

A Report from Indian Meteorological Society and its Local Chapters (October 2020 to March 2021)

1. IMS Webinar on Winter Weather Systems and Their Impacts

Indian Meteorological Society (IMS), India Meteorological Department (IMD) and the Ministry of Earth Sciences (MoES) jointly organized a half-day Webinar on “Winter Weather Systems and their Impacts” on 27th November 2020 starting from 2:30 up to 5 PM (<https://youtu.be/O80R4HD01vw>).

It is well known that India experiences moderately cool weather in winter from November to February with December and January as the coldest months. The Western Disturbances (WDs) are the major weather systems that affect both the hilly regions of northern India and also the Indo-Gangetic plains. Snowfall over J&K, Ladakh, Himachal Pradesh, Uttarakhand and nearby areas are very common during this season. The heavy snowfall causes cold wave and cold day conditions for many days over northern plains of India. Fog during the season disrupts daily life and also disrupts air travel. The onset of winter brings a haze over north India with increase in pollution and causes cardiovascular and respiratory diseases. Extreme cold or warm winter impacts winter crops. In the winter months, cold weather leads to more demand for heating in the residential and commercial sectors and can impact the demand and distribution of power.

The proceedings of the webinar started with the welcome address by Dr. D. R. Pattanaik, Secretary IMS. It was followed by the opening remarks given by Dr. M. Mohapatra, DGM IMD and the President IMS, where he highlighted the impact of winter weather systems on various sectors and the NWP & observational products that are being generated operationally in IMD for the use of various sectors. The inaugural talk on “Winter Weather Systems and Their Impacts -Scope and Objective of the Workshop” was delivered by Dr. D. R. Pattanaik. This was followed by the Technical Session-I entitled ‘Winter Weather Systems and Operational NWP Products’ Chaired by Dr. A. K. Sahai. The speakers in this session consisted of experts like Dr.

Sachin Gude, IITM; Dr. R. Ashrit, NCMRWF; Dr. A. P. Dimri, JNU and Dr. M. S. Sekhar, SASE RDC (DRDO) delivered talks on various aspects of winter weather systems. The Technical Session–II entitled “Impacts of Winter Weather on Various Sectors” was chaired by Prof. S. K. Dash, Immediate Past President IMS. The sectoral experts from Agriculture, Health, Aviation and Power delivered their talks. The speakers included Dr. Ranbir Singh Rana CSK HP Ag University; Dr. Sanjeev Kumar, Director, IIHMR (Retd.); Shri P. P. Singh Chief Airside Officer, GMR DIAL, IGI Airport; and Shri Alok Kumar, POSOCO.



Webinar on Winter Weather Systems and their Impacts, 27 November 2020.

2. E-Conference on Environmental Determinants of Infectious Diseases in India (Focus on COVID-19).

This e-conference was organized by IMS on 7th to 10th December 2020 while focusing on the prevailing COVID-19 pandemic. The epidemiological triad for infectious diseases, including COVID-19, consists of environment, agent and host factors. There is a large body of evidence linking environmental factors such as temperature and humidity with infectious diseases such as malaria, cholera and the like.

However, particularly in the case of COVID-19, the impact of climatological, environmental and extreme weather risk factors such as temperature, humidity and air pollution are less clear. The e-conference also addressed critical challenges of multiple disasters such as when cyclones and COVID-19 co-exist. The indoor environment is also of particular concern including workplace, school and industry settings, especially in terms of ventilation and air-conditioning. Based on the above facts, the following objectives of the conference were set to:

- (i) Comprehend the association of climate, environment and natural disasters with infectious disease in India with a focus on COVID-19.
- (ii) Orient students and scholars with research methods in these areas.
- (iii) Understand how this knowledge can be applied in practice. The main conference was over 4 half-days, with focus on Climate, Air

Pollution, Extreme Weather and Indoor Environment. This e-conference consisted of keynote lectures, expert sessions, panel discussions, posters and oral sessions by scholars. The key note address was delivered by the Chief Guest Dr. Randeep Guleria, Director AIIMS during the opening session. Dr. M. Mohapatra, DGM IMD and President IMS also addressed the participants during the inaugural session. A dedicated “Expert Session on Climatological Determinants of Infectious Diseases” was conducted by IMS and was chaired by Dr. A. K. Sahai, Vice President IMS. Three experts from IMS (Dr. Sagnik Dey, IITD; Dr. Nitish Dogra, IHMR and Dr. D. R. Pattanaik, IMD) and Dr. Ben Zaitchik from Johns Hopkins University delivered their talks during this session.

The e-conference culminated in Bringing out its proceedings, Strengthening scholar research skills, Dissemination via social media and other channels, Expanding the UCHAI community of practice (uchai.net) and the web-link.

Environmental Determinants of Infectious Diseases in India (Focus COVID-19)

Inaugural Session

EMINENT SPEAKERS

Dr. Gwen Collman
Acting Deputy Director
NIEHS/NIH
United States

Dr. M Mohapatra
Director General,
India Meteorological Department

Dr. Randeep Guleria
Director,
AIIMS,
New Delhi, India

KEYNOTE ADDRESS

Dr. Preetha Rajaraman
Health Attache
U.S. Embassy
New Delhi, India

Dr. V M Katoch
NASH-ICMR Chair on Public Health,
Rajasthan University of Health Sciences

DAY: 1, SESSION 2
TIME: 7:30 TO 8:30 PM

Expert Session on Climatological Determinants of Infectious Diseases

Session Chair
Dr. A.K. Sahai
Scientist G, IITM,
Pune

SPEAKERS

Dr. Ben Zaitchik
Associate Professor,
Johns Hopkins University,
United States

Dr. Sagnik Dey
Associate Professor,
Centre for Atmospheric Sciences,
IIT Delhi

Dr. Nitish Dogra
Associate Professor,
IHMR Delhi,
New Delhi

Dr. D. R. Pattanaik
Scientist F,
IMD, New Delhi



Registration link: <https://bit.ly/IHMRDeconf>

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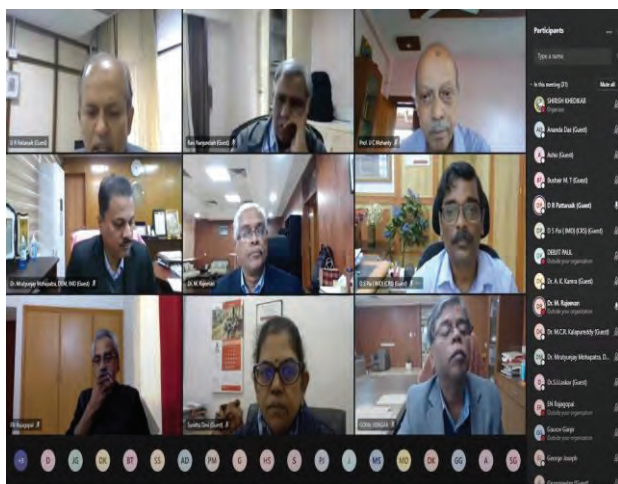
3. Annual Monsoon E-Workshop and National E-Symposium on “Cloud and Precipitation Processes”

Brain Storming Workshop on Monsoon 2020 and National E-Symposium on “Cloud and Precipitation Processes” was jointly organised by MoES, IMD, Indian Institute of Tropical Meteorology (IITM), National Centre for Medium Range Weather Forecasting (NCMRWF) and IMS on 18-20 January, 2021 hosted by IMS Pune Chapter (IMSP).

(<https://youtu.be/KvtJEDrn0zs>, https://youtu.be/dhFR_u0hvWo and <https://youtu.be/mAti7zW9TuE>).

The Brain Storming Workshop on Monsoon 2020 on 18th Jan 2021 was coordinated by IMS National Council. It started with a brief welcome address by Dr. D. R. Pattanaik, Secretary, IMS. He also briefly talked about the objective of the workshop.

Dr. M. Rajeevan, Secretary MoES in his opening remarks highlighted the purpose of this one-day workshop, which is basically to take review of the forecast performance of monsoon 2020 at different time scales, challenges faced during the monsoon monitoring and early warning and also to plan for improving monsoon forecasting and services to different sectors for the coming monsoon season.



The Technical Session-I on Observational Features and Forecasts of Monsoon 2020 was chaired by Prof. U. C. Mohanty and co-chaired by Dr. M. Mohapatra, IMS President and DG, IMD. There were 7 talks on different aspects of monsoon-2020 including the observational features, forecasts

performance by operational NWP models at different time scales starting from seasonal, extended range, medium range and short range to the future plans.

The Technical session-II on Sectoral Applications was chaired by Dr. Ajit Tyagi and co-chaired by Dr. E. N. Rajagopal, where the flood forecasting aspects of 2020 monsoon along with the issues and challenges pertaining to the impact based forecasting of heavy rainfall have been discussed by the experts.

