

Annual Lightning Conference 2023

Date :28 – 29 August, 2023 , Venue: Vrishti Auditorium, IMD, New Delhi -110003

CONFERENCE NOTE

Recent trends have evidenced a notable surge in lightning occurrences and so the fatalities. As per the observations by Lightning Detection Network (LDN) of Indian Institute of Tropical Meteorology (IITM)/ Ministry of Earth Science (MoES) and National Remote Sensing Centre (NRSC)/ Indian Space Research Organisation (ISRO), India has witnessed continuous rise in lightning strikes. Annual Lightning Report 2023 highlights the overall rise in lightning Cloud to Ground (CG) flashes to 53% from 2019 to 2023. There are states with more than 300% rise in lightning. Central Indian states like Madhya Pradesh (MP), Uttar Pradesh(UP), Bihar, Jharkhand, Chhattisgarh, Odisha, West Bengal and Maharashtra has been most effected with rise in both lightning and mortality. The region between central river basin between the Ganges, Sone, Mahanadi with Vindhya, Satpura, Kaimur and Vidarbha covering most lightning prone zones. The socio-economic vulnerabilities make it more impactful. Coastal states have its own dynamics of lightning. These need holistic consideration and solutions towards a lightning resilient India.



The poster for the Annual Lightning Conference - 2023 features a background image of a person plowing a field with a bullock. At the top, it displays the logos of the Government of India, the Ministry of Earth Science, and the Climate Resilient Observing Systems Promotion Council (CROPC). The text on the poster includes:

LIGHTNING RESILIENT INDIA CAMPAIGN
वज्रपात सुरक्षित भारत अभियान
ANNUAL LIGHTNING CONFERENCE - 2023
28 - 29 August 2023
Venue : Mausam Bhawan , India Meteorological Department, Lodhi Road, New Delhi

Highlights:

1. Release of Annual Lightning Report 2022-2023
2. Understanding Atmospheric Electricity and Mitigation - How to populate rural India with Lightning protection systems: available technologies
3. Lightning Safety education and awareness (the most ignored aspect) - how to make Lightning everybody's business
4. Lightning Forecast - Available technologies and way to seed among effected communities
5. HAM Radio - Lightning Forecast and Education- Method of Dissemination, Practical Demonstration
6. Hackathon for CAD and creating impactful messages on theme "awareness and sensitisation on lightning hazards and safety "

Contact information: +91-7667860470, Registration link: www.cropc.org, cropcn@gmail.com

2. The Annual Lightning Conference, as part of yearly event by Lightning Resilient India Campaign- a joint initiative of Climate Resilient Observing Systems Promotion Council (CROPC) and India Meteorological Department (IMD) , Ministry of Earth Science, Government of India serves as an annual congregation wherein stakeholders assemble to share insights and knowledge, with a central focus on fortifying India's resilience against lightning-related threats. There are significant advances made towards lightning resilience. There are challenges and complexities . These can be discussed and scientifically evaluated with the local contexts of each state, its topography, weather patterns and socio-economic dimensions.

3. As we know, lightning is extreme promulgation of climate change impacts. Global warming has fuelled the heat resulting in rise sea surface temperature and melting of ice in Himalayas and mountains globally. Climate change is visible through the rampant extreme events in the form of heat wave, cloud burst or thunderstorms and lightning

It is imperative to emphasize that lightning-induced damage is entirely preventable, a reality underscored by the diligent efforts and expertise of CROPC. The organization has meticulously mapped and catalogued instances of lightning, disseminating this data through its Annual Lightning Reports.

Highlights to be covered during the Annual Lightning Conference. In the evolving field of lightning risk management, where India efforts are incredible and appreciated by world over. Yet, in this journey , there are many issues in lightning risk management at various levels. Few salient topics have been identified to be discussed during the conference . SDMAs , academia, private weather and lightning protection industries, PSUs and others can suggest more topics. The identified topic to be discussed during the event are as follows:-

Lightning Early Warning or Forecast

4. India has Lightning forecast being issued by IMD based on observations from satellites, Doppler Weather Radars (DWR) network, inputs from IITM- LDS Network and models. It is being disseminated by IMD and NDMA through various official, social media and mobile applications like Damini, Mausam, Sachet and even few state- developed applications like Vajrapat, Satark, Situlu, Indravajra etc.

