



पृथ्वी विज्ञान
मंत्रालय
Ministry of
Earth Sciences

PULSE

पृथ्वी विज्ञान मंत्रालय

Vol. 2 July-September 2024



“The Cabinet’s decision of approving Mission Mausam will strengthen our capacities in climate-related science and services. It will benefit agriculture, disaster management apparatus and other such sectors.”

SHRI NARENDRA MODI
Hon'ble Prime Minister of India



National Centre
for Seismology



NCCR



INCOIS



Centre For
Marine Living
Resources &
Ecology



Message from Dr M Ravichandran, Secretary to the Government of India, Ministry of Earth Sciences (MoES)

Under the visionary leadership of our Hon'ble Prime Minister, Shri Narendra Modi Ji, and our Hon'ble Minister of Earth Sciences, Dr Jitendra Singh Ji, we are witnessing remarkable progress in earth system sciences in India. The recent launch of Mission Mausam envisaging a climate-smart and weather-ready Bharat and High-Performance Computers Arka, Arunika, and Tarang with a combined capacity of ~21 petaflops are steps towards our Viksit Bharat in 2047. We are also progressing to make India's flagship Deep Ocean Mission and initiatives under our schemes, highly beneficial and successful, with an approach that is citizen-centric under the existing PrithVI scheme.

I would like to draw special mention to a few recent initiatives empowering the youth and women scientific workforce. I had the distinct honour of inaugurating the national seminar on 'Women's Participation in Geosciences' at the National Centre for Earth Science Studies (NCESS), Thiruvananthapuram, in September 2024. This event brought together over 65 brilliant Indian women scientists and researchers in earth system sciences, showcasing their invaluable contributions through intellectually stimulating sessions, discussions, and exhibitions. Such initiatives highlight the importance of equality and inclusivity and inspire young women to pursue science. The third edition of Swachh Sagar Surakshit Sagar brought together youth, especially students, with a call

for action to protect our oceans, coastlines and ecosystems. The initiative serves as a powerful reminder that safeguarding our environment requires collective action, underscoring the role of each individual in creating a sustainable future.



As we look ahead, we recognise that challenges will continue to arise. However, with science, innovation and collaboration, we will navigate these challenges successfully. The vision of a developed India Viksit Bharat is within our grasp, driven by our advancements in science and technology. Earth sciences will play a crucial role in addressing pressing and upcoming issues such as climate change, disaster risk reduction and environmental sustainability.



Let us continue to work together, inspiring and supporting each other to advance our understanding and services. With collective efforts and commitment, I am certain that we can achieve even greater milestones in the years to come!



About Ministry of Earth Sciences

The Ministry of Earth Sciences holistically addresses all components of Earth system sciences (atmosphere/air, hydrosphere/water, cryosphere/frozen solid, lithosphere/land and biosphere/life and their complex interactions) to provide reliable services for the country.

Ministry of Earth Sciences is mandated to provide services for weather, climate, ocean and coastal state, hydrology, seismology and natural hazards; explore and harness marine living and non-living resources sustainably; and explore the Earth's poles (Arctic, Antarctic) and the Himalayas. The functions of Ministry of Earth Sciences are to augment and sustain long-term observations of the atmosphere, ocean, cryosphere and solid earth to record the vital signs of the Earth System and change; to develop forecasting capability of atmosphere and oceanic phenomena through dynamical models and assimilation techniques and to build prediction system for weather climate and hazards; to understand the interaction between components of Earth Systems and human systems at various spatial and temporal scales; to explore polar and high seas regions of the Earth towards the discovery of new phenomena and resources; to translate knowledge and insights from Earth systems science into services for societal, environmental and economic benefit; and development of ocean technology for exploration of oceanic resources and societal applications. The services provided by the Ministry of Earth Sciences cater to various international and national agencies, state governments, and local bodies for societal benefit.

The research and development and operational (service activities of the Ministry of Earth Sciences are carried out under:

1. PRITHvi VIgyan (PRITHVI)
2. Deep Ocean Mission (DoM)
3. Mission Mausam

The PRITHVI scheme encompasses five sub-schemes of the Ministry of Earth Sciences: ACROSS (Atmosphere and Climate Research, Modelling, Observing Systems, and Services), O-SMART (Ocean Services, Modelling, Application, Resources, and Technology), PACER (Polar Science and Cryosphere Research), SAGE (Seismology and Geosciences), and REACHOUT (Research, Education, Training, and Outreach).



The Deep Ocean Mission, approved by the Cabinet in 2021, aims to develop deep-sea technologies for manned submersible, deep-sea mining and deep-sea exploration; expansion of ocean climate change advisory services; exploration and conservation of marine biodiversity; acquisition of an ocean research vessel, and deep-sea mineral surveys and exploration; and capacity building in marine biology.

In September 2024, MoES launched the Mission Mausam, which aims to make the country weather-ready and climate-smart. The aim is to significantly elevate India's observations infrastructure and further integrate and strengthen capabilities in data acquisition and analysis, modelling, forecasting and prediction. Also envisioned are achieving a quantum leap in computational apparatus and data-driven weather management for public benefit and the nation's progress.

Ministry of Earth Sciences mandate is pursued through eleven institutes: India Meteorological Department (IMD), Indian Institute of Tropical Meteorology (IITM), National Centre for Medium-Range Weather Forecasting (NCMRWF), National Institute of Ocean Technology (NIOT), Indian National Centre for Ocean Information Services (INCOIS), National Centre for Polar and Ocean Research (NCPOR), National Centre for Earth Science Studies (NCESS), National Centre of Coastal Research (NCCR), National Centre for Seismology (NCS), Centre for Marine Living Resources and Ecology (CMLRE), and Borehole Geophysics Research Laboratory (BGRL).