The Technical session-III on ‘New Modelling Plan for Monsoon 2021’ was chaired by Prof. J. Srinivasan, IISc and co-chaired by Dr. Ravi Nanjundiah. There were 4 talks on new modelling plan on data assimilation, model development and new model forecasting strategy to be adopted from 2021 monsoon season by scientists from NCMRWF & IITM.

After the daylong deliberations on the topic of monsoon, the Concluding Session was chaired by Dr. M. Mohapatra, DG IMD. He summarized the day long presentations and discussions. He invited comments & suggestions from seniors, chairmen of the technical sessions and experts in the meeting. Based on these comments and the discussions the final recommendations were prepared. A formal vote of thanks was presented by Dr. D. R. Pattanaik, Secretary, IMS

The e-workshop on “Cloud and Precipitation Processes” on day 2 and day 3 (19-20 Jan 2021) was co-ordinated by IMS Pune Chapter.

4. Azadi Ka Amrit Mahotsav: E-Conference on “The Ocean, Our Climate and Weather”

On the occasion of the World Meteorological Day, IMD, IMS and Ocean Society of India (OSI) jointly organized a half-day E-Conference on the theme of World Meteorological Day “The Ocean, our Climate and Weather” from 2:30 to 5:15 PM on 23rd March, 2021. The Secretary, MoES was the Chief Guest on this occasion. There were four talks by four distinguished scientists in the areas of Atmospheric and Oceanic Sciences. (<https://youtu.be/JgXma9Vpd10>).



Azadi Ka Amrit Mahotsav

5. IMS Annual Symposium TROPMET-2020

As in the past years, this year also IMS organized the National Symposium called TROPMET in the midst of COVID-19 pandemic, 14-17 December, 2020 jointly by the North Eastern Space Applications Centre (NESAC) and Indian Meteorological Society – Shillong Chapter. The theme of TROPMET-2020 was “Weather and Climate Services over Mountainous Regions”. The symposium was organized in the virtual mode and it focused on all the aspects of weather and climate over the mountainous regions. The atmospheric processes over these regions are different from those over the plains and therefore need a different analysis and modeling approach to include the complexities of such regions. Such terrains are also more prone to extreme weathers. TROPMET-2020 provided the platform to bring together atmospheric scientists, oceanographers, agricultural scientists, policy makers, disaster managers and other related experts to discuss and share knowledge, experience, and information for the benefit of the society.

For the first time in the history of IMS, this symposium was conducted virtually with all the controls set at NESAC, Shillong with the support from the conference management partner M/s ALPCORD Network. Efforts were made to provide uninterrupted, user friendly, real 3D feel with a nicely designed lobby, three separate halls namely Himalaya, Brahmaputra, and Ganga hall for three parallel technical sessions, e-poster area, e-exhibition areas, etc. Most of the programs were

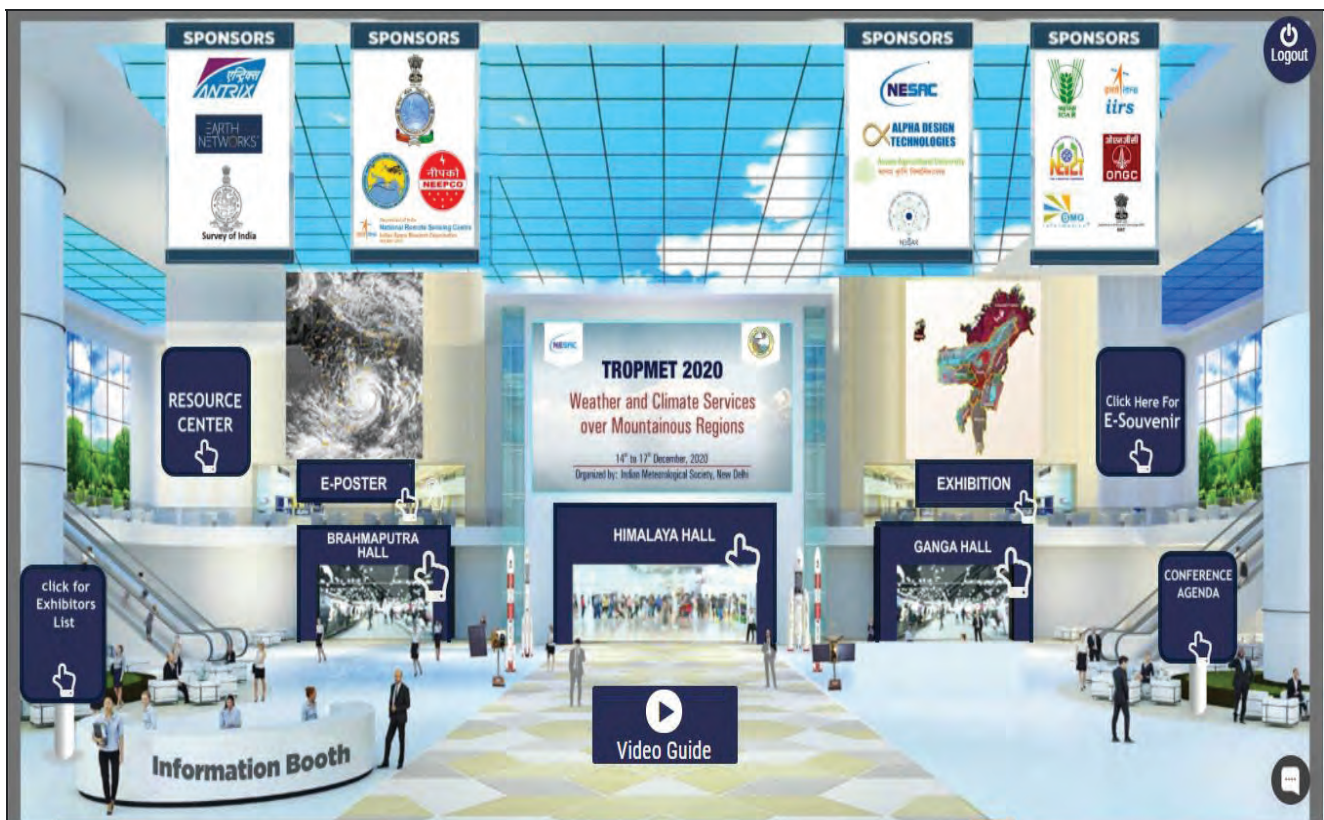
conducted at the Himalaya Hall, while the other two halls were used only for the parallel sessions during the technical program. The symposium was hosted on the web-based platform www.tropmet2020.webconevents.com for ease of access and was provided with video guide on how to use and explore the entire virtual platform. Each registered delegate was given a user ID and password to log-in in the portal. The presentations were made using a separate CISCO WEBEX link and the presentations along with the video of the speaker were fed to the web-portal. The participants could ask questions using the CISCO-Webex chat box as well as using the Q&A tab available in the symposium portal. The whole program at the Himalaya hall was also made available at the YouTube channel of IMS.

A dedicated web portal www.tropmet2020.in was created to facilitate registration of delegates which commenced on September, 2020 and continued till the end of the symposium. 470 delegates from India, United States of America, United Kingdom, Sri Lanka, and Myanmar registered using the portal. A nominal registration fee was charged for the delegates to meet the required expenditures. The symposium received overwhelming response with 314 abstracts submitted. The review committee recommended 201 abstracts for oral presentation and 113 for posters. The entire symposium was divided into 21 technical sessions, four plenary sessions, 3 sessions for popular and memorial lectures, one session for industry presentations, in addition to the inaugural and valedictory sessions. One special talk by Dy Secretary General of World Meteorological Organisation (WMO) was organised.

The inauguration of the symposium was held during 10:00 to 11:15 AM on 14 December, 2020 at the Himalaya hall. Hon’ble Secretary of Ministry of Earth Sciences, Dr. M. N. Rajeevan was the Chief Guest while Shri Moses K. Chalai, Hon’ble Secretary of North Eastern Council, Shillong was the Guest of Honour. The panel during the inauguration program also included Dr. M. Mohapatra, President IMS and Director General IMD; Shri P. L. N. Raju, Director, NESAC; and Dr. D. R. Pattanaik, Secretary, IMS.



The Inauguration program of TROPMET-2020.



Virtual lobby in the TROPMET-2020 Symposium.



The Himalaya Hall during the symposium. Other Halls were of similar design.

WEATHER, CLIMATE, WATER
TEMPS, CLIMAT, EAU



WMO OMM
World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
世界气象组织

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Message from WMO

WMO congratulates the Indian Meteorological Society for organizing the virtual symposium on weather and climate services over mountain regions.

WMO attaches great importance to the development of better climate services for the mountainous Hindu-Kush region, known as the Third Pole, which provides water supplies for about 45% of the world’s population.

