

6. Indian Institute of Tropical Meteorology – Geography

Indian Institute of Tropical Meteorology inaugurated a climate-tech incubation centre and hosted WISE-2026 under Mission Mausam.

1. Background

Indian Institute of Tropical Meteorology inaugurated India's first dedicated weather and climate startup incubation centre and hosted WISE-2026 (Weather and Climate Innovation Meet for Startups and Entrepreneurs) under Mission Mausam demonstrating India's efforts to integrate climate science, innovation and entrepreneurship for resilient development. IITM established in 1962 at Pune is India's premier institute for tropical meteorology, climate science and atmospheric research, functioning as autonomous institution under Ministry of Earth Sciences with key roles including monsoon prediction and weather modelling developing advanced forecasting systems under Monsoon Mission to improve seasonal and extended-range monsoon predictions, climate change research through Centre for Climate Change Research developing Earth System Models for climate projections and global warming studies, extreme weather forecasting studying cyclones, heatwaves and heavy rainfall events to strengthen disaster preparedness and climate resilience, and atmospheric observation and cloud physics using radar, satellite data and field experiments to study aerosols, cloud physics and atmospheric processes.

Mission Mausam launched in 2025 to commemorate 150th foundation anniversary of India Meteorological Department is chiefly implemented by Ministry of Earth Sciences with aim to enhance India's ability to predict and respond to extreme weather events and impacts of climate change, focusing on improving observations and understanding to deliver highly-accurate and timely weather and climate information across temporal and spatial scales. IITM Climate-Tech Incubation Hub launched under National Enterprise for Atmospheric Technology promotes climate-tech entrepreneurship supporting startups developing climate-smart and weather intelligence solutions for critical sectors, provides access to scientific infrastructure including IITM's supercomputers, climate models and remote sensing datasets for product development, offers financial and institutional support through seed funding, mentorship, workspace and technical validation, establishes industry and investor linkages connecting startups with investors, researchers and policymakers supporting commercialization, and encourages hyperlocal forecasting solutions developing AI-driven tools for agriculture, disaster management and urban resilience. WISE-2026 organized by IITM under Ministry of Earth Sciences aimed at bridging science and application converting advanced climate science into practical and commercially viable technologies, strengthening climate resilience through climate-smart innovations safeguarding lives, livelihoods and infrastructure, promoting public-private collaboration encouraging partnerships among startups, academia, government agencies and industry experts, and advancing Mission Mausam supporting vision of building weather-ready and climate-smart nation with participation from startups, scientists and institutions including India Meteorological Department, National Centre for Medium Range Weather Forecasting, National Centre for Polar and Ocean Research and Indian Institutes of Technology.

2. Indian Institute of Tropical Meteorology (IITM)

Establishment and Institutional Framework

1. IITM was established in 1962 at Pune, Maharashtra as India's premier institute for tropical meteorology, climate science and atmospheric research.
2. It functions as an autonomous institution under the Ministry of Earth Sciences (MoES) with scientific and administrative autonomy.
3. IITM serves as national nodal agency for tropical meteorology research and operational weather forecasting support.

3.Key Roles and Functions

Monsoon Prediction and Weather Modelling

1. IITM develops advanced forecasting systems under the Monsoon Mission to improve seasonal and extended-range monsoon predictions critical for agriculture, water resource management, and disaster preparedness.
2. Monsoon Mission launched in 2012 established high-resolution dynamical models improving forecast accuracy significantly.
3. Extended-range forecasts provide predictions 2-4 weeks in advance enabling better planning for farmers and policymakers.

Climate Change Research

1. Houses the Centre for Climate Change Research (CCCR) which develops Earth System Models for climate projections and global warming studies.
2. CCCR contributes to Intergovernmental Panel on Climate Change (IPCC) assessments providing Indian perspective on climate science.
3. Develops high-resolution regional climate models simulating Indian monsoon and extreme events under different greenhouse gas emission scenarios.

Extreme Weather Forecasting

1. Studies cyclones providing track and intensity predictions supporting disaster management authorities.
2. Analyzes heatwaves understanding formation mechanisms and developing early warning systems protecting vulnerable populations.
3. Investigates heavy rainfall events improving flood forecasting and urban drainage planning.
4. Research strengthens disaster preparedness and climate resilience reducing loss of life and property.

Atmospheric Observation and Cloud Physics

1. Uses radar including Doppler weather radars detecting precipitation intensity and storm movement.
2. Employs satellite data for monitoring weather systems, clouds, aerosols, and surface conditions.
3. Conducts field experiments including Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEEX) studying aerosol-cloud interactions.
4. Studies aerosols understanding their role in climate, air quality, and monsoon rainfall.
5. Investigates cloud physics including cloud formation, precipitation processes, and lightning.