The Ministry of Earth Sciences website is www.moes.gov.in. Updates are available on social media (Twitter, Instagram, Facebook, LinkedIn, and YouTube) @moesgoi.

MoES in News

India Meteorological Department issued Monthly Outlook for Rainfall and Temperature for the month of July 2024



Odisha S&T Minister Sh Krushna Chandra Patra calls on Union Minister Dr Jitendra Singh



Delhi to get a massive upgradation in weather and rain forecast system, says Union Minister Dr Jitendra Singh



India shines at the 17th International Earth Sciences Olympiad as Indian student team has bagged multiple prestigious medals



Union Cabinet approves India's signing of the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement



Centre for Marine Living Resources and Ecology (CMLRE) organises national-level workshop on IndOBIS



Union Minister Dr Jitendra Singh holds a meeting to review Indo-Norway collaboration on Blue-Economy



Cabinet approves 'Mission Mausam' to create a weather-ready and climate-smart Bharat with an outlay of Rs. 2000 crore over 2 years



Ministry of Earth Sciences organises high-level workshop for BIMSTEC countries, promoting scientific capacity and regional cooperation



Mission Mausam Unveiled: A 2,000 Crore initiative to Enhance India's Weather and Climate Forecasting by 2026



Administrator of Lakshadweep, Daman Diu, Dadra and Nagar Haveli Sh Praful Patel called on Union Minister Dr Jitendra Singh



Ministry of Earth Sciences announces several activities to mark the Swachhata Hi Seva campaign 2024



Ministry of Earth Sciences celebrates 18th Foundation Day: Releases important publications for public utility and benefit



Ministry of Earth Sciences Gears Up for The Special Campaign 4.0 - Promoting Cleanliness and Effective Governance



Active monsoon conditions likely over most parts of northwest India during next 4-5 days: Indian Meteorological Department (IMD)



Ministry of Earth Sciences Successfully Concludes the Swachh Sagar, Surakshit Sagar 3.0



Union Minister Dr Jitendra Singh said about the installation of 10 X-Band Doppler Weather Radars in Northeast India and Himachal Pradesh



PM Shri Narendra Modi Inaugurated High-Performance Computing (HPC) System tailored for Weather and Climate Research



No natural Earthquake recorded in Wayanad and its adjoining areas in Kerala: Ministry of Earth Sciences (MoES)



Press Releases from MoES

Posted On: 01 JUL 2024 6:45PM by PIB Delhi

Rainfall over India – Monthly rainfall over the country as a whole during July 2024 is most likely to be above normal ($>106\%$ of LPA). During July, normal to above normal rainfall is most likely over most parts of the country except many parts of northeast India and some parts of northwest, east and southeast peninsular India where below normal rainfall is likely.

Surface Air Temperature over India – During July 2024, monthly minimum temperatures are most likely to be above-normal over many parts of the country except some parts of northwest and adjoining areas of central India and some pockets of south-eastern peninsular India where normal to below normal temperatures are likely. The minimum temperatures are likely to be normal to maximum temperature in most parts of the below normal over many parts of India. Northwest India and south peninsular India except West coast. Above normal maximum temperatures are likely over many parts of central India, east and northeast India and along west coast.

Administrator of Lakshadweep, Daman Diu, Dadra and Nagar Haveli Sh. Praful Patel called on Union Minister Dr. Jitendra Singh

Posted On: 17 JUL 2024 3:28PM by PIB Delhi

Sh Patel thanked Minister of Earth Sciences Dr. Jitendra Singh for the World's first Low Temperature Thermal Desalination LTTD plant which brought huge relief to the people of UT by providing clean drinking water.

"Two Airports approved by Modi Government will prove to be a boon for Eco-tourism and development in Lakshadweep," says Dr. Jitendra Singh.

Odisha S&T Minister Sh. Krishna Chandra Patra calls on Union Minister Dr. Jitendra Singh

"Development of Startups and innovation in the Odisha foster by Double engine Government to bring the state on investment map", says Dr. Jitendra Singh.

People have deposited their faith in the leadership of Prime Minister Modi and chose development: Dr. Singh

Posted On: 10 AUG 2024 6:47PM by PIB Delhi

Sh. Krishna Chandra Patra, Minister for Science and Technology, Food Supply and Consumer Welfare called on Union Minister Dr. Jitendra Singh here today.

Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, MoS PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr. Jitendra Singh congratulated Sh. Patra on his victory in the recent assembly elections in state and being given the responsibility as a minister.

Ministry of Earth Sciences announces several activities to mark the Swachhata Hi Seva campaign 2024

Posted On: 18 SEP 2024 1:49PM by PIB Delhi

The Ministry of Earth Sciences is set to organize several activities under the Swachhata Hi Seva campaign 2024 from September 17 to October 2, 2024, at its Prithvi Bhawan Headquarters in New Delhi. The Ministry's Swachhata Hi Seva 2024 activities are aligned with the nationwide call of the Government of India to promote cleanliness through public awareness, collective action, behavioural change, and citizen-led participation under the Swachh Bharat Mission inaugurated by the Prime Minister, Shri Narendra Modi, in 2014. The activities planned at MoES emphasise cleanliness, mass awareness, group participation, environmental stewardship, and staff health aligned with this year's theme of *Swachh Swachh, Smiles Smiles*.



Prime Minister Narendra Modi's vision to empower the farmers, fisherman and common man by those weather forecasting systems: Dr. Singh

Posted On: 08 JUL 2024 6:52PM by PIB Delhi

Delhi to get a massive up gradation weather and rain forecast system, said Union Minister Dr. Jitendra Singh here today at a special high-level meeting convened by him to exclusively address the public concerns and inputs in the wake of the ongoing monsoon season across the country including the national capital.