Mountains are often referred to as “the water towers” of the world. Rising global temperatures are causing changes to mountain meteorology, hydrology, and ecology, and increasing the risk of local and downstream disasters.

In this context, the symposium is an important event for fostering coordination on adapting the weather and climate services to meet evolving needs of mountain and downstream regions.

We wish you a successful event.

Dr Elena Manaenkova, the Deputy Secretary General of WMO, will be pleased to address the symposium during the concluding segment.

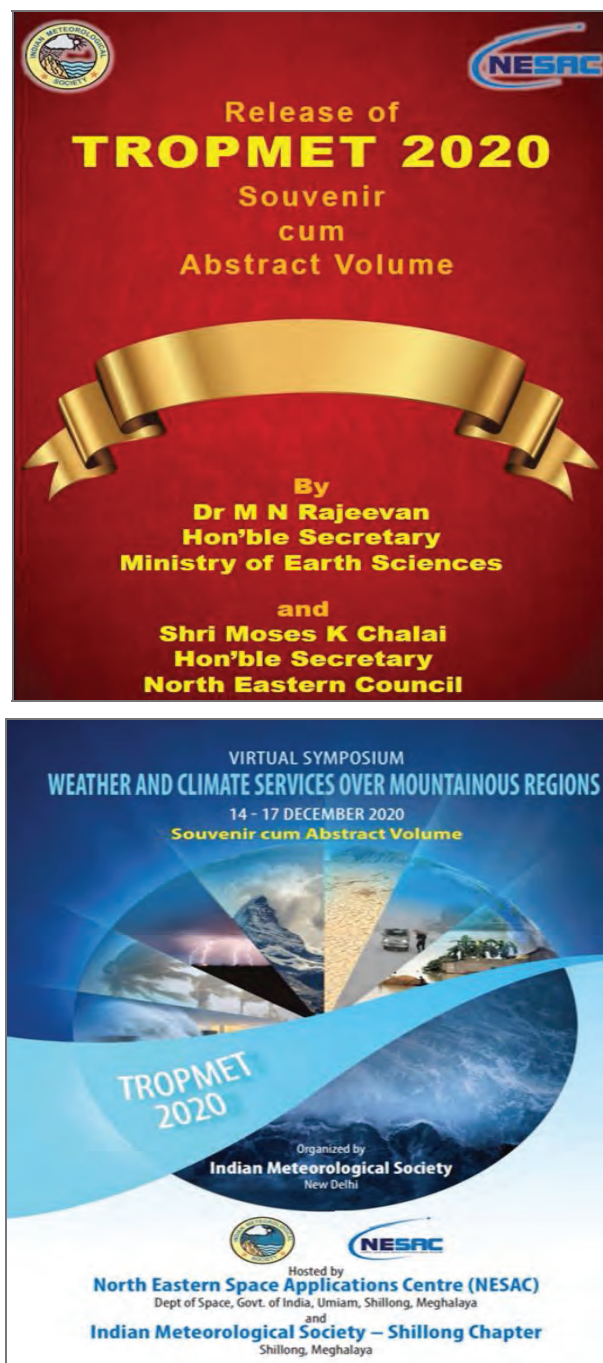
Message from WMO.

The program started with an invocation by NESAC students and lighting of holy lamp digitally. This was followed by welcome address by Shri P. L. N. Raju. He welcomed all the panelists and the participants and thanked IMS for giving the opportunity to NESAC and IMS-Shillong Chapter to host TROPMET-2020. He informed that it was initially planned to be a physical symposium, however due to the movement restrictions because of COVID-19 pandemic, the symposium was conducted virtually. He briefed about all the preparations made and requested delegates to actively participate in technical sessions and plenary talks. Dr. D. R. Pattanaik welcomed the participants and the panelists on behalf of IMS. He briefed on IMS activities and the importance of TROPMET symposium at the national level. He informed that two legendary meteorologists from India, Dr. S. Raghavan and Dr. G. B. Pant left us for the heavenly abode. IMS paid digital tribute to both of them. Dr. Pattanaik also informed that the Secretary General of WMO has wished for the success of the TROPMET-2020 and has deputed Dr. Elena Manaenkova, Deputy Secretary-General, WMO to deliver a talk during the valedictory session. He read out the message from WMO on this occasion. He also mentioned that WMO conducted a High Mountain Summit during 2019 and a video depicting the proceedings of the Summit was sent from WMO for screening during the event. The documentary was screened during the inauguration program and was also screened during the break times.

Dr. M. Mohapatra during his address explained the reason for selecting the theme of the current TROPMET symposium. The importance of weather and climate services for the mountainous regions including the complex NE region of India and its challenges were highlighted by him. This was followed by virtual release of the souvenir cum abstract volume by the Chief Guest and Guest of Honor.

Guest of Honor, Hon'ble Secretary, NE council stressed on the importance of improved services and enhancement of observatories to address the challenge posed by severe weather and climate change that can derail the livelihood options for the

indigenous population living over the mountainous regions.



Release of Souvenir cum abstract volume.

Chief Guest of the program, Hon'ble Secretary, MoES stressed on the utilization of advanced technology and greater involvement of younger generation to develop solutions for the problems faced by the population living in mountainous regions. There was a consensus that different department need to join hands to address the complex problems of weather and climate services over the mountainous regions.

Plenary Sessions:

The first plenary session was conducted just after the inauguration program during 11.30-13.15 Hrs at Himalaya Hall. The session was chaired by Prof S. K. Dube and Prof. U.C. Mohanty. There were three lectures during this session by Dr. M. N. Rajeevan, Secretary, MoES on India's Monsoon Mission, followed by Dr. M. Mohapatra, DG, IMD on Impact Based Forecasting & Risk Based Warning: Advancement & Challenges. The last lecture of the session was by Dr. Satish Shenoi, Former Director, INCOIS on Discovery of Barotropic sea level variability in the tropical Indian Ocean driven by Madden-Julian Oscillation. Dr. Rajeevan explained the details of Indian Monsoon Mission in a very efficient and brief manner. He pointed out how the monsoon mission growing up in India day by day. He further extended his explanation regarding the future prospect of the monsoon research and its necessity. Dr. M. Mohapatra further added the IMD's new concept of Impact based forecasting system & Risk based warning circulation. He explained how such methodology combines the traditional Numerical weather prediction model and big data analyses using Artificial Intelligence. Later on Dr. S. Shenoi elaborated the research on the discovery of barotropic sea level variability in the tropical Indian Ocean driven by the Madden-Julian Oscillation.

The second day started with commencement of the second plenary session of TROPMET, which was conducted during 10:00 to 11:30 Hrs at Himalaya Hall. The session was chaired by Prof S. K. Dash and Dr. K. J. Ramesh. There were three lectures during this session by Dr. R. S. Nanjundiah, Director, IITM on Use of AI/ML in Weather and Climate Studies The second lecture was by Dr. R. Krishnan, Executive Director, CCCR, IITM on Understanding the recent observed changes in the activity of western disturbances over the Western Himalayas. The third and final lecture was by A.K. Sahai, Scientist G, IITM on Sub-seasonal to Seasonal Prediction Initiatives and Progress.

The third plenary session of TROPMET-2020 was conducted during 10:00 to 11:30 Hrs at Himalaya Hall on 16 December, 2020. The session was

chaired by Dr. R. K. Datta and Dr. L. S. Rathore. There were three lectures during this session with the first one by Prof B N Goswami on "Looking beyond TOGA for Prediction and Predictability of Indian Summer Monsoon Rainfall". The second lecture was by Dr. Sunil Singh on "Ocean Circulation - Plate Tectonics - Climate Coupling", while the third and final lecture was on "A possible research framework to link weather and climate with COVID-19" delivered by Dr. S. K. Behera. The lectures focussed on varied areas on what can modulate climate and the impact of weather and climate on human health.

The 4th Plenary session consisted of three presentations. This session was conducted during 10:00 to 11:30 Hrs at Himalaya Hall. The session was chaired by Dr. H. N. Srivastava and Prof. D.V. Bhaskar Rao. Shri P L N Raju, Director, NESAC was also present and welcomed all the speakers and session chairs. The first lecture was delivered by Dr V K Dadhwal, Director of Indian Institute of Space Science and Technology, while second and third lectures were delivered by Dr. Akhilesh Gupta, Advisor, Department of Science and Technology, Government of India and Dr. Kala Chand Sain, Director of Wadia Institute of Himalayan Geology, respectively. Dr Dadhwal spoke about "Understanding Biogeochemical Cycle of Carbon for India using earth observation data" and stressed on use of space technology for different components of carbon related studies associated with climate and climate change. Dr. Gupta delivered his lecture on "Climate Research in India: Recent Progress and Way Forward" and informed about different initiatives taken by DST to study, quantify, and mitigate climate change impacts. Dr. Sain spoke on "Climate Change Impact on Himalayan Glaciers" and highlighted the very important issue on climate change impact on the very fragile ecosystem of the Indian Himalayan region. The lectures were followed up by question and answer sessions by the audience where several questions and clarifications were raised.

