



REFLECTIONS

The Quarterly In-House Newsletter of the
North Eastern Space Applications Centre



From the Director's Desk



Dr. S. P. Aggarwal
Director, NESAC

HIGHLIGHTS OF THIS ISSUE:

TEC Monitoring over
NER - 2

Space Based Emergency
support during Flood in
Guwahati and
Tripura - 3

This has been a vibrant period for NESAC. The 2nd Edition of the NESAC User Interaction Meet (NeUIM) was held on September 5-6, 2024, in a hybrid mode. The event also flagged off NESAC's yearlong Silver Jubilee celebrations, set to culminate in September 2025. NeUIM drew around 170 in-person participants, with over 1,000 attending virtually via video conferencing and YouTube. Recognition followed, as NESAC received the prestigious "National Geospatial Enabler Award" (Jury Award) on September 15, 2024, at IIT Bombay for its cutting-edge space technology initiatives. Further acclaim came when the ISRO/NESAC exhibition stall won the Best Stall Award at Vibrant NE 2024 in Guwahati. In another key moment, Meghalaya's Chief Minister, Dr. Conrad Sangma, released the NESAC executed project report "Mineral Mining Database of Meghalaya," highlighting its significance for planning and management. NESAC's commitment to promoting Hindi was underscored by its successful organization of a one-day inter-centre Hindi Technical Seminar on "Space Technology Applications in Sustainable Development."

Despite these achievements, the monsoon season brought challenges, with floods and landslides impacting Assam and Tripura. NESAC played a crucial role in disaster response, providing flood inundation maps for decision-making and regularly updating landslide inventories on its NER Disaster Risk Reduction portal. Additionally, 85 flood alerts were issued till date to various states during this monsoon season. In all, NESAC showcased resilience and leadership, supporting the region with innovative geospatial solutions and a commitment to sustainable development.

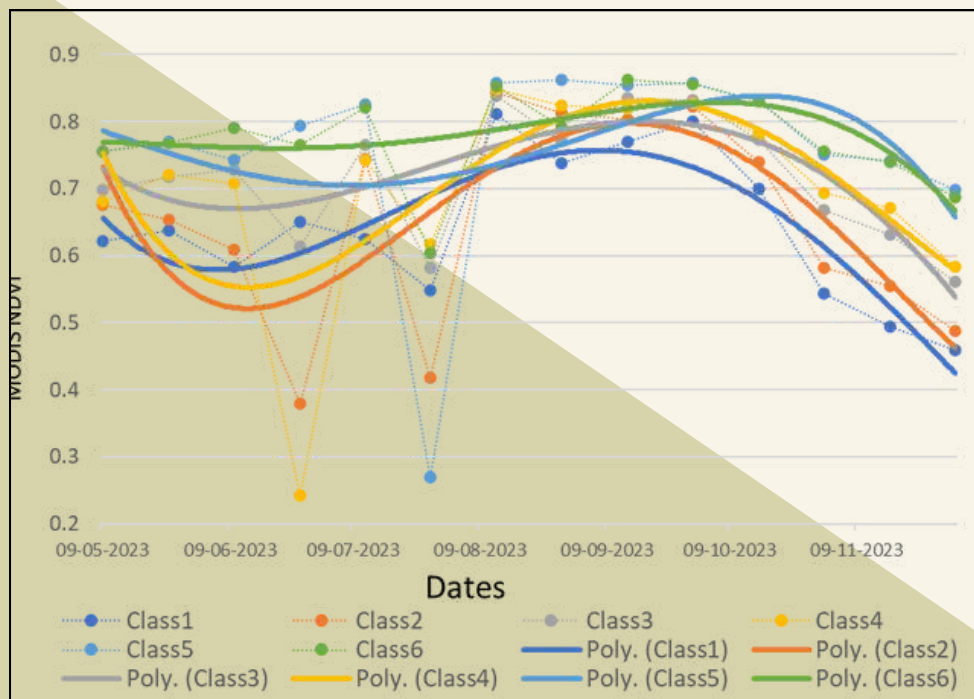
R&D Activities

Simulation and Prediction of Rice Yield Through Remote Sensing Based Models in Hilly Terrain of NER

Pradesh Jena

The study focuses on the simulation and prediction of rice yield in the hilly terrain of Northeast India using remote sensing-based models. The Sung Valley Area in Meghalaya has been selected as the study area as it is the state's primary rice-producing region and is a good representation of a hilly agro-ecosystem of NER.