Everything possible will be done, he said, to make the forecast system people-friendly, in order ensure convenience and ease of living for the citizen and to save man days as well as economic fall-out of unexpected weather changes.



Presently Delhi has 17 Automatic Weather Forecast Centres. The Minister directed to install 50 more systems at the earliest and later upto 100.

Ministry of Earth Sciences celebrates 18th Foundation Day: Releases important publications for public utility and benefit

Posted On: 27 JUL 2024 3:37PM by PIB Delhi

The Ministry of Earth Sciences (MoES) celebrated its 18th Foundation Day at its Prithvi Bhawan Headquarters today, marking nearly two decades of significant contributions to Earth system sciences. Founded on July 27, 2006, MoES has been at the forefront of scientific research and services. The Ministry's achievements span across all spheres of earth system sciences: air or atmosphere, water or hydrosphere, land or lithosphere, solid earth or cryosphere, life or biosphere and their interactions, reflecting its commitment to scientific and technological progress.

India shines at the 17th International Earth Sciences Olympiad

Posted On: 17 AUG 2024 11:02AM by PIB Delhi

The Indian student team has bagged multiple prestigious medals at the 17th edition of the International Earth Sciences Olympiad (IESO) held in Beijing, China, from August 08-16, 2024. The four-membered Indian team comprising students from Gujarat, Kerala, Chhattisgarh, and Rajasthan have won three gold and bronze and two silver medals across three competition categories (Theory and Practical, Earth System Project, and International Team Field Investigation).

Dr. Jitendra Singh, Hon'ble Minister of State (Independent Charge), Ministry of Earth Sciences and Ministry of Science and Technology, MoS PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, congratulated the Indian team and expressed appreciation for bringing the coveted academic laurel to the country.

Union Cabinet approves India's signing of the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement

Posted On: 08 JUL 2024 7:13PM by PIB Delhi

The Union Cabinet, chaired by Prime Minister Narendra Modi, has approved India to sign the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement. This landmark decision marks a significant step towards the conservation and sustainable utilisation of marine biological diversity in areas beyond national jurisdiction. Often referred to as the 'High Seas', areas beyond national jurisdiction are the global common oceans open to all for internationally lawful purposes such as navigation, overflight, laying submarine cables and pipelines, etc. The Ministry of Earth Sciences will spearhead the country's implementation of the BBNJ Agreement.

Union Minister Dr. Jitendra Singh holds meeting to review Indo-Norway Collaboration on Blue-Economy

The high-level delegation was led by Norwegian Ambassador to India Ms. May-Elin Stener

"The Joint Task Force (JTF) on Blue Economy (BE) to be strengthened by reinforcing our cooperation", says Dr. Jitendra Singh

Prime Minister Narendra Modi's leadership enabled India's Journey to Marine and Ocean exploration: Dr. Singh

"Norway has Technology and India has Scalability" says Norwegian Ambassador

"India And Norway neighbors in Antarctica" Norwegian Ambassador recalled their PM's remarks

"10 X-Band Doppler Weather Radars to Enhance Weather Monitoring in Northeast India and Himachal Pradesh" says Union Minister Dr. Jitendra Singh

Posted On: 08 AUG 2024 6:03PM by PIB Delhi

Union Minister of State (Independent Charge) for Science and Technology, Minister of State (Independent Charge) for Earth Sciences, MoS PMO, Department of Atomic Energy, Department of Space, Personnel, Public Grievances and Pensions, Dr. Jitendra Singh informed that the Government of India has initiated the procurement and installation of 10 X-Band Doppler Weather Radars (DWRs) to enhance the weather forecasting and monitoring capabilities in the Northeastern states of India and the Lahaul & Spiti District of Himachal Pradesh while answering to an unstarred question in Rajya Sabha today.



The Centre for Marine Living Resources and Ecology (CMLRE) organises national-level workshop on IndoBIS: enhancing marine biodiversity documentation, research, and conservation

Posted On: 03 SEP 2024 6:59PM by PIB Delhi

The Centre for Marine Living Resources and Ecology (CMLRE), an attached office of the Ministry of Earth Sciences, conducted a national-level workshop on the Indian Ocean Biodiversity Information System (IndoBIS) on September 03, 2024, at its Kochi campus. The workshop brought together scientists and researchers from various institutions across the country. The workshop helped raise awareness about marine biodiversity data documentation and publishing among the participants.

Cabinet approves 'Mission Mausam' to create a more weather-ready and climate-smart Bharat with an outlay of Rs.2,000 crore over two years

Mission boosts an extra edge in tackling extreme weather events and impacts of climate change

Next-generation radars and satellite systems with advanced sensors and high-performance supercomputers to be included

Posted On: 11 SEP 2024 8:18PM by PIB Delhi

The Union Cabinet, chaired by the Prime Minister Shri Narendra Modi, has approved 'Mission Mausam' today with an outlay of Rs.2,000 crore over two years.

Mission Mausam, to be chiefly implemented by the Ministry of Earth Sciences, is envisaged to be a multi-faceted and transformative initiative to tremendously boost India's weather and climate.

Ministry of Earth Sciences organizes a high-level workshop for BIMSTEC countries, promoting scientific capacity, skill and regional cooperation

Posted On: 15 JUL 2024 8:15PM by PIB Delhi

The National Centre for Medium Range Weather Forecasting (NCMRWF)—a sub-ordinate office of the Ministry of Earth Sciences (MoES), is organising a two-week workshop for BIMSTEC countries from July 15 to 26, 2024, in Noida. The high-level workshop will have key officials of the National Hydrology and Meteorology Services of BIMSTEC members—Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand in attendance. The workshop was inaugurated by Shri Vishwajeet Sahay, Additional Secretary and Finance Adviser, MoES, on July 15, 2024. It is designed to enhance skill and share knowledge in Data Assimilation and Forecast Verification Techniques.