Memorial lectures:

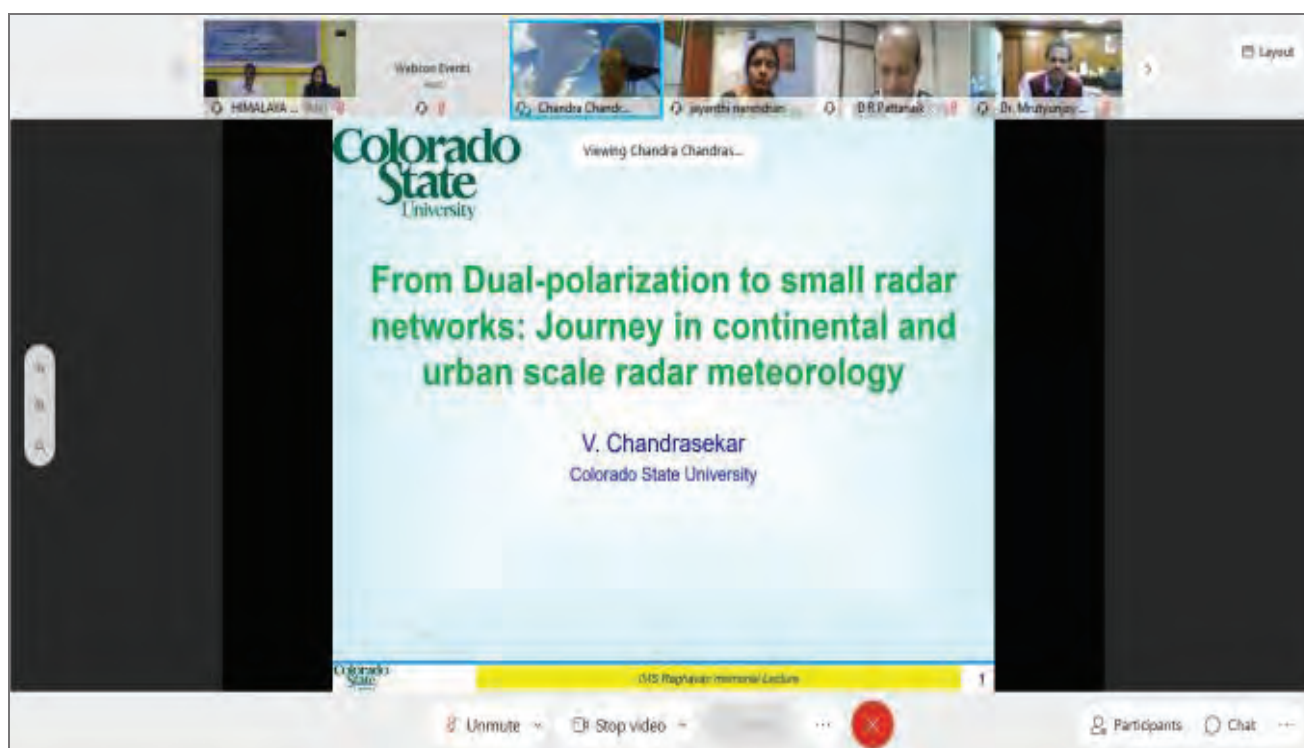
Two eminent Scientists, Mr. S. Raghavan and Dr. G. B. Pant, who contributed immensely to the field

of Atmospheric Sciences left for heavenly abode during 2020. IMS paid tribute to these great scientists and organised two memorial lectures during the TROPMET-2020. Dr. Raghavan memorial lecture was organized in the first day during 18:30 to 19:30 so that everybody can attend it after first technical session. Dr. N. Jayanthi, Former ADGM, IMD was the Chairperson for this

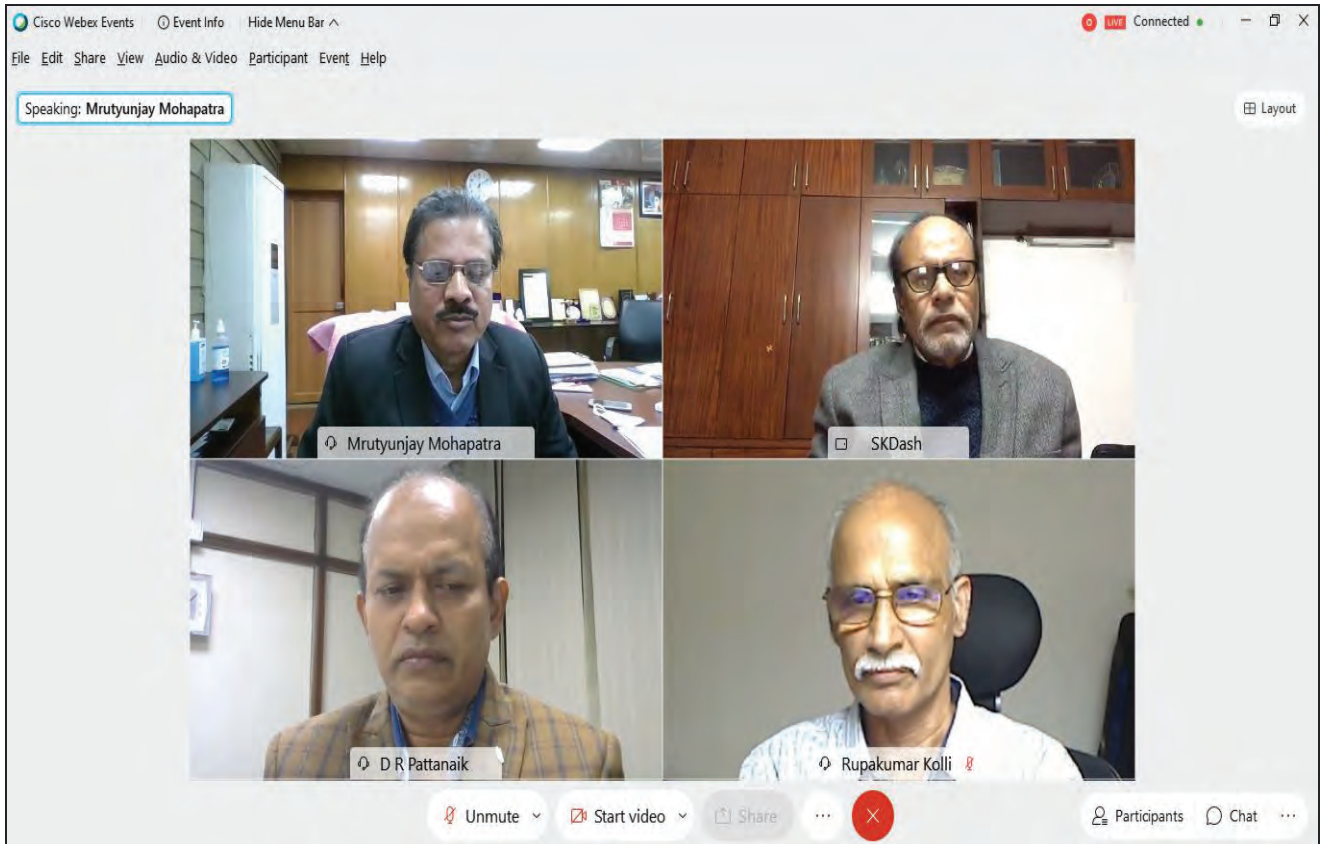
session. The lecture was delivered by Dr. V. Chandrasekar, University Distinguished Professor, Colorado State University, USA on Radar Meteorology for Complex Terrain: Small Radar networks. The talk highlighted the importance of Radar, particularly the small radar for nowcasting of severe storms. His experience with US radar network was explained and covered