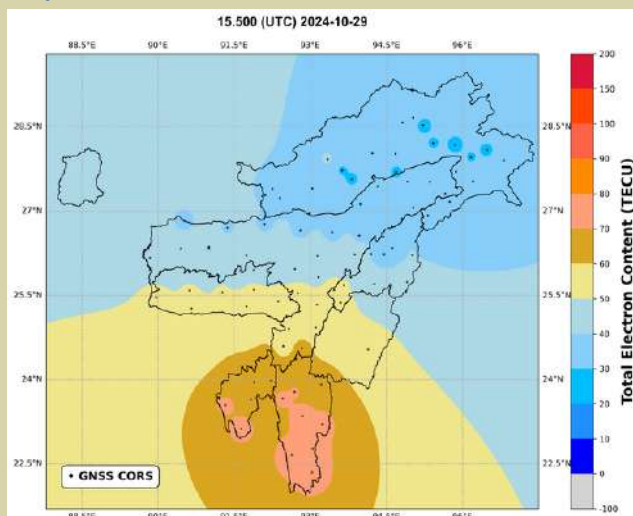
During the 2023-2024 period, distinct rice transplanting dates within this area and acreage corresponding to various transplanting dates have been identified and mapped. Identification of rice transplanting dates were done using time series MODIS NDVI, Sentinel 1 and EOS-4 data. Yield estimation using remote-sensing based models is currently in progress.



Identification of rice transplanting dates using time-series MODIS NDVI

Near real time monitoring of Ionosphere Total Electron Content (TEC) variations over NER

Gopal Sharma



Ionosphere TEC map of 29 October 2024, 15.5 UTC

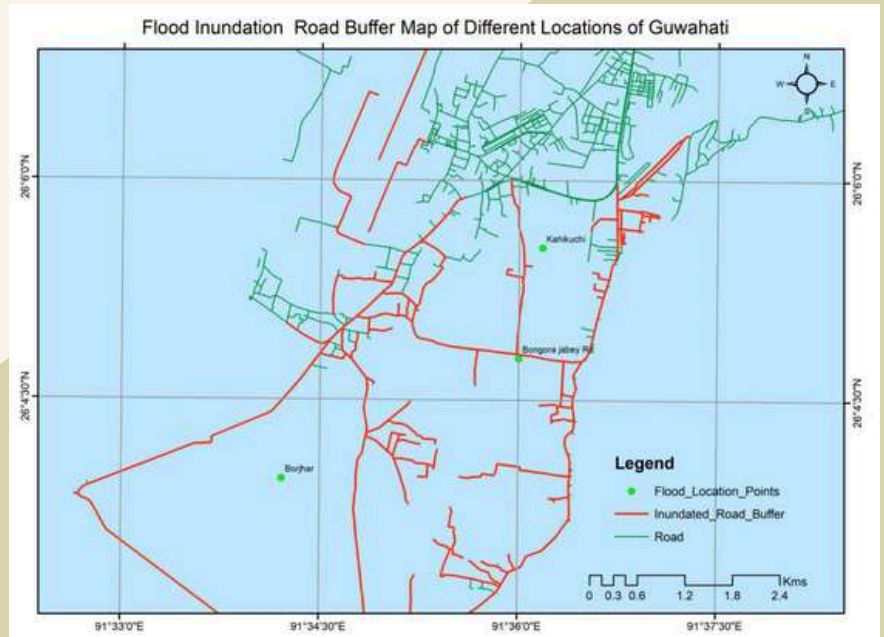
Total Electron Content (TEC) analysis is a vital tool in the study of ionospheric variations, particularly in relation to seismic activities. Anomalies in TEC variations can serve as potential precursors to earthquakes, providing valuable data for earthquake analysis. By monitoring these anomalies, significant patterns and deviations can be identified that may correlate with seismic events. In this experimental study, we generate a daily ionosphere TEC variability map over the North Eastern Region (NER) of India for the first time using indigenous Continuously Operating Reference Stations (CORS) data from Survey of India (SOI).