No natural Earthquake recorded in Wayanad and its adjoining areas in Kerala: Ministry of Earth Sciences (MoES)

Posted On: 10 AUG 2024 9:20AM by PIB Delhi

National Centre for Seismology (NCS), Ministry of Earth Sciences (MoES) herewith confirms that there is no natural earthquake recorded in Wayanad and its adjoining areas by any of the Seismographic stations installed in the State of Kerala or its surroundings on 09.08.2024.

The felt tremor reported by media sources with rumbling sound may be due to shifting of unstable rock masses accumulated during landslides from one level to other lower level for better stabilization that have generated sub tectonic acoustic vibration due to frictional energy.

Mission Mausam Unveiled: A 2,000 Crore initiative to Enhance India's Weather and Climate Forecasting by 2026

Ministry of Earth Sciences organises a national-level media interaction on 'Mission Mausam' chaired by Secretary MoES

Posted On: 13 SEP 2024 12:05PM by PIB Delhi

The Ministry of Earth Sciences (MoES) organised a national-level press interaction on Mission Mausam at Prithvi Bhawan in New Delhi.

Dr. M. Ravichandran, Secretary, MoES, addressed the media along with Dr. Mritunjay Mohapatra, Director General of India Meteorological Department (IMD), and the Head of National Centre for Medium-Range Weather Forecasting (NCMRWF), Dr. VS Prasad.

The Union Cabinet approved Mission Mausam on September 11, 2024, with a budget outlay of 2,000 crores over two years, is an ambitious initiative of the Government of India. It aims to

Ministry of Earth Sciences Successfully Concludes the Swachh Sagar, Surakshit Sagar 3.0

Posted On: 22 SEP 2024 9:14AM by PIB Delhi

The Ministry of Earth Sciences (MoES) successfully concluded the Swachh Sagar, Surakshit Sagar 3.0 campaign on September 21st, 2024, facilitating beach cleanup drives at more than 80 locations across the country's coasts, removing more than 60 tons of waste, including plastic, metal, cloth, rubber, and paper and wood debris. The Swachh Sagar, Surakshit Sagar 3.0 initiative of the Government of India is aligned with the Swachh Bharat Mission envisioned by the Prime Minister, Shri Narendra Modi. The event witnessed widespread voluntary public participation, generating mass enthusiasm and awareness. The key highlights of MoES Swachh Sagar, Surakshit Sagar 3.0 included the participation of the public, several students, NGOs, and community groups at various locations across the country's coastline.

Prime Minister Shri Narendra Modi inaugurated High-Performance Computing (HPC) System tailored for Weather and Climate Research

The New HPC Systems named 'Arka' and 'Arunka' - Reflecting their Connection to Surya, the Primary Energy Source for the Earth System

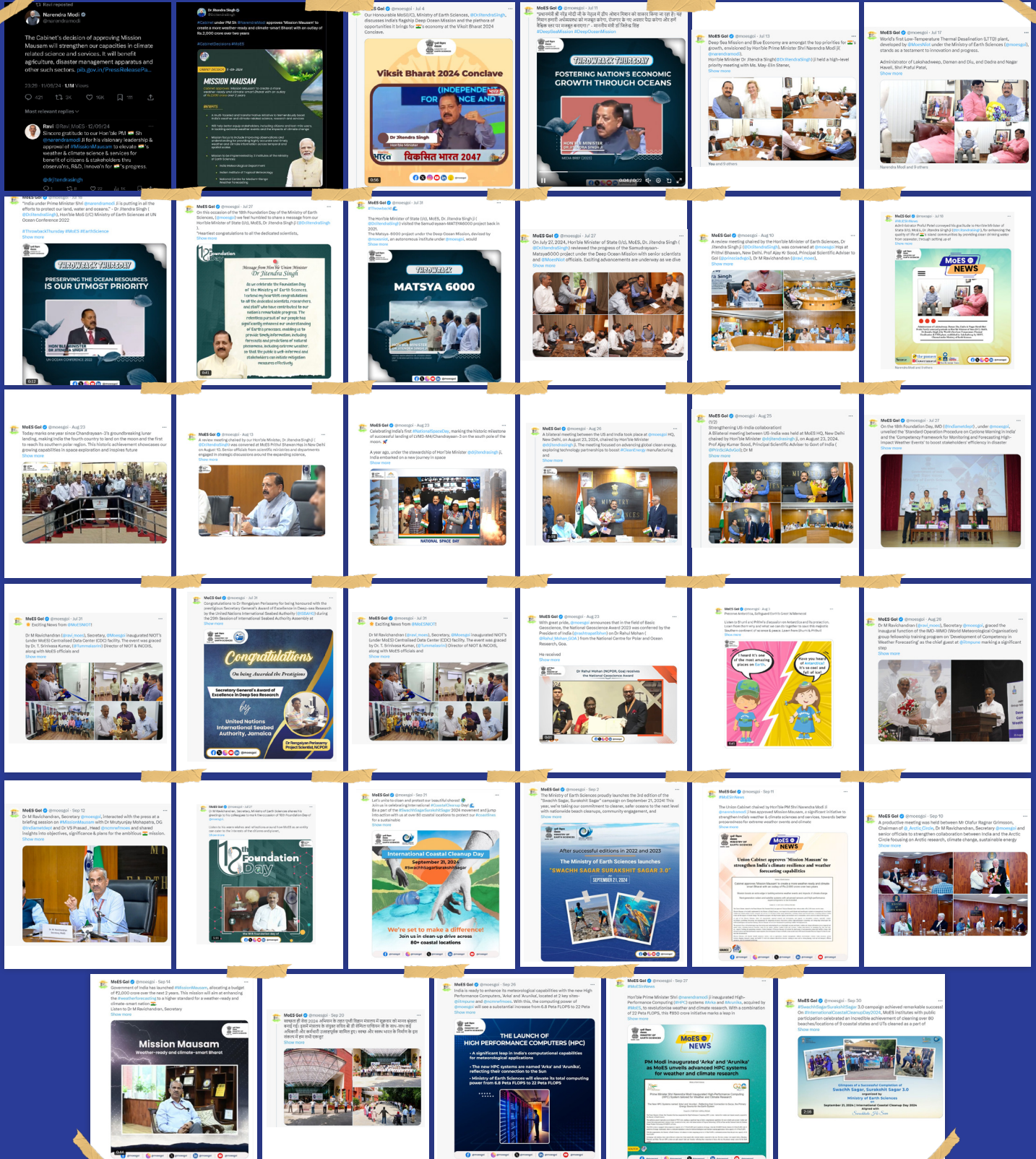
Posted On: 27 SEP 2024 1:42PM by PIB Delhi