4.Mission Mausam

Launch and Institutional Framework

1. Mission Mausam was launched in 2025 to commemorate the 150th foundation anniversary of the India Meteorological Department celebrating legacy of weather services.
2. Nodal Ministry is Ministry of Earth Sciences (MoES) which will chiefly implement Mission Mausam coordinating with various scientific institutions.

Aim and Focus

1. Aim to enhance India's ability to predict and respond to extreme weather events and the impacts of climate change.
2. Focus on improving observations through enhanced weather monitoring networks including radars, satellites, automatic weather stations, and ocean observatories.
3. Emphasize understanding atmospheric processes through research on monsoons, cyclones, thunderstorms, heatwaves, and air quality.
4. Deliver highly-accurate and timely weather and climate information across temporal scales from nowcasting (0-3 hours) to seasonal forecasts, and spatial scales from hyperlocal to national.

Strategic Importance

1. Mission Mausam supports climate-smart agriculture through improved weather forecasts enabling farmers to optimize sowing, irrigation, and harvesting decisions.
2. Strengthens disaster management providing early warnings for cyclones, floods, heatwaves reducing casualties and economic losses.
3. Enhances urban resilience through hyperlocal forecasts supporting city planning, transportation, and emergency services.
4. Supports aviation, maritime, and defence sectors with specialized weather services.

IITM Climate-Tech Incubation Hub

Establishment and Framework

1. IITM launched India's first dedicated weather and climate startup incubation centre under the National Enterprise for Atmospheric Technology (NEAT).
2. NEAT established to promote atmospheric science applications and commercialization of weather and climate technologies.
3. Incubation hub provides comprehensive ecosystem supporting climate-tech startups from ideation to commercialization.

5.Key Features

Climate-Tech Entrepreneurship

1. The centre promotes startups developing climate-smart and weather intelligence solutions for critical sectors including agriculture providing precision weather advisories, disaster management offering early warning systems, insurance developing weather-based risk assessment tools, renewable energy optimizing wind and solar power forecasting, urban planning supporting smart city climate resilience, and transportation providing weather routing for logistics.

Access to Scientific Infrastructure

1. Startups receive access to IITM's supercomputers with high-performance computing capabilities for running weather models and processing large datasets.
2. Climate models including monsoon prediction systems, regional climate models, and air quality models available for research and product development.
3. Remote sensing datasets from satellites, radars, and ground observations providing comprehensive atmospheric data.
4. Access enables startups to develop sophisticated products without investing in expensive infrastructure.

Financial and Institutional Support

1. The incubation centre provides seed funding supporting proof-of-concept development and prototype testing.
2. Mentorship from IITM scientists and industry experts guiding startups on technical and business aspects.
3. Workspace including office facilities, laboratories, and meeting rooms creating collaborative environment.
4. Technical validation support helping startups test and validate their products using scientific methods and real-world data.

Industry and Investor Linkages

1. IITM connects startups with investors including venture capital firms, angel investors, and government funding agencies.
2. Facilitates partnerships with researchers from academic institutions and research organizations.
3. Links with policymakers helping startups understand regulatory frameworks and government procurement processes.
4. Connections support commercialization of climate technologies scaling successful innovations.

Hyperlocal Forecasting Solutions

1. The centre encourages AI-driven hyperlocal forecasting tools providing weather predictions at village, city-block, or farm-level resolution.
2. Applications for agriculture include farm-specific advisories on sowing, irrigation, pest management, and harvesting.
3. Disaster management uses include localized flood, heatwave, and thunderstorm warnings.
4. Urban resilience applications support traffic management, outdoor event planning, and emergency response.
5. Hyperlocal forecasting addresses last-mile delivery of weather information critical for decision-making.

6.WISE-2026 – Weather and Climate Innovation Meet

Organization and Institutional Framework

1. WISE-2026, or Weather and Climate Innovation Meet for Startups and Entrepreneurs, was organized by IITM under Ministry of Earth Sciences.
2. Event brought together ecosystem stakeholders for collaboration and knowledge exchange.

Key Objectives

Bridging Science and Application

1. Aimed to convert advanced climate science developed at research institutions into practical and commercially viable technologies serving society.
2. Addressed gap between research output and market application through technology transfer and commercialization support.
3. Encouraged startups to leverage scientific knowledge for innovative products and services.