TEC variation from Global Positioning System (GPS) data of 120 CORS installed in the NER was studied. Monitoring comprises daily TEC map generation at every 30-minute resolution followed by TEC anomaly detection for earthquake precursor if any using Python programming and open source tools. The figure represents one of the examples of the TEC map generated during the study (29 October 2024 at 15.5 UTC). We chose five CORS each located near Dauki, Koppili, Barapani, Oldham, and Dhubri Fault zone for daily TEC anomaly Monitoring. Once, an anomaly is identified, we plan to estimate TEC from all available CORS in the region and study the spatial distribution of TEC patterns. This comprehensive study will identify TEC deviation if any before the earthquakes that may be correlated with other parameters for identifying the successful earthquake precursors in the region.

Space Based Emergency Support During Floods in Guwahati and Tripura

NER-DRR Team

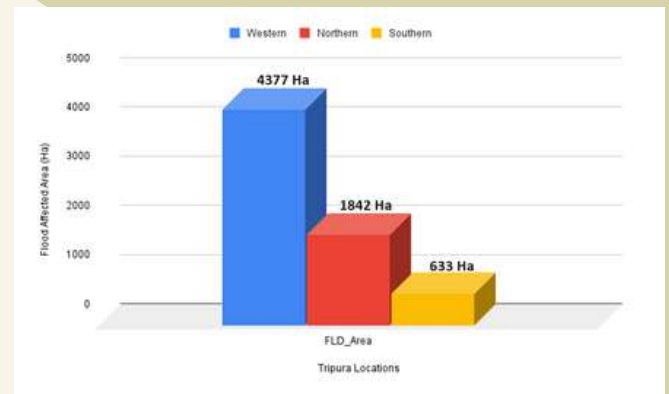
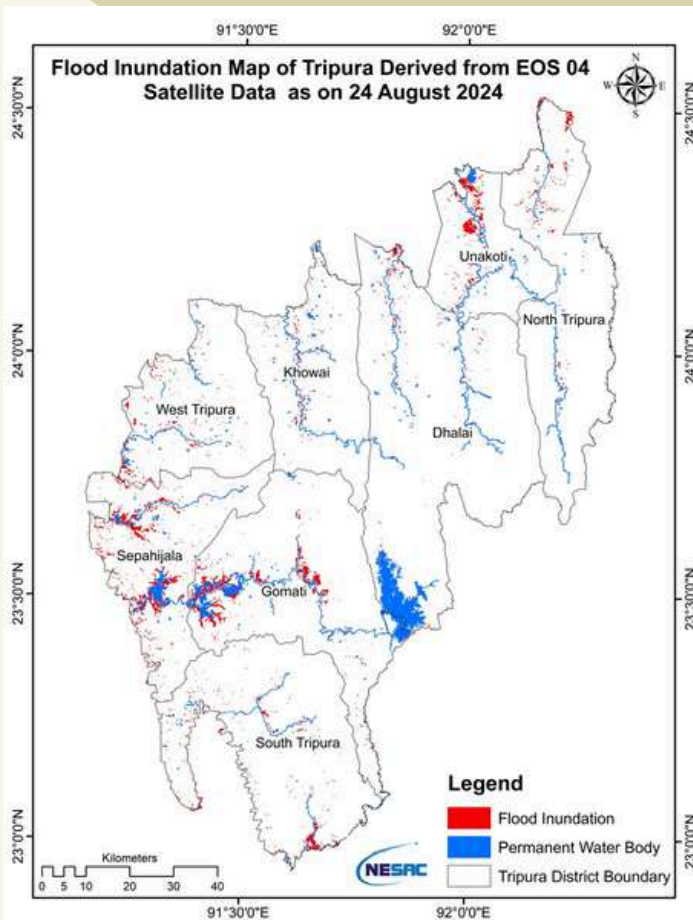
On August 05, 2024, a large part of Guwahati area was submerged in urban floods due to continuous heavy rain, resulting in the disruption of the normal life of the people. Accumulation of water was reported from almost all peripheral roads in the city, with people stranded in their vehicles for hours amid heavy traffic. A report on flood inundation mapping of Guwahati Urban Area on Aug 5, 2024 using EOS 04 SAR satellite data has been submitted to Assam State Space Application Centre (ASSAC).



In addition, a report of rainfall activity over Guwahati city and surrounding area for Aug 5 and land use changes in the catchment area has been submitted to assist in the evaluation of the urban flooding event which occurred over the Guwahati city.