The Prime Minister of India, Shri Narendra Modi has inaugurated the High-Performance Computing (HPC) system - tailored for weather and climate research, acquired by the Ministry of Earth Sciences.

The ambitious project represents an investment of ₹80 crores, marking a significant leap in India's computational capabilities for more reliable and accurate weather and climate forecasting particularly extreme events. Located at two key sites—the Indian Institute of Tropical Meteorology (IITM) at Pune and the National Centre for Medium Range Weather Forecasting (NCMRWF) at Noida.



Social Media Highlights



News from MoES

- Union Cabinet approved India's signing of the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, an international treaty under the United Nations Convention on the Law of the Sea (UNCLOS).
- Union Minister Dr Jitendra Singh held a meeting to review the ongoing IndoNorway collaboration on Blue-Economy with the Norwegian Ambassador to India on July 12, 2024.
- BIMSTEC Centre for Weather & Climate (BCWC) at NCMRWF conducted a two-week workshop on Data Assimilation and Forecast Verification Techniques from July 15-26, 2024, for BIMSTEC countries.
- MoES celebrated its 18th Foundation Day on 27th July 2024. On this occasion, the following publications were launched:
 - Standard Operation Procedure on Cyclone Warning in India and Competency Framework for Monitoring and Forecasting High-impact Weather Events by IMD.
 - Consolidated report on the 14th Indian Arctic Expedition (2023-24), including India's maiden winter Arctic Expedition (launched on December 18, 2023) by NCPOR.
 - A catalogue entitled Taxonomy and Systematics of Anomuran Crabs (Paguroidea, Chirostyloidea and Galatheaidea) from the Indian EEZ (Exclusive Economic Zone) by CMLRE.
 - The first issue of the Ministry of Earth Sciences Newsletter, envisaged to be a quarterly publication highlighting news, events, and updates by MoES.
- INCOIS hosted the maiden National Space Day 2024 events, including a workshop on the theme 'Application of Space Technology for Earth System'.
- The four-member Indian team comprising students from Gujarat, Kerala, Chhattisgarh, and Rajasthan won three gold and bronze each and two silver medals across three competition categories at the 17th edition of the International Earth Sciences Olympiad (IESO) held in Beijing, China.
- IMD released a Met Monograph on 'Disastrous Weather Events 2023' on August 26, 2024, providing critical insights into severe weather occurrences across the nation to improve preparedness and response.
- A faunal survey in the Andaman Sea on-board the Fishery Oceanographic Research Vessel Sagar Sampada revealed a rich diversity of coral reef-associated brachyuran crabs and reported four genera occurring in Indian waters for the first time.
- IITM established a Climate Data Archival and Distribution System (CDAS) for disseminating climate change projections generated from India using the IITM Earth System Model (IITM-ESM).
- NIOT deployed the Indian Arctic subsurface instrumented mooring IndARC-VI and recovered the Acoustic mooring System mooring that was deployed last year in the Kongsforden, Ny-Alesund, Svalbard Arctic during August 30-31, 2024, onboard the Arctic University of Norway ship, RV Helmer Hanssen. The entire Arctic expedition has been coordinated by NCPOR.



- NCPOR scientists retrieved core samples from the Canadian permafrost on September 09, 2024, to uncover the mysteries of the microbiome and multi-drug-resistant bacteria preserved within. This research is crucial for understanding the impacts of Climate Change and its implications for Global Health.
- The Union Cabinet approved the 'Mission Mausam' on September 11, 2024, with an outlay of 2,000 crores over two years. Mission Mausam, chiefly implemented by MoES, is envisaged to be a multi-faceted and transformative initiative to boost India's weather and climate-related science, research, and services.
- INCOIS launched an Integrated Ocean Energy Atlas to generate 9.2 lakh TWh of renewable energy from blue sources such as tidal waves, currents and salinity gradients within the Exclusive Economic Zone. It was inaugurated by the Secretary, MoES, Dr M Ravichandran, on September 12, 2024.
- India's first Urban Radar Network over the Mumbai Metropolitan Region, established by IITM, Pune, was inaugurated by the Secretary, MoES, Dr M Ravichandran, on September 14, 2024, in Colaba, Mumbai.
- IITM Delhi Branch Office initiated a Rainwater Chemistry Campaign at multiple locations across the Indo Gangetic Plain and the foothills of the Himalayas during the Monsoon 2024, spanning over four months from June to September 2024.
- Dr M Ravichandran, Secretary, Ministry of Earth Sciences, and Her Excellency Ms May-Elin Stener, Ambassador of Norway to India, participated in the Swachh Sagar Surkashit Sagar 3.0 at Thiruvananthapuram Beach, Chennai, to commemorate the International Coastal Cleanup 2024.
- Dr M Ravichandran, Secretary, Ministry of Earth Sciences, chaired the 10th meeting of the World Meteorological Organisation (WMO) Regional Steering Group (RSG) for the Asia node on Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) inaugurated at Prithvi Bhawan, New Delhi, organised by IMD. The meeting began with a welcome address by Dr M Mohapatra, Director General, IMD, and 3rd Vice President of the WMO.
- Hon'ble Prime Minister Shri Narendra Modi launched the Ministry of Earth Sciences High-Performance Computers (HPC) systems at the IITM (named Arka) and NCMRWF (named Arunika) through virtual presence on September 26, 2024. The HPC will revolutionise meteorology, climate research and disaster