- 4.1 Lightning Forecast - How effective, precise and actionable are they?
- 4.2 What next after the forecast?
- 4.3 What is the method of operationalising the Early warning /lead time at National, state or district level?
- 4.4 How is this being utilised at grass root level?
- 4.5 What parameters are we detecting for lightning forecast?
- 4.6 In the field of lightning detection and forecast, what could be possible collaboration between State Disaster Management Authorities and IMD or NRSC at national and local level? There is a need to streamline.

Micro zonation of Lightning Hotspots

5. CROPC has mapped entire lightning in India through the data from multiple sources like IIT, NRSC, WWLN and NOAA on an indigenous platform Map my India. These lightning flashes which matter most to us are the cloud to ground CG lightning. Are all CG lightning cause damages? It is important to know it is only 1 out of two lakhs people who could be hit by lightning. It is also pertinent to mention that only 10% of those hit by lightning, succumb to it. Detailed analysis reveals that all CG strikes are not inflicting damage, though lightning strikes are all over countryside. There is a need to geotag the deaths and injuries and identify hot spot areas. The lightning safety implementation has to be focused to these hot spots and identified geographical features. Map my India shall be making special presentation on these lightning mapping and importance of hotspots.

Lightning Protection or Mitigation

6. There are two methods of mitigation of lightning that is: -

6.1 Scientifically by installing lightning protection devices

6.2 By behaviour complying to lightning safety actions

7. Lightning Protection Devices (LPD) – A lightning protection device is based on concept of intercepting the atmospheric electricity and channelize it through a down-conductor to earth through proper earthing systems. An LPD is generally structure specific. A lightning protection is designed on detailed risk assessment, design engineering and simulation prior to its commissioning. The commissioned LPD should be preferably verified by third party.

7.1 **Risk Assessment.** The current Lightning risk assessment is governed by National Building Code (NBC) 2016 and standards laid down by Bureau of Indian Standards (BIS) and materials specifications by BMTPC. Major parameters being considered are type of asset to be protected, type of structures, no of lightning days, flash density etc. Are these parameters adequate?

There has been significant change in the characteristic of electrical surge in terms of its frequency, intensity and dimensions.

7.2 **Lightning Protection Standard** – There are lightning protection standards as laid down in NBC 2016 by BIS. What are other lightning protection standards? National Electricity Authority has come up with Lightning protection act? What are its significance? Extra sensitive power, chemical, petroleum and hydrocarbon industries have different standards?

What is the significance of BIS standards? Are they commensurate to the rising dimensions of lightning risk potential? What is the lightning protection sample design advised by BIS for rural masses?

What are the available technology for lightning protection – their merits and de-merits?

7.3 **High Voltage Lightning Testing Labs** – Central Power Research Institute (CPRI) is mandated agency for High Voltage Lightning Testing Labs. CPRI has two labs, one at Hyderabad and second at Bangalore with testing capacity of 80 kilo ampere and 40 kilo amperes.

7.3.1 With the atmospheric electricity current amplitude almost doubled up, are these testing labs able to perform their task? What is the way out?

7.3.2 What is the maximum high impulse current testing ability of CPRI?

7.3.3 Testing of Lightning protection devices, all its rods, terminals, earthing materials, nuts and bolts is huge demand of the hour to institutionalize and regulate industries / manufactures of lightning protection devices. What is the plan of BIS, BMTPC, NEC or CPRI to undertake it?

7.3.4 India is geographically huge. Practically it is not possible to cater for testing of LPDs at these two CPRI labs at Hyderabad and Bangalore. What is the plan for setting up High voltage testing labs in north, west and east India.