Similarly, an initial report on flood inundation mapping of Tripura on Aug 21, 2024 has been submitted to Tripura Space Applications Centre and SDMA, Tripura. On further request from SDMA,

Tripura, separate inundation maps were prepared for Gomati, Sepahijala, South Tripura, West Tripura districts along with Agartala for Aug 21 and Aug 22, 2024 respectively and submitted to the concerned authority. Daily weather monitoring report for Tripura during Aug 22, 2024 to Aug 26, 2024 has been submitted to SDMA, Tripura. In addition to this, a report on landslide has also been submitted to SDMA, Tripura.



Flood-Affected Areas in Tripura by Region as on August 24, 2024

Capacity Building

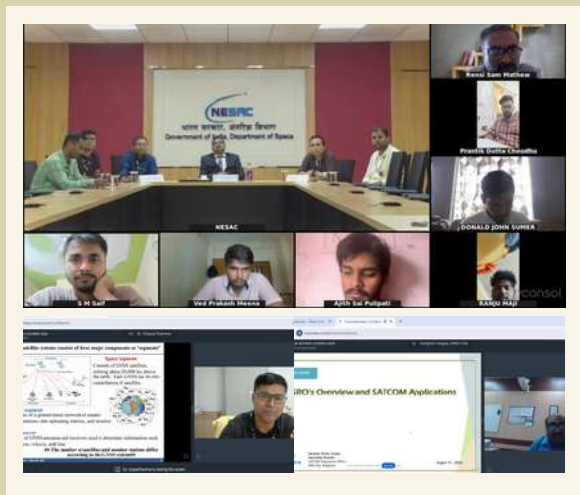
NESAC Conducts 5th Edition of Two-Week Short Course on “Applications of RS & GIS in Agriculture and Allied Areas”

NESAC successfully conducted the fifth edition of the two-week short course on “Applications of Remote Sensing & GIS in Agriculture and Allied Areas” during August 19-30, 2024. The course was attended by 28 participants, which included officials from state agriculture, horticulture, and fishery departments, faculty members from colleges and universities, scientists, subject matter specialists, research scholars and private startups.

During the period of the course, participants engaged in 15 hours of theory classes, 25 hours of practical sessions, and 16 hours for project work. One invited lecture on “Satellite Agrometeorology and Applications” was delivered by Dr. Rahul Nigam, a senior scientist from SAC Ahmedabad on August 27, 2024.



NESAC Conducts One Week Online Course on SATCOM & SATNAV



The fourth edition of the online Course on Satellite Communication & Satellite Navigation: Technologies & Applications was conducted at NESAC during September 23rd-27th, 2024. A total of 135 participants registered for the course mainly from NITs and other Engineering Colleges. A total of 13 lectures were delivered by Scientists of SUD, NESAC as well as thematic experts from Space Applications Centre (SAC), Ahmedabad, Satcom Program Office (SATCOM PO), ISRO HQ & MCF, ISRO.

Hindi Technical Seminar Organized at NESAC Umiam

A Hindi technical seminar on “Space Technology Applications in Sustainable Development” was organized at NESAC on October 03, 2024. Dr. Vinay Kumar Mishra, Director, Indian Council of Agricultural Research, North Eastern Hill Region (ICAR-NEH), graced the inaugural session of the seminar as the chief guest. Dr. Shankar Kumar, Joint Director (Official Language), Department of Space Branch Secretariat, New Delhi was also present at the event. A total of 13 articles were presented in the seminar in two technical sessions. The article titled “Investigation of Earth Deformation and its Impact on Seismic Potential Using Radar Satellites in Barapani Shear Zone Area of Meghalaya” by Dr. Gopal Sharma, Scientist/Engineer-SE, NESAC, Umiam was selected as the best presentation.



Capacity Building

Official Language Orientation Program Organized at NESAC

Official Language Orientation Program for Official Language cadre Officials/Personnel (Senior Translation Officer/Junior Translation Officer) of Department of Space/ISRO was successfully organized at NESAC on October 04, 2024. Dr. S.P. Aggarwal, Director, NESAC addressed the participants and highlighted the role of officers/personnel of Rajbhasha cadre in the successful implementation of the Official Language Policy. Subsequently, Dr. Shankar Kumar, Joint Director (Official Language), Department of Space, Branch Secretariat, New Delhi also briefed the participants about the orientation programme.