management, enhancing India's supercomputing capacity to 22 petaflops (from the previous capacity of 6.8 petaflops) for accurate predictions to tackle climate change and disaster preparedness.

- Dr M Ravichandran, Secretary, Ministry of Earth Sciences, and Shri SB Sharma, Inspector General, Indo Tibetan Border Police, inaugurated the Antarctic Huts facility on September 29, 2024, redeveloped under an agreement between NCPOR and M&SI-ITBP, which will train participants in snow-ice craft and acclimatisation for pre-Antarctic missions.
- Dr M Ravichandran, Secretary, Ministry of Earth Sciences, inaugurated the Heliport Automatic Weather Observing System (HAWOS) at Kedarnath Temple, Uttarakhand, on September 29, 2024. This system, executed by IMD and Uttarakhand Civil Aviation Development Authority, will enhance meteorological services for safer helicopter operations during the Yatra season.



Events at MoES

- INCOIS conducted a cruise onboard RV Sagar Nidhi in the Arabian Sea from June 22 to July 15, 2024, as part of the EKAMSAT program to study the physical and biological variabilities during the monsoon period.
- NCPOR Arctic Expedition batch-03 reached the Indian Arctic station 'Himadri' on July 01, 2024 and undertook their research activities at Himadri.
- Over 65 students from T.I.M.E International School, Hyderabad, visited INCOIS on July 05, 2024, and gained insights into various oceanic services. The young minds were fascinated to learn how these services help coastal communities by providing early warnings.
- IMD organised an Online International Webinar on 'SDS Monitoring and Forecasting' jointly organised by RA II's Working Group on Services (WGServices) and the Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) Asian Node on July 12, 2024.
- NCPOR signed a contract with M/s Garden Reach shipbuilders and Engineers, Kolkata on July 16, 2024, for the construction and delivery of the Ocean Research Vessel.
- INCOIS hosted over 25 MTech students from VNR-VJIEET Hyderabad on July 19, 2024, on various oceanographic services, utilisation of satellite data and scientific endeavours to safeguard coastal communities.
- Over 45 trainee officers from NIRD&PR (Officials from LGA, Maldives) and MANAGE, Hyderabad, visited INCOIS on July 24, 2024, witnessed state-of-the-art ocean science technologies and services provided for the benefit of coastal communities and also engaged in valuable knowledge exchange.
- The 18th Foundation Day of the Ministry of Earth Sciences concluded successfully on July 27, 2024. Prof. Ajay Kumar Sood, Principal Scientific Adviser to the Government of India, was the Chief Guest. The event was presided over by Dr M Ravichandran, Secretary, with Shri Vishwajeet Sahay, AS & FA, and Shri D Senthil Pandiyan, Joint Secretary, Ministry of Earth Sciences.
- INCOIS organised a Training Session for Officials of Mauritius on 'PFZ and Operational Services' from July 29 to August 2, 2024.
- Ministry of Earth Sciences and its institutes celebrated the 78th Independence Day on August 15, 2024.
- IMD organised the 20th Annual Attachment Training for Tropical Cyclone Forecasters in 13 WMO/ESCAP Panel member countries (August 19-30, 2024). There were 43 international participants, nine joining in person and 34 joining online, apart from the participants from India. The training aimed at building the capacity of the cyclone forecasters in the region by understanding the latest developments in observations, monitoring, modelling, prediction and early warning services of cyclones over the Bay of Bengal and the Arabian Sea region.
- The IMD-WMO fellowship training program on 'Development of Competency in Weather Forecasting' started at the Regional Training Centre, Meteorological Institute, Pune, from August 26 to September 27, 2024.
- Delegates from the Tamil Nadu Disaster Risk Reduction Agency visited NCMRWF on August 27, 2024, for familiarisation with ongoing research works at NCMRWF.
- NCESS organised the 13th Prof C Karunakaran Memorial on August 28, 2024, to remember his legacy and achievements. During the event, Dr Shailesh Nayak, Director, National Institute of Advanced Studies (NIAS), Bengaluru, delivered a talk on 'Earth Observations from Space: Benefits for Humanity'.



- NIOT conducted activities as part of the 'National Sports Day' paying tribute to the legendary hockey player Major Dhyan Chand on August 29, 2024.



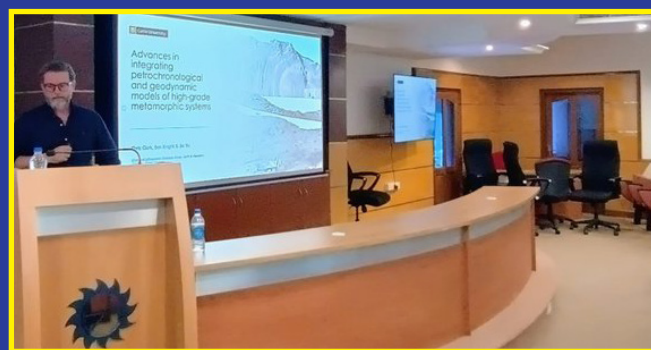
- NCESS conducted a three-day National Conference on Women in Geosciences between September 02-04, 2024, themed 'Opportunities, Challenges and Accomplishments' highlighting the vital contributions of women in advancing our understanding of the Earth.