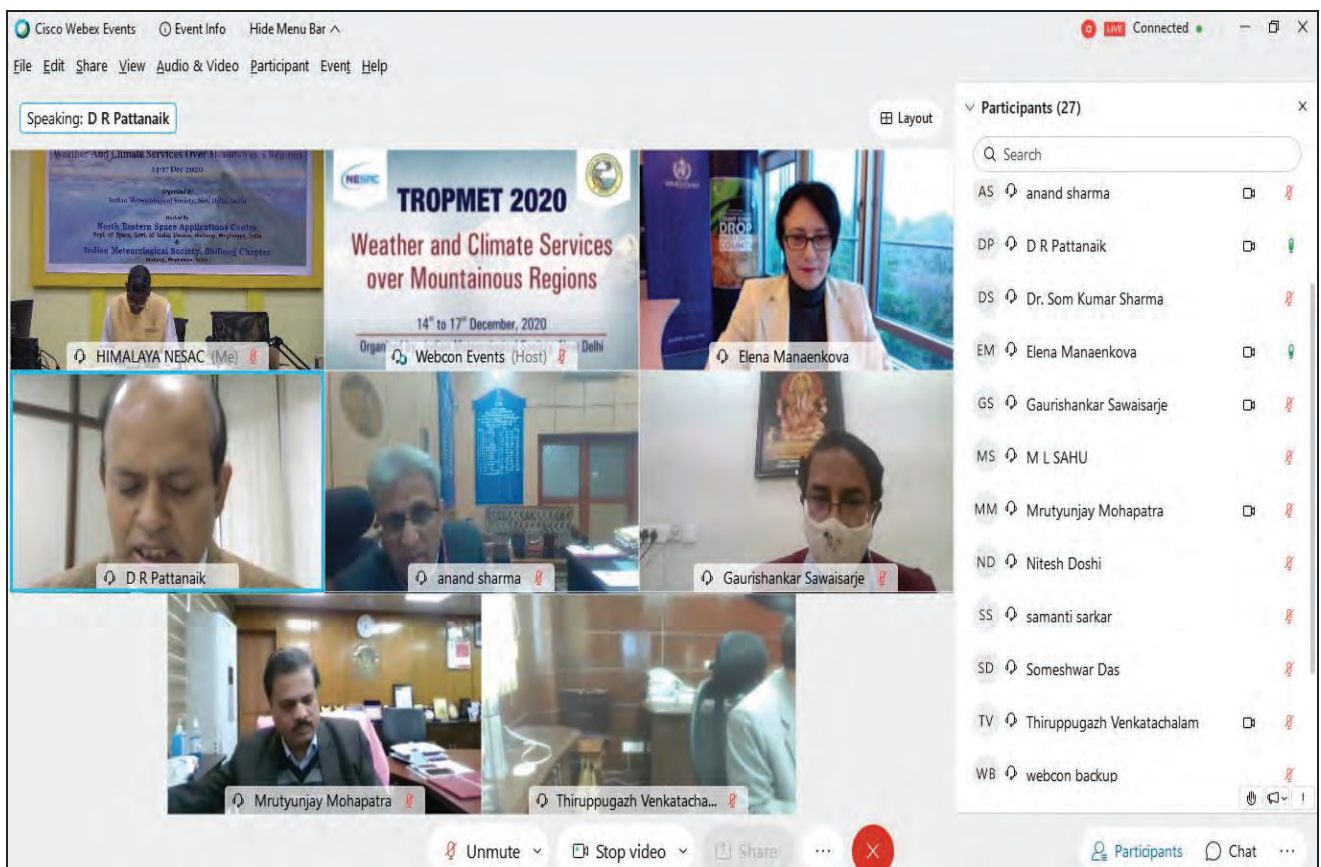
Tribute to Mr. S. Raghavan and Dr. G. B. Pant.



Mr. S. Raghavan Memorial Lecture in progress.



Panelists during the Dr. G. B. Pant memorial lecture.



Dy. Secretary General, WMO (top right corner) during the special talk.

many basic parameters of polarimetric radar. He also emphasised on challenges of extreme precipitation and its forecasting. He highlighted the gap between the observation and modeling and called on to reduce the gap. He mentioned that the scenario is poor in India. He also stressed on citizen centric instrument network to encourage interest in meteorology. The last program of the second day of TROPMET-2020 symposium was Dr. G. B. Pant Memorial Lecture. Dr. P. C. Joshi, Former Group Director from SAC was the Chairman for this session. He gave a brief life history of Dr. G. B. Pant and explained his contributions in development of atmospheric science research in India. The memorial lecture was delivered by Dr. Rupa Kumar Kolli, Executive Director, International CLIVAR Monsoon Project Office (ICMPO), on Understanding Climate and Climate Change over the Himalayas: Dr. G. B. Pant's legacy. The importance of Himalaya for the Indian sub-continent and also for the world weather and climate was very efficiently explained by Dr. Kolli. Dr. S. K. Dash mentioned about his fond memories of Dr. Pant. Dr. M. Mohapatra also shared his memories with Dr. G. B. Pant and thanked Dr. Kolli for delivering the lecture.

Popular talk:

A popular talk was organized on the third day of symposium during 16:30 to 17:30 at Himalaya Hall. Dr. Shailesh Nayak, Director, National Institute of Advanced Studies (NIAS) & Former Secretary, MoES has delivered a talk on Recent Developments of Remote Sensing in Weather and Climate Applications. The session was moderated by Shri P. L. N. Raju, Director, NESAC and Dr. D. R. Pattanaik, Secretary, IMS. Dr. Sailesh Naik highlighted the progress achieved in the fields of weather and climate research with the progress of the space technology and with the utilization of other remote sensing tools.

Special talk:

A special talk was organised on 17th December, 2020 before the valedictory session. This talk was delivered by Dr Elena Manaenkova, Deputy Secretary-General, WMO. She delivered her talk on “WMO - International Cooperation for Improved

Weather and Climate Services for Mountain Regions”. She briefed about the WMO’s initiatives on mountain meteorology and discussed about the outcome of the High Mountain Summit organized by WMO in 2019. She congratulated IMS and NESAC for the successful conduct of TROPMET-2020.

Technical Sessions:

There were seven technical sessions running in parallel in three different halls at Himalaya Hall, Brahmaputra Hall, and Ganga Hall respectively. Altogether there were 21 sessions with 21 lead talk by eminent scientist or subject experts covering all 17 themes.

Industry presentations:

This session was chaired by Shri P L N Raju, Director, NESAC and Co-Chaired by Shri M Somorjit Singh, Scientist, NESAC. Two industries named as M/s NEEPCO (North East Electric Power Corporation) and M/s EARTH NETWORKS presented during this session.

E-Poster presentations:

TROPMET-2020 had a dedicated poster presentation session. Posters were arranged theme wise with different links. All the poster presenters were requested to send a video recording of their presentations. However, only 32 poster presenters send the video recorded presentations. Those video presentations were put using a separate link “E Poster Videos”. The posters were reviewed by a committee by making phone call to the presenters and based on their reply, six awards have been given to the poster presenters.

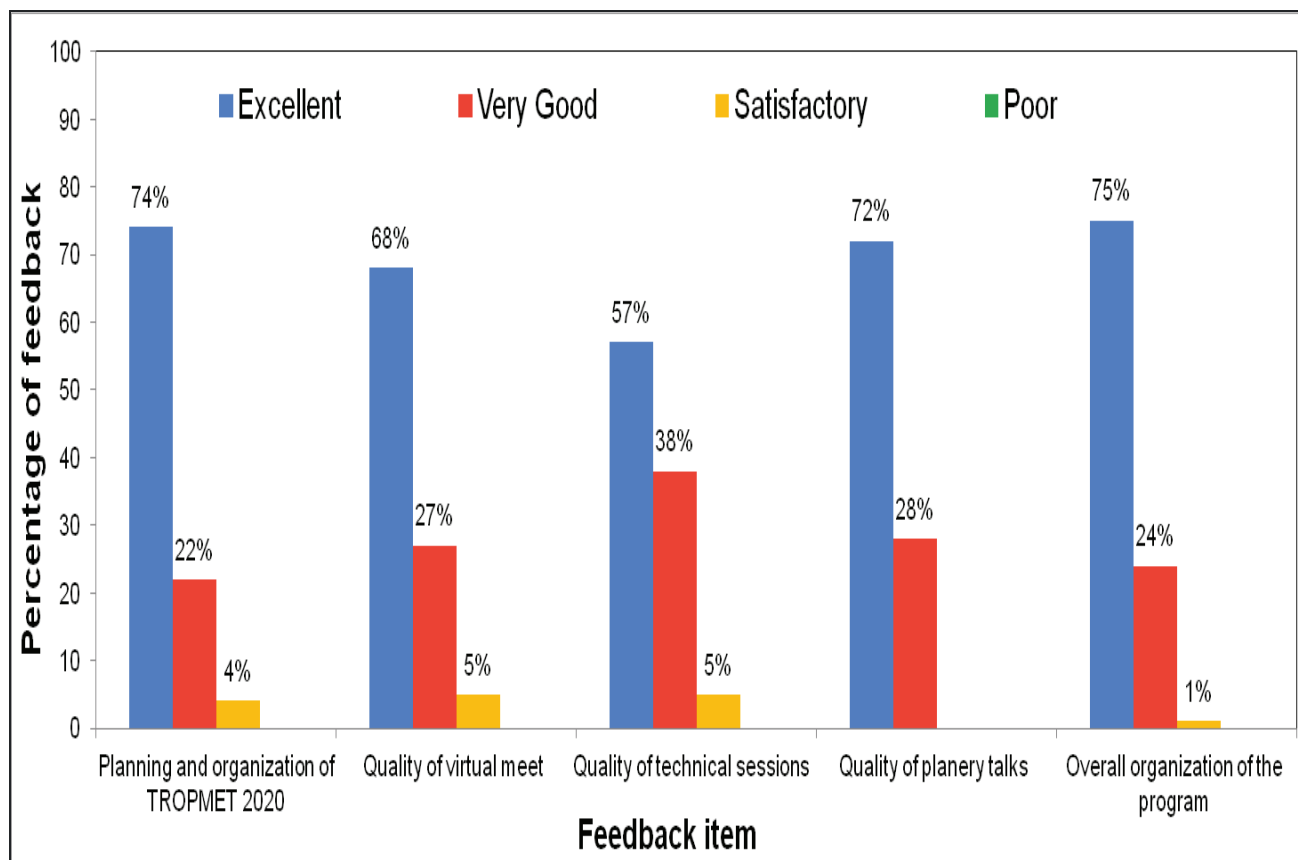
TROPMET-2020 also had provided opportunities for exhibition by the Industry, research organisations, academic institutes, etc. A dedicated hall was arranged for online exhibition by each participant. Altogether 13 institutes and industries participated in e-exhibition. Each exhibitor was provided dedicated digital stall to showcase their products and services. In addition to displaying posters in each stall, the exhibitors could also share their product videos, demonstrations in their respective areas. The exhibition area was visited by a large number of delegates.