Strengthening Climate Resilience

1. The programme focused on climate-smart innovations for safeguarding lives protecting people from extreme weather events, livelihoods supporting climate-dependent sectors like agriculture and fisheries, and infrastructure enhancing resilience of buildings, transportation, and utilities.
2. Emphasized adaptation and mitigation technologies addressing climate change challenges.

Promoting Public-Private Collaboration

1. Encouraged partnerships among startups bringing innovation and agility, academia providing research and talent, government agencies offering policy support and funding, and industry experts contributing market insights and scaling capabilities.
2. Collaboration model enables effective technology development and deployment.

Advancing Mission Mausam

1. The event supported Mission Mausam's vision of building a weather-ready and climate-smart nation.
2. Aligned startup innovations with national priorities in weather forecasting, climate services, and disaster resilience.
3. Created ecosystem supporting Mission Mausam implementation through entrepreneurship.

Participants and Scope

1. Witnessed participation from startups developing weather and climate technologies, scientists from research institutions, and institutions such as India Meteorological Department providing operational weather services, National Centre for Medium Range Weather Forecasting developing forecast models, National Centre for Polar and Ocean Research studying polar regions and oceans, and Indian Institutes of Technology contributing engineering and technology expertise.

Significance

1. WISE-2026 highlighted the growing importance of climate-tech innovation for economic resilience reducing climate-related economic losses, disaster management saving lives and protecting assets, and sustainable development achieving climate goals while supporting growth.
2. Event demonstrated India's leadership in climate science and innovation inspiring similar initiatives globally.

7. Significance of IITM Initiatives

Advancing Climate Science Application

1. IITM incubation centre and WISE-2026 translate research into practical solutions addressing real-world problems.
2. Startups leverage scientific knowledge creating value for society and economy.

Supporting National Climate Goals

1. Initiatives align with India's climate commitments including Nationally Determined Contributions under Paris Agreement.
2. Support Mission Mausam, National Action Plan on Climate Change, and disaster risk reduction frameworks.

Creating Economic Opportunities

1. Climate-tech sector generates employment for scientists, engineers, entrepreneurs, and support staff.
2. Startups attract investments creating wealth and economic activity.
3. Export potential exists for Indian climate technologies serving global markets.

Enhancing Disaster Resilience

1. Improved weather forecasts and climate services reduce disaster impacts saving lives and reducing economic losses.
2. Early warning systems enable proactive disaster management.

Promoting Innovation Ecosystem

1. Incubation centre creates model for science-based entrepreneurship replicable in other domains.
2. Public-private collaboration strengthens innovation ecosystem.

8. Way Forward

Scale Incubation Support

1. Expand incubation facilities accommodating more startups and providing specialized support for different climate-tech domains including renewable energy, water management, and carbon capture.
2. Establish regional incubation hubs in collaboration with state governments and universities.

Strengthen Industry Partnerships

1. Develop deeper collaborations with corporates for technology co-development, pilot testing, and market access.
2. Create corporate social responsibility funding mechanisms supporting climate-tech startups.

Enhance Funding Mechanisms

1. Establish dedicated climate-tech venture capital fund providing risk capital for early-stage startups.
2. Create government procurement preferences for Indian climate technologies.
3. Facilitate international funding through partnerships with global climate funds.

Build Talent Pipeline

1. Develop specialized training programs in climate science, data science, and entrepreneurship.
2. Create internship and fellowship opportunities connecting students with startups.
3. Establish curricula integrating climate-tech entrepreneurship in universities.

Expand International Collaboration

1. Partner with international incubators and climate-tech hubs sharing best practices and accessing global markets.
2. Participate in international climate innovation initiatives showcasing Indian technologies.
3. Facilitate technology transfer agreements with advanced climate-tech ecosystems.

Strengthen Policy Support

1. Develop regulatory frameworks enabling climate-tech innovation while ensuring quality and safety.
2. Create standards for weather and climate services ensuring reliability and interoperability.
3. Establish intellectual property protection mechanisms encouraging innovation.

Conclusion

Indian Institute of Tropical Meteorology inaugurated India's first dedicated weather and climate startup incubation centre and hosted WISE-2026 (Weather and Climate Innovation Meet for Startups and Entrepreneurs) under Mission Mausam demonstrating integration of climate science, innovation and entrepreneurship for resilient development. IITM established in 1962 at Pune as India's premier institute for tropical meteorology functions as autonomous institution under Ministry of Earth Sciences with key roles including monsoon prediction developing advanced forecasting systems under Monsoon Mission, climate change research through Centre for Climate Change Research developing Earth System Models, extreme weather forecasting studying cyclones, heatwaves and heavy rainfall for disaster preparedness, and atmospheric observation using radar, satellite data and field experiments.

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