- INCOIS conducted a week-long, in-person training course on 'Tsunamis and Marine hazards' for Oman National Multi-Hazard Early Warning Centre delegates from September 02-06, 2024.

- CMLRE hosted a national-level workshop on the Indian Ocean Biodiversity Information System (IndOBIS) on September 03, 2024. The workshop brought together scientists and researchers from various institutions, raising awareness about the documentation and publication of marine biodiversity data.

- Prof Chris Clark, ARC Future Fellow and Director Global Initiatives, School of Earth and Planetary Science, Curtin University, Perth, Western Australia, delivered the ESF Distinguished Lecture on September 06, 2024, entitled 'Progress in the development of integrated petro-chronological and geodynamic models of high-grade metamorphic systems' on the NCESS-Earth Science Forum.



- INCOIS conducted a one-week training course on 'Early Warning Systems for Tsunami and Ocean-Related Hazards' to enhance expertise on improving preparedness and response strategies for oceanic threats on September 06, 2024.
- An 8-week training course for ten international candidates per the PMN Contract between MoES and International Seabed Authority commenced at NIOT, Chennai, on September 10, 2024.



- INCOIS, in coordination with Gujarat State Disaster Management Authority (GSDMA), conducted a sensitisation meeting and training on tsunami-ready implementation for disaster management officials from September 10-11, 2024, at Gandhinagar, Gujarat.

- MoES organised a press briefing on Mission Mausam on September 12, 2024, and provided valuable insights into the initiative's goals and impact on India.
- INCOIS hosted a one-day operational services training course for the National Institute of Hydrography Officers on September 12, 2024. The sessions were focused on understanding ocean state forecast products, tsunami decision support systems, and hands-on exposure to the products and services of INCOIS.
- An 8-week training course for 5 international candidates per the PMS Contract between MoES and International Seabed Authority commenced at NCPOR, Goa, on September 16, 2024.
- INCOIS, in collaboration with NDMA, hosted a two-day Tsunami-SOP Workshop from September 25-26, 2024, that focused on SOPs, tsunami bulletins, and dissemination mechanisms. There was a dedicated session on tabletop exercises with key stakeholders such as DMOs and media from coastal States/UTs.
- INCOIS organised the 'Tsunami Standard Operating Procedure (SOP) workshop for all coastal disaster management officials from September 25-26, 2024 in preparation for the national tsunami mock exercise which coincided with World Tsunami Awareness Day.
- Onboard Training for International Participants nominated by the International Seabed Authority embarked on a scientific cruise onboard Sagar Anveshika from September 26-30, 2024, for specialised onboard training in scientific activities and studies.



- IITM organised the workshop jointly with the Indian Aerosol Science and Technology Association (IASTA) from September 30 to October 04, 2024. The workshop focused on a wide range of instrumentation and measuring techniques for studying different atmospheric aerosols and their characteristics.
- NCPOR successfully conducted various field activities such as ablation and accumulation measurements, and discharge measurements under Himalayan Cryosphere studies.
- IMD issued daily weather forecasting videos of about 5 minutes in English and Hindi through YouTube, Facebook, Twitter and the IMD website, and weekly video on extended range forecasts (up to two weeks) every Thursday through the website and social media.
- NCCR organised a session titled 'Ocean Ecosystem Accounting Experiences from India and Norway' with NIVA, Norway, under the INECO project during the 5th Global Dialogue on Sustainable Ocean Development, Bali.
- INCOIS hosted 13 Sastra Prathibhas (School students selected from GCC Countries through Science India Forum, VIBHA) on various oceanic services provided by INCOIS.
- As a part of the Polymetallic Nodule Mining programme, training under contract with the International Seabed Authority and the Ministry of Earth Sciences was held at NIOT with the participation of International candidates jointly with the Geological Survey of India and the Indian Bureau of Mines nominated team.
- The 'Swachhata Hi Seva 2024' celebration commenced with a Swachhata Pledge in MoES and its institutes, where the staff committed to maintaining cleanliness across the nation. The officials united to form a Human Chain rally under 'Swachhata Hi Seva 2024' to promote a clean environment for a healthy planet on September 17, 2024.
- MoES successfully concluded the Swachh Sagar, Surakshit Sagar 3.0 campaign on September 21, 2024, facilitating beach cleanup drives at more than 80 locations across the country's coasts, removing more than 60 tons of waste, including plastic, metal, cloth, rubber, and paper and wood debris.

Collaborations: MoUs and MoAs

- IMD signed an MoU with Reliance Foundation to enhance cooperation and collaboration between the two agencies.
- INCOIS signed an MoU with the Directorate of Fisheries, Government of West Bengal, and Vidyasagar University to foster collaboration in ocean information services, research, and outreach.
- IITM signed an MoU with the PMOD/WRC (Physical Meteorological Observatory in Davos/ World Radiation Centre) for the international project titled 'Exploring the Chemical and Climatic Impacts of Solid Particles for Stratospheric Solar Geoengineering' on September 11, 2024.



- The collaboration between the Ministry of Earth Sciences and UK's Weather from the Met Office under 'Weather and Climate Science for Service Partnership India (WCSSP India)' has been extended for another 5 years. Scientists from the MoES institutes met their UK counterparts at the annual WCSSP science meeting from July 01-05, 2024, at the UK-Met office.
- INCOIS signed an MoU with BOBP-IGO on August 05, 2024, to enhance knowledge sharing, research and tailored advisories on fishing zones, reef health and algal blooms.
- IMD signed the MoUs with the Climate Resilient Observing-Systems Promotion Council, All India Disaster Mitigation Institute, Ahmedabad, Survey of India, Jaypee Institute of Information Technology, Noida, to strengthen collaborative research and development.
- IMD signed an MoU with the Space Application Centre (SAC), Ahmedabad, to promote collaborative activities on September 30, 2024.