TROPMET 2020
Weather and Climate Services over Mountainous Regions
 14th to 17th December, 2020
 Organized by: Indian Meteorological Society, New Delhi

E-Posters Theme

- T - 1: DYNAMICS AND PHYSICS OF OROGRAPHIC CLOUDS AND PRECIPITATION
- T - 2: LIGHTNING PHYSICS AND FORECASTING
- T - 3: NUMERICAL WEATHER PREDICTION, DATA ASSIMILATION, AND FORECASTING IN COMPLEX TERRAIN
- T - 4: MONSOON PREDICTION AND DYNAMICS OVER COMPLEX TERRAIN
- T - 5: BOUNDARY LAYERS AND TURBULENCE IN COMPLEX TERRAIN
- T - 6: THE MOUNTAIN CRYOSPHERE (SNOWPACK, GLACIERS, AVALANCHES, ETC.)
- T - 7: CLIMATE CHANGE AND VARIABILITY OVER COMPLEX TERRAIN
- T - 8: LAND-OCEAN-ATMOSPHERE INTERACTIVE PROCESSES
- T - 9: WEATHER AND CLIMATE SERVICES FOR FARMERS
- T - 10: IMPACT OF CLIMATE VARIABILITY/CHANGE ON AGRICULTURE
- T - 11: HYDRO-METEOROLOGICAL DISASTERS AND MANAGEMENT
- T - 12: ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, AND DEEP LEARNING IN WEATHER AND CLIMATE RESEARCH AND SERVICES
- T - 13: REMOTE SENSING OF ATMOSPHERE, GEOPHYSICAL PARAMETER RETRIEVAL, CALIBRATION, AND VALIDATION
- T - 14: AEROSOL-CLOUD-PRECIPITATION INTERACTIONS
- T - 15: WEATHER AND CLIMATE FOR HUMAN HEALTH
- T - 16: INDIGENOUS INSTRUMENTATION FOR ATMOSPHERIC PROFILING (RADARS, SODARS, LIDAR, WEATHER STATION, ETC.)
- T - 17: SEVERE WEATHER AND COMPLEX TERRAINS

Theme-wise E-poster arrangements.



Overall feedback received from 236 delegates.

Valedictory program:

The valedictory program was held on 17th December, 2020. The session was moderated by Shri P L N Raju, Director, NESAC. The panel included Dr M Mohapatra, DG, IMD, Prof Bidyut Deka, Vice Chancellor, Assam Agricultural University, Dr. V. Thiruppugazh, IAS, Additional Secretary (Policy & Plan), NDMA, Dr Ajit Tyagi, Former DG, IMD, Dr Shantanu Bhatawdekar, Director, EDPO, ISRO HQ, and Dr D R Pattanaik, Secretary, IMS.

Feedback:

The organizing committee requested feedback on various aspects of the virtual symposium from all the delegates using google form. 236 delegates provided their feedback. The feedback was very positive and all delegates were very happy with the arrangements. The summary of feedback received is provided in the bar diagram.

6. IMS Ahmedabad (IMSA) Chapter

Ahmedabad chapter is one of the active chapters of IMS dedicated to spreading awareness of meteorology and allied subjects in different parts of the society. Although its activities in the last year were severely affected by the Covid-19 pandemic, yet a good number of events were organized with the help of digital platforms. All the events were highly successful and it all happened because of the active support and well wishes of our members.

6.1 Annual Monsoon talk

This annual talk organized on October 16, 2020. This time the talk was delivered online by Dr. M. Mohapatra, DG IMD on “Monsoon-2020: Scientific Issues and Challenges”. More than two hundred members from different chapters of IMS attended the event.

6.2 Antarctica Day

IMSA in collaboration with Indian Society of Remote Sensing, Ahmedabad Chapter (ISRS-AC) and Indian Society of Geomatics, Ahmedabad Chapter (ISG-AC) celebrated the Antarctica Day on December 1, 2020. In this event, an online talk on

“India in Antarctica” by Dr. Rasik Ravindra, former DDG, GSI and former Director NCPOR was organized.

6.3 National Science Day

In 2021, IMSA began its activities by celebrating this day jointly with ISRS-AC and ISG-AC. On that occasion, a popular talk on “Raman Scattering: Its usefulness in Science and Society” by Dr. Som Kumar Sharma, Associate Professor, Physical Research Laboratory was held on February 28, 2021.

6.4 World Meteorological Day

IMSA jointly with ISRS-AC and ISG-AC celebrated the WM Day on March 23, 2021 by organizing a popular lecture on “Ocean Observations, Information and Advisory Services” by Dr. T. Srinivasa Kumar, Director, Indian National Centre for Ocean Information Services (INCOIS).

6.5 Publication of Monsoon and Winter Issues of Society Newsletter E-Megha (<http://imsa.net.in/emegha.php>)



Release of Monsoon edition of E-Megha by Dr. M. Mohapatra.



Offering Dr. M. Mohapatra a small token of appreciation on behalf of IMSA after Annual Monsoon Talk (16-October-2020).



Release of Winter edition of IMSA newsletter E-Megha by Dr. T.Srinivasa Kumar.



Offering Dr. T. Srinivasa Kumar a small token of appreciation on behalf of IMSA on World Meteorological Day (23-March-2021).

7. IMS Chennai (IMSch) Chapter

One event was organised by IMSCh Chapter during October 2020 to March 2021. Under the joint auspices of Regional Meteorological Centre, Chennai and IMSCh Chapter a webinar on "Review of Monsoons 2020" was conducted on the occasion of World Meteorological Day on 23 March 2021. The keynote lecture on the theme "The ocean, our climate and weather" was delivered by Dr. R. Venkatesan, Scientist-G from NIOT Chennai. Advances in ocean technology and observational techniques over the oceans were highlighted. The other speakers from IMD reviewed the performance and salient features of southwest and northeast monsoons 2020. Over 60 online participants attended the webinar.

8. IMS Cochin (IMSCo) Chapter

The annual General Body Meeting of IMSCo was conducted on 29.1.2020 through online mode and 36 members attended the meeting. As per the agenda, the meeting unanimously elected the new office bearers of IMSCo Chapter. The committee agreed to organize INTROPMET-2021 at Cochin under the chairmanship of Prof. K. Mohankumar and Dr. S. Abhilash as organizing secretary. Subsequently the proposal for conducting INTROMET-2021 with the main theme "Changing Climate: Consequences and Challenges" was approved by IMS National Council. The first circular was released in March.

The following webinars were held by IMSCo during this period:

Dr. K. Mohankumar delivered the key-note address in "FDP on Climate Science" organized by the School of Environmental Sciences, CUSAT & Advanced Center for Atmospheric Radar Research, CUSAT during 9-13 November, 2020.

Prof. B. Chakrapani delivered invited talks in "FDP on Climate Science" on the topics Present Climates on Earth and Energy Feedbacks & Role of Oceans in Climate.