7.4 Public Sector Undertakings and Corporates like BHEL, NTPC, NHPC, GAIL, Adani Power, TATA Power, Reliance Industries etc. are mostly dependent on imports for lightning

protection. This causes huge financial burden on these industries. What is the plan by BIS, NEC or PNGRC to combat the ongoing crisis?

7.5 Rural India is most hit by lightning damages, deaths and injuries. Framers, fishermen, cattle grazers, labourers, kutcha houses are most vulnerable to lightning strikes. What is the plan of BIS to design a technically safe, cost effective and easily adaptable model.

Lightning Safety Education and Public Safety Programme

8. Public sensitivity and their awareness to the dangers of lightning drives their behaviour. This is possible by proper Lightning Safety Education and Public Safety Programme . What are the views of NDMA, SDMA, academia and NGOs? What has been the lessons learnt by states may be shared for benefit of each other?

9. The fourth iteration of Annual Lightning conference upholds the tradition and encompasses the following agenda items:

9.1 Release of Annual Lightning Report 2022-2023 - Release of Annual Lightning Report 2022-2023. This report encompasses community centric actions based on citizen science ,comprehensive lightning trends in India and for each state by plotting observations of lightning by IITM, NRSC, state wise lightning maps, gaps in early warning, dissemination of lightning forecast & nowcast, mitigation measures specially focussed on farmers, mass congregation events , socio economic dimensions, lightning education and awareness initiatives and research and development in fulminology (science of lightning) .

9.2 Understanding Atmospheric Electricity and Mitigation - How to overcome challenges of technologies driven lightning protection vis a vis conventional systems. Also to suggest lightning protection for rural masses which is safe, simple and affordable. Discuss the emerging dimensions of lightning and the existing laws by BIS and other bodies .

9.3 Lightning Safety Education and awareness- the most ignored aspect - how to make Lightning everybody's business

9.4 Lightning Forecast- Available technologies and way to seed compliance mechanism for instant lightning early warnings among effected communities

9.5 Farmers deaths due to lightning – thrust area of lightning risk management.

9.6 HAM Radio - Lightning Forecast and Education- Method of Dissemination. Practical Demonstration.

9.7 Hackathon for CAD and creating impactful messages on theme “awareness and sensitisation on lightning hazards and safety” .

10. The assemblage of participants for this event encompasses a broad spectrum of entities from scientific ministries both Ministry of Earth Science and Ministry of Space that is IMD, IITM, NRSC , National Disaster Management Authority (NDMA), State Disaster Management Departments and Authorities , Indian Council of Agriculture Research, Ministry of Panchayati Raj, Department of Science and Technology (DST), Defence Research and Development Organization (DRDO), Indian Armed Forces (Army, Air Force, and Navy), academic institutions, international non-governmental organizations (NGOs), the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), Disaster Management Authorities, National Disaster Management Authority (NDMA), State Disaster Management Authorities (SDMAs), research and development institutes, and community-based organizations such as the Indian Red Cross Society, self-help groups, health workers, and volunteers etc.

11. **Session Plan.** Day wise , broad session plan as follows :-

The event has been organised for two days 28- 29 August 2023 .

Day 1 : 28 August 2023

Session 1 : Inaugural session

Session 2 : Technical Session 1 – Lightning Forecast and its dissemination , show casing lightning maps by MapmyIndia

Session 3 : Lightning Protection – Changing characteristic extremes of lightning and existing lightning protection standards, testing facilities and regulatory mechanism, showcasing of technologies by CIKIT Electricals and technologies Chennai to PSUs

Session 4 : Lightning Safety Education and Awareness

Session 5 : Interactive session

Valedictory session

12. Registration- It is requested that the participating agencies should register for the event at the link <https://docs.google.com/forms/d/e/1FAIpQLSenG1Di5VdjtSt5CjJb43m7hd-ECHHmOBYOq-CnmkP3yH6QEw/viewform> . The same can be intimated to CROPC through email at email id cropcn@gmail.com latest by 25 August 2023 .