- IITM signed an MoU with Watershed Organisation Trust (WOTR) for three years on September 09, 2024, to enhance hydro-meteorological research and community outreach, leveraging IITM's expertise and WOTR's rural network.



New to Science

- NIOT developed 'ROSHNI' (Renewable Ocean System for Harnessing Novel Illumination) – a saline water lantern to power the LED light and also works as a mobile charger has been selected as one of the top 100 Indian innovations by the Indian Innovator Association



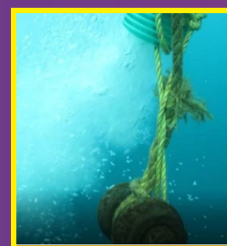
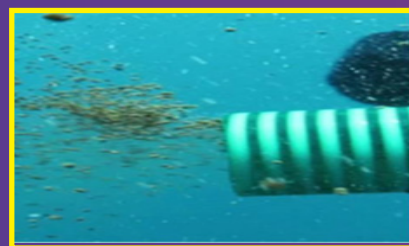
- NIOT deployed a Vector Sensor Array System for data acquisition towards ship detection and tracking carried out off Chennai on June 11, 2024, onboard Sagar Manjusha. The system is operational at sea.



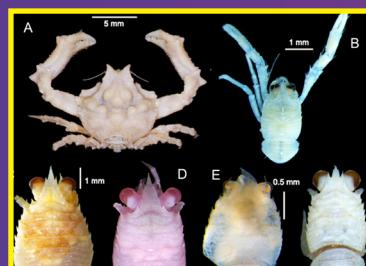
- NIOT successfully demonstrated the water extraction from humid air. The water connection from the developed unit is provided at the NIOT bus stop for public consumption.



- NIOT tested an underwater feeding system based on water ejectors conducted as part of the development of open-sea submerged fish cage technologies.



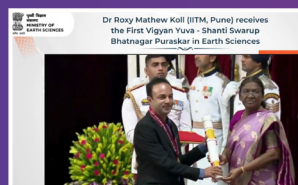
- CMLRE identified five new species of false lobsters, commonly known as squat lobsters and one new species of sponge crab from the Indian Ocean. These unique crustaceans add to the already diverse marine life in the region. The specimens were collected during various scientific expeditions onboard FORV Sagar Sampada.



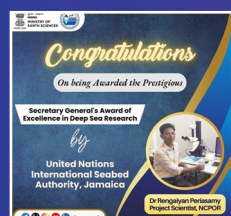
Awards



Dr Rahul Mohan,
NCPOR, received the prestigious National Geoscience Award 2023 from the Hon'ble President of India, Smt Droupadi Murmu.



Dr Roxy Mathew Koll,
IITM, received the esteemed Rashtriya Vigyan Puraskar, Vigyan Yuva - Shanti Swarup Bhatnagar 2024 in Earth Sciences for his contributions to climate science and the development of advanced networks and models for predicting monsoon extremes.



Dr Rengaiyan Periasamy,
NCPOR, received the prestigious Secretary General's Award of Excellence in Deep-sea Research from the United Nations International Seabed Authority during the 29th Session of the International Seabed Authority Assembly in Jamaica.



Dr Shailendra Saini,
NCPOR, was elected as the Vice-Chair of the Executive Committee of COMNAP (Council of Managers of National Antarctic Program) for a three-year term.

What's New!

India International Science Festival (IISF):
November 30 to December 03, 2024 at Guwahati

IISF 2024 takes place to encourage scientific innovation and provide a platform for fruitful discussions between students and scientists, fueling India's scientific progress.



Research Highlights

The MoES publication list (July-September 2024), featuring peer-reviewed academic papers in high-impact international journals, is compiled from Web of Science (Clarivate) and Scopus (Elsevier) and can be accessed here.



Know More

Knowledge resources subscribed by MoES for its officials and staff can be accessed 24/7 at www.moeskrc.remotexs.in/user/login



Connect

The MoES newsletter welcomes feedback, suggestions, and inputs. Please write at newsletter.moes@gov.in, with the subject line: MoES newsletter.





Doppler Weather Radar



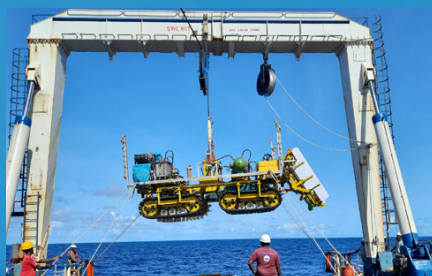
Maitri Station in Antarctica



Bharati Station in Antarctica



Himansh Station in Himalayas



**Seabed Mining Machine
Varaha**



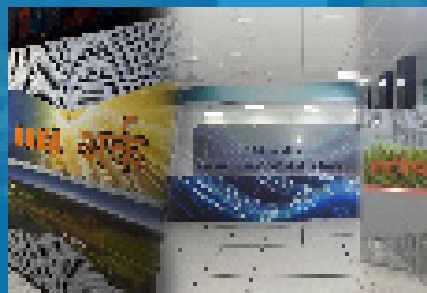
Himadri station in Arctic



MoES vessel Sagar Nidhi



**Atmospheric Research
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**High Performance Computers:
Arka, Arunika and Tarang**

Ministry of Earth Sciences, Government of India
Prithvi Bhawan, Lodhi Road
New Delhi 110003

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मंत्रालय
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