Dr. S. Abhilash delivered 10 invited talks as resource person on (i) "Global Warming and its

Impacts” in the Short Term Course on Disaster Management conducted by UGC-Human Resource Development Centre (HRDC), University of Calicut on 27.2.2021; (ii)“Climate Change & Challenges in Attaining Sustainable Development Goals” in the Short Term Course on Disaster Management conducted by UGC-Human Resource Development Centre (HRDC), University of Calicut on 3.3.2021; (iii)“Climate Change and Extreme Weather Events” in the refresher course in Earth sciences by UGC-Human Resource Development Centre (HRDC), Kannur University on 17.3.2021; (iv) “Climate change and disaster risk reduction” in the webinar series conducted by M. S. Swaminathan Botanical Garden on 13 March 2021; (v)“Challenges posed by climate change” in the Training of Trainers (ToT) program on Climate change & Climate adaptive agricultural practices jointly organized by NABARD and Shreyas, Wayanad on 9.2.2021; (vi)“Global warming and Extreme weather events” in the webinar conducted by MES College, Marampally on 4.3.2021; (vii)“The climate factors on the recent extreme rainfall events over Kerala“ in the Annual Monsoon E-Workshop and National E-Symposium on “Cloud and Precipitation Processes” jointly organized by Indian Meteorological Society and Savitribai Phule Pune University during 18-21 January 2021; (viii)“Climate change and Extinction crisis” in the High-end workshop on Solar activities and their influences in the Heliosphere and Planetary Atmospheres conducted by National Institute of Technology, Calicut during 8-14 March 2021; (ix)“Genesis, Evolution and Future Prospects of the Operational Extended Range Prediction System” in the webinar organized by Indian Meteorological Society, Pune Chapter during 25-26 March 2021 and (x)“Science of Climate Change: Past Climate: How do we Detect Climate Change & Natural Causes”, in “FDP on Climate Science” organized by School of Environmental Sciences, CUSAT & Advanced Center for Atmospheric Radar Research, CUSAT during 9-13 November, 2020.

Dr. M.G. Manoj delivered four invited talks which includes (i)‘Changing Climate and Disaster Risk Reduction’ in the Session on Climate Change and Extreme Events organized by the Kerala State Disaster Management Authority, Govt. of Kerala on

17th October 2020; (ii)‘Mitigation and Adaptation in Climate Change: Sustainable Solutions’ for the Faculty Development Program in Climate Science by School of Environmental Studies, Cochin University of Science and Technology, held during 9-13 November, 2020; (iii)‘Floods and Climate Change’, in the Workshop in ‘Utilizing the Potential of Bamboo and other Bioengineering Methods for Landslide Risk Reduction and Stream bank stabilization’ held at Kerala Forest Research Institute (KFRI), Thrissur on 26th January 2021 and (iv)‘Potential role of aerosols in altering the dynamics of monsoon and convection’ during the Webinar organized by the India Meteorological Society (IMS), Pune during 25-26 March 2021.

Dr. P. Vijayakumar also delivered four talks such as (i)“FDP on Climate Sciences during 9-13 November, 2020 organised by School of Environmental Studies and Advanced Centre for Atmospheric Radar Research (ACARR); (ii)“IQAC Webinar Series” on 19/8/2020 organised by Alphonse College Pala; (iii)“National Webinar” on 10/11/2020 organised by Ansr Training College for Women, Perumpilavu and (iv) “Lecture on Climate Change and Human Life” on 12/6/2021 organised by Peace Hub Foundation.

9. IMS Dehradun (IMSD) Chapter

9.1 Youth Climate Action Day 2020

Youth plays a pivotal role in spreading the awareness and mitigating the impacts of climate change at global level. IMSD in collaboration with Indian Institute of Remote Sensing (IIRS), Dehradun and Indian Society of Remote Sensing, Dehradun Chapter (ISRS-DC) organized an online lecture series in December 2020 on 4th and 10th on the behest of Youth Climate Action Day 2020. The lecture series was aimed to sensitize youth (9th-12th standard school and under graduate college students) about the essence of climate and weather and their implications on society. The first lecture on “Weather and climate: observations and prediction” in the series was delivered by Dr. C.M. Kishtawal, former scientist, ISRO. Dr. Kishtawal has tremendous experience of more than 35 years in weather and climate studies using satellite observations. Dr. Arijit Roy Scientist and Head,

Disaster Management Studies Department, IIRS, ISRO delivered the second lecture on “Remote Sensing for disaster risk management”. The lectures were well appreciated by youth around the country with viewership of more than 1 lakh. Although few of the questions from students were answered after the lectures, the lecturers also received significant number of questions on email. Overall, the event was a grand success.

9.2 Paper in Tropmet-2020

A paper entitled “Heavy rainfall forecasting for Dehradun capital city during monsoon season 2020” was presented in Tropmet-2020. The authors are Rohit Thapliyal and Bikram Singh.

10. IMS Guwahati (IMSG) Chapter

10.1 Release of BATAR

On 15.12.2020, during the meeting of local chapters of IMS, 'BATAR-The Weather' published by IMSG Chapter was released by Dr. M. Mohapatra, President, IMS. The link for BATAR is https://drive.google.com/file/d/1RHeYT0TqV8BKn0betdkR0lba8EifNw6l/view?fbclid=IwAR3AoNq4wd7JlbNyc-gMmeTP6PZjRLWXTnHcVV_pnM44zu6cpHIshtOHJ8.

10.2 Papers in Tropmet-2020

The following six papers were presented in Tropmet-2020.

(a) The skill of maximum temperature forecasts for major cities of North-East region of India during summer 2020 by S.O. Shaw, S. Das, S.K. Gogoi, J. Ganguly, R.C. Debnath and K.C. Sarkar.

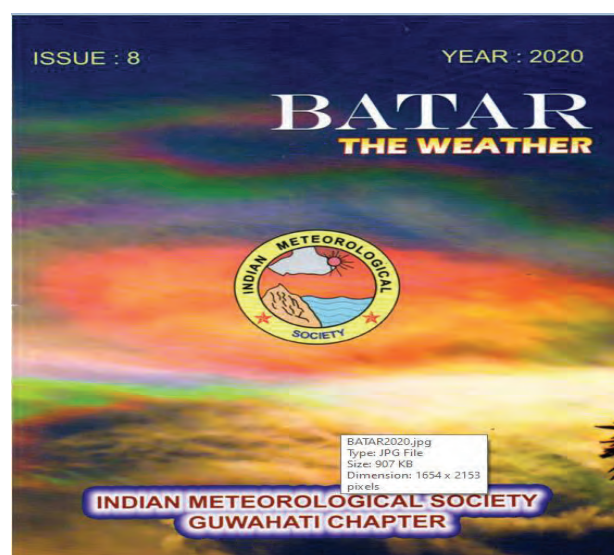
(b) Temperature and Rainfall trends over Meghalaya (1970-2019) by Rakesh Kumar, Ranjan Phukan, A. Kumar, S. Das and S.O. Shaw.

(c) Spatial and temporal variation of maximum and minimum temperature over North-East Region of India by S.O. Shaw, S. Das and A.K. Maurya.

(d) Affect of Weather, Environment and Wastes on Human Health by Sanjay O'Neill Shaw, Krishna Kumar Sinha and Mukesh Kumar Gupta.

(e) Role of convective available potential energy (CAPE) and total total index (TTI) in the genesis of lightning during convective weather by M. Sarma and S.O. Shaw.

(f) Analysis of rainfall and temperature trends in Assam and the comparative study of climate of different regions of Assam by Pankaj Kumar Das.



11. IMS Jaipur (IMSJ) Chapter

The World Meteorological Day was organized by the IMSJ Chapter in association with Amity University Jaipur; Poornima University Jaipur and the Central University of Rajasthan, Ajmer on March 23, 2021, 10:00-11:00 AM. The theme of this World Meteorological Day was “The Ocean, our Climate and Weather”. The program started with the welcome address of Prof. Rajesh Kumar, Dean, SES, CURAJ and President, IMS Jaipur Chapter. Professor Kumar welcomed the event's speaker, Dr. Abhijit Sarkar, and all distinguished guests, faculty members, participants, and IMSJ Chapter members. The speaker of the occasion, Dr. Abhijit Sarkar is Scientist E at the National Centre for Medium Range Weather Forecasting, Noida. He delivered the technical session on “Uncertainty in NWP and Ensemble Prediction System”. This technical session was conducted online through <https://meet.google.com/tos-dbox-pmw>. About 100 participants from different organizations, i.e., Central University of Rajasthan, Ajmer; Banaras Hindu University, Varanasi; Indian Institute of Technology Madras; Birla Institute of Technology

Jaipur; Poornima University Jaipur; IITM Pune; Central University of Jammu; Dibrugarh University; Amity University Jaipur; Pondicherry University; HNB Garhwal University Srinagar etc. attended the program.

Flyer and the 1st slide of the talk held on March 23, 2021.

The talk ended with the discussion and question-answer session, which was appreciated by all. In the end, Dr. Divya Prakash, Head of Department, Civil Engineering, Poornima University Jaipur, and Treasurer of IMS-Jaipur Chapter, proposed a vote of thanks to all the delegates, participants, volunteers and IMSJ Chapter members.

