climate. • Set up of System for Air Quality Forecasting and Research (SAFAR) for real time monitoring & forecasting air quality in a metropolitan city 	<p>No. of papers published with Total Impact Factor (IF)</p> <p>Date of completion of work</p>	NIL
Physics and Dynamics of Tropical Clouds	<ul style="list-style-type: none"> • To develop expertise in understanding physics and dynamics of clouds required to improve the re-presentation of cloud processes and their interaction with large scale environment in models 	No. of papers published with Total Impact Factor (IF)	<p>3</p> <p>(Impact Factor: 3.717)</p>

Development of Skilled manpower in Earth System Sciences (DESK)	<ul style="list-style-type: none"> To create a large pool of trained and dedicated multidisciplinary earth system and climate research manpower in the country for meeting the research and application requirements of MoES. 	Date	
Academic Programme	<ul style="list-style-type: none"> Ph. D. Awarded 	No. of Ph.D.s	---

**List of Papers published in Peer Reviewed Journals
(15 Papers, Total Impact Factor: 38.76)**

Monsoon Mission (IF: 3.760)

- **Sarkar S, Mukhopadhyay P, Phani Murali Krishna R, Dutta S.**, Coupled model fidelity in capturing atmospheric internal processes during organization and intensification of boreal summer intra-seasonal oscillation. **International Journal of Climatology**, Online, August 2018; DOI:10.1002/joc.5736, 1-15 (**Impact Factor 3.760**)
- **Yadav R.K., Srinivas G., Chowdary J.S.**, Atlantic Niño modulation of the Indian summer monsoon through Asian jet, **Climate and Atmospheric Science**, August 2018, 1:23, DOI: 10.1038/s41612-018-0029-5, 1-11

Centre for Climate Change Research (IF: 31.283)

- **Fadnavis S., Roy C., Chattopadhyay R., Sioris C.E., Rap A., Müller R., Kumar K.R., Krishnan R.**, Transport of trace gases via eddy shedding from the Asian summer monsoon anticyclone and associated impacts on ozone heating rates, **Atmospheric Chemistry and Physics**, 18, August 2018, <https://doi.org/10.5194/acp-18-11493-2018>, 11493-11506 (**Impact Factor 5.318**)
- **Kedia S., Vellore R.K., Islam S., Kaginalkar A.**, Study of Himalayan extreme rainfall events using WRF-Chem, **Meteorology and Atmospheric Physics**, Online, July 2018, DOI:10.1007/s00703-018-0626-1, 1-11 (**Impact Factor 1.159**)
- **Lin X., Ciais P., Bousque P., Ramonet M., Yin Y., Balkanski Y., Cozic A., ..., Tiwari Y.K., Zhou L.**, Simulating CH4 and CO2 over South and East Asia using the zoomed

chemistry transport model LMDz-INCA, **Atmospheric Chemistry and Physics**, 18, July 2018, DOI:10.5194/acp-18-9475-2018, 9475–9497 (**Impact Factor 5.318**)

- **Nandargi S.S., Barman K.**, Analysis of trends and variability in rainfall over West Bengal, **International Journal of Current Advanced Research**, 7, July 2018, DOI:10.24327/ijcar.2018.14229.2570, 14223-14229.
- **Sinha N., Gandhi N., Chakraborty S., Krishnan R.**, Yadava M.G., Ramesh R., Abrupt climate change at ~ 2800 yr BP evidenced by a stalagmite from Peninsular India, Holocene, 2018, DOI:10.1177/0959683618788647 (**Impact Factor 2.324**)
- **Sooraj K.P.**, Terray P., Masson S., Cretat J., Modulations of the Indian summer monsoon by the hot subtropical deserts: insights from coupled sensitivity experiments, **Climate Dynamics**, Online, August 2018, DOI:10.1007/s00382-018-4396-8, 1-29 (**Impact Factor 4.146**)
- **Srivastava A.K., Revadekar J.V., Rajeevan M.**, State of the Climate in 2017 : South Asia, **Bulletin of the American Meteorological Society**, 99, August 2018, S239-S242 (**Impact Factor 7.281**)
- **Vaid B.H., Preethi B., Kripalani R.H.**, Asymmetric influence of the South China Sea biweekly SST on the abnormal Indian Monsoon rainfall of 2002, **Pure and Applied Geophysics**, Online, July 2018, DOI:10.1007/s00024-018-1934-6, 1-18 (**Impact Factor 1.591**)
- **Varikoden H., Revadekar J.V., Kuttippurah J, Babu C.A.**, Contrasting trends in southwest monsoon rainfall over the Western Ghats region of India, **Climate Dynamics**, Online, August 2018, DOI:10.1007/s00382-018-4397-7, 1-10 (**Impact Factor 4.146**)
- **Yadav R.K.**, Relationship between Iran Surface Pressure and India Summer Monsoon, **Vayu Mandal**, 44, June 2018, 23-30

Physics and Dynamics of Tropical Clouds (IF: 3.717)

- **Bera S., Prabha T.V., Malap N., Patade S., Konwar M., Murugavel P., Axisa D.**, Thermodynamics and Microphysics Relation During CAIPEEX-I, **Pure and Applied Geophysics**, Online, July 2018, DOI:10.1007/s00024-018-1942-6, 1-18 (**Impact Factor 1.591**)
- **Bisht D.S., Srivastava A.K., Kulkarni R., Pithani P., Ghude S., Chate D.M., Safai P.D., Tiwari S.**, Chemical characterization of aerosols at an urban site New Delhi: during winter fog campaign, **Journal of Agrometeorology**, 20, August 2018, 257-261 (**Impact Factor 0.402**)
- **Verma S., Rao P.V.N., Shaeb H.B.K., Seshasai M.V.R., Padma Kumari B.**, Cloud fraction retrieval using data from Indian geostationary satellites and validation, **International Journal of Remote Sensing**, Online, June 2018, DOI: 10.1080/01431161.2018.1479792, 1-14 (**Impact Factor 1.724**)

Other Publications

- Flossmann A.I. , Manton M., Abshaev A., Brintjes R., Murakami M., **Thara P.**, Yao Z., **Peer Review Report on global precipitation enhancement activities WWRP 2018 - 1**, WMO, 2018
- **Sreesh M.G., Valsala V., Pentakota S.**, Prasad K.V.S.R., Murtugudde R., A new parameterization for biological production in global models improves carbon cycle simulation, **The Indian Ocean Bubble 2**, IIOE, Issue No. 9, July 2018, 9-11

Financial Achievement:

<i>Month</i>	<i>Expenditure for Projects</i> (in Crores Rs)
1 April 2018 – 23 July 2018	35.15
24 July 2018 – 23 August 2018	6.83
Total	41.98