12. IMS Kolkata (IMSK) Chapter

12.1 Webinars

The year 2020-2021 was a very difficult period for arranging seminar, lecture etc. Though a new

system emerged due to the demand of the time to arrange webinars. In this connection, it may be mentioned that Chairman Dr. Sanjib Bandyopadhyay, Scientist F. DDGM, RMC Kolkata advised, in the first Executive Committee Meeting on line, to arrange the Topic according to the Seasonal Weather Events.

As arranging webinars is a less known subject to IMSK and hence immediate change over to this system is not easy. However, finally the following five webinars were organized by IMSK:

- (i) December 12, 2020 , 3:30-4:30 PM by Dr. Devendra Pradhan, Scientist G , Retired ADGM (Instruments) IMD on the topic “Tropical Cyclone Amphan: Tracking by DWR and satellite”.
- (ii) December 26, 2020, 4:00-5:30 PM by Mr. Alaykanti Dasgupta, Retired Assistant Meteorologist Gr. I, IMD on the topic “Services Rendered by IMD personnel at Airports”.

Mr. A.K. Dasgupta
Assist. Meteorologist (Retd.)
India Meteorological Department

(iii) January 2021, 2:30-4:00 PM by Mr. Debdip Chakraborty, Polar Meteorologist, (Team Leader, Indian expedition Team from Antarctica) IMD on the topic “Unknown Antarctica and Indian Expedition”.

(iv) January 30, 2021, 4:00-5:30 PM Dr. Somnath Dutta, Scientist F, Head MTI Pune, IMD on the topic “Basics of Numerical Weather Prediction”.

(v) February 13, 2021, 4:00-5:00 PM by Dr. Parthasarathi Mukhopadhyay, Scientist F, IITM, Pune on the topic “NWP: The current Status in India and the future Pathways”.

12.2 Papers presented in TROPMET 2020

The following papers were presented in Tropmet-2020, held during 14-17 December:

- (i) Prognostication on changing tidal environment due to climate change in estuarine parts of Sundarbans, a geographic approach by Dr. Jayanta Gour.
- (ii) Analysis of TCMI feature of three very Severe Cyclonic storms over the Bay of Bengal utilizing Brown Ocean Theory by Dr. Rishiparna Guha.
- (iii) Rainfall Variability in Hilly Terrain of Jharkhand particularly in Damodar Valley area during premonsoon, monsoon, post monsoon and winter seasons in last 20 years by Suman Chattopadhyay and Raja Acharjee.

13. IMS Nagpur (IMSNa) Chapter

IMSN Chapter arranged a virtual lecture by Dr P. Sivaswaroop, Regional Director, IGNOU, Nagpur Centre on “ Environment Education: Past, Present and Future” at RMC, Airport Nagpur. In his speech he advised that individuals have to have deeper understanding of environmental issues for betterment of mankind. Dr. Sivaswaroop said that like moral values, environmental issues are also concerned with everyone and everyone has individual responsibility towards the environment. He explained how the environmental education was part of daily life in ancient India and later with Supreme Court Judgment it became compulsory in education. He shared how the future education will be and explained IGNOU’s contribution towards Environment Protection (Like Online admissions, Digital Study Material) and also various Environment Programmes offered by IGNOU.

This programme was held under the guidance of Shri M. L. Sahu, Head, RMC, Nagpur. Dr. R. S. Akre, Secretary, IMSNa Chapter gave the introductory remarks of the event. Smt. Lata Sridhar conducted the programme and Miss Sulekha Sonal proposed vote of thanks. The event was successfully organized with the efforts of Shri Kanholkar, Ghormade, Sainis, Albert and Bidyanta, Ambarte. Shri M. L. Sahu, Head, RMC, Nagpur presented memento to Dr. P. Sivaswaroop.



Shri M. L. Sahu presenting memento to Dr P. Sivaswaroop. Dr. R. S. Akre sharing the dias.

14. IMS Noida (IMSNo) Chapter

NCMRWF and IMSNo Chapter organized online program to celebrate the World Meteorological Day 2021 on 23rd March from 11:30 AM to 12:30 PM with the theme “The Oceans, Our Climate and Weather” as per the following schedule:

11:30 to 11:35 Welcome by Dr. Indira Rani Scientist, NCMRWF.

11:35 to 11:40 Address by Head Dr. A.K.Mitra NCMRWF Sc-G, & Head NCMRWF.

11:40 to 12:00 Address by Prof. U. C. Mohanty Chief Guest IIT, Bhubaneswar.

12:00 to 12:20 WMO Day Prof. A. D. Rao Guest Speaker CAS, IIT, Delhi.

12:20 to 12:30 Vote of Thanks by Dr. Ashish Routray Scientist, NCMRWF Secretary IMS Noida.

15. IMS Pune (IMSP) Chapter

15.1 AMW2020 and National e-Symposium on 'Cloud and precipitation processes'

In association with MoES, IITM, NCMRWF, S. P. Pune University, IMS, and IMSP Executive Council successfully organized the “Annual Monsoon e-Workshop (AMW2020) and National e-Symposium on 'Cloud and precipitation processes' during 18-20 Jan 2021. IMSP hosted the first day for 'A Brain Storming Workshop on Monsoon 2020' conducted by the IMS and MoES. Remaining two days meant for the National Symposium; were divided into oral and continuous 3-day poster display for the proposed 4 themes in 5 sessions. Highlights of these events are given below:

(i) Virtual e-Platform was provided for MoES and IMS for the first day.

(ii) The National e-symposium received a total of 150 abstracts on four themes. There were 15 invited talks, 33 orals, 31 poster presentations done on the last two days.

(iii) Special oral upgraded best poster session was conducted at the end.

(iv) Three-day continuous online Poster Session was conducted for the first time with internal R&D

efforts. For short audio-video visual clip and online comments posted to the author via IMSP filter was the novel addition. This idea has been utilized quickly by IITM for the online RAC.

(v) More than 25 best IMSP AMW cash awards were declared by the Chairman IMSP in the concluding session.

(vi) IMSP demonstrated the most economical ways of conducting virtual workshop cum symposium using Teams virtual conferencing platform that gave the feel of personal presence.

15.2 Weekend IMSP Scientific Bash

IMSP would like to reach the societal interests through the science of weather events for the awareness and knowledge by echoing a Weekend IMSP Scientific Bash. The first Scientific Bash was done on the "Recent central India Hailstorm: Forecast and Dynamics" by Dr. J. R. Kulkarni arranged at 1430 IST on Sunday, 28 February 2021.

15.3 Felicitation to Dr. A.K. Sahai

IMSP conducted a national workshop to felicitate Dr. A.K. Sahai during 25-26 March.

15.4 WhatsApp Group

IMSP has been maintaining a “IMS Pune Chapter” WhatsApp Group since 2019 for scientific communication and information sharing among all the IMSP Life members and students especially on topics related to Earth Sciences. This group has more than 216 members. Mr. Sikandar Jamadar, NEC Member, has been coordinating and administrating the WhatsApp IMSP Group and Dr. J. R. Kulkarni has been educating and explaining monsoon online questions.

15.5 Executive Council for 2020-2022 term

The newly elected IMSP Executive Council took charge in October with Dr. C. Gnanaseelan as its Chairman. Intimation of Cooption of Dr. MCR Kalapureddy as Secretary and Mr. S. Raskar as EC Member of IMSP Chapter was made in the 19th Oct 2020 meeting through a letter No. IMSNC/2020-21/1 Dated 5 January 2021.

16. IMS Shillong (IMSS) Chapter

Training program on Satellite Meteorology and its Applications in NWP

A one-week virtual training programme on “Satellite Meteorology and its Applications in Numerical Weather Prediction” was jointly conducted by the North Eastern Space Applications Centre and IMSS Chapter at NESAC during 5-9 October, 2020. Dr. Mrutyunjay Mohapatra, DG, IMD graced the inaugural programme as the Chief Guest. The course was a compact 5-day experience on basic concept of satellite meteorology, numerical weather prediction using Weather Research and Forecasting (WRF) model and Geographic Information System (GIS) in meteorological applications. The course consisted of oral lectures and online practical demonstrations. Apart from the lectures by NESAC scientists, a few lectures were delivered by prominent Scientists from ISRO, IMD, and Professor from Cotton University. In total 35 participants from all over India attended this training program on virtual mode. The valedictory

program was graced by Dr. D. R. Pattanaik, Senior Scientist, IMD and Secretary, IMS. The participants expressed satisfaction during the valedictory program and desired NESAC and IMS to conduct more such programs with longer durations. This was the first course conducted by Space and Atmospheric Science group at NESAC and IMSS Chapter.