Basic Course on Remote Sensing & GIS Technologies and Applications Conducted for CAPF & IB Officials

A one week Basic Course on Remote Sensing & GIS Technologies and Applications for Central Armed Police Forces & Intelligence Bureau Officials sponsored by Initiatives Identification and Execution Cell, Force Headquarters, Border Security Force was organised during 22nd to 26th July 2024. The programme was attended by one Second In Command & four Assistant Commandants from Central Reserved Police Force and five Constables from Indo-Tibetan border Police. Basic theory on the principles of remote sensing and GIS, GPS, satellite data downloading, image processing and various applications were covered in the course with hands on practice sessions for the benefit of the trainee officers.



NESAC Organised One Day State-Level Workshop in Collaboration with SRSAC, Arunachal Pradesh



A one day state-level workshop on "Capacity Building on the Utility of Geo-Spatial Data and the Available Data on the North Eastern Spatial Data Repository (NeSDR) Portal" was successfully organized in collaboration with SRSAC, Arunachal Pradesh on October 01, 2024 in Dirang. About 80 participants attended the workshop.

Capacity Building

NESAC Organised Two-Week Course on “UAV Remote Sensing Technological Advances and Applications”

NESAC conducted a two-week course on "UAV Remote Sensing Technological Advances and Applications" as part of its capacity-building and outreach initiative during October 14-25, 2024. This program attracted 16 participants, including students and professionals from diverse fields and states. A hands-on demonstration showcased the entire workflow of UAV remote sensing, which encompassed UAV assembly, integration, and operations, along with mission planning, data acquisition, processing, and analysis. To reinforce their learning, participants also engaged in a mini-project focused on UAV remote sensing applications across various thematic areas.



ISPRS TCIV 2024 Symposium



Dr. B K Handique, Head, ASD & PPEG represented ISRO/DOS in the ISPRS TCIV 2024 Symposium and chaired the WG 10 Session-2 on “Applied Spatial Science for Public Health” at Perth, Australia during October 22-25, 2024.



Achievement

National Geospatial Enabler Award 2024 Conferred to NESAC

The North Eastern Space Applications Centre was honoured with the National Geospatial Enabler Award 2024 in recognition for the exceptional services and world-class support provided in the geospatial domain to educational institutions and research organizations across India. National Geospatial Awards is an initiative of the FOSSEE project of IIT Bombay under the aegis of the National Mission on Education through ICT (NMEICT), Ministry of Education, Government of India. Dr S.P Aggarwal received the award on behalf of NESAC during the Open-Source Day & National Geospatial Awards 2024 (Edition 01) event held at IIT Bombay on September 15, 2024.



National Science Day Celebration

On August 06, 2024, the Mizoram Remote Sensing Applications Centre (MIRSAC) and NESAC jointly celebrated National Space Day at the conference Hall of Assembly House Annexe, Aizawl, Mizoram. The event was honoured by the presence of Dr. Vanlalhlana, Hon'ble Minister i/c School Education, Govt. of Mizoram, as the Chief Guest. Over 100 students and teachers representing schools from different districts of Mizoram attended the program and eagerly participated in the Quiz Program and Exhibitions. First, second and third prizes in the Quiz competition were awarded to the two students from each of three winning schools among the 25 competing schools.



NESAC, in collaboration with ISRO, celebrated the National Space Day-2024 at Dibrugarh Hanumanbax Surajmall Kanoi (DHSK) College, Dibrugarh on August 08, 2024. Dr. Jiten Hazarika, Vice-Chancellor, Dibrugarh University who attended the program as the chief guest, commended NESAC and DHS Kanoi College for organising such a significant event in Upper Assam and emphasized its potential to inspire students interested in space research and foster a research-oriented mindset. A space exhibition was also organized as part of the program and a quiz competition was conducted for students from 25 schools and colleges in Dibrugarh district.

National Space day was celebrated at Silchar, Assam on August 12, 2024. The event was jointly organised by NESAC and Guru Charan College (GC College), Silchar. Around 400 students of 9-12 standard of various schools from Cachar, Hailakandi & Karimganj districts of Assam participated in the event along with their teachers. The program was inaugurated by Dr Bibhas Deb, Principal, GC College. A Quiz Competition was held, which was followed by distribution of prizes and interaction with NESAC & ISRO Scientists.



NESAC, in collaboration with ISRO and other State centres/institutes successfully organised the National Space Day celebrations across 8 NE states and West Bengal during the period July 12 to Aug 16, 2024. The concluding zonal event, held on Aug 16, 2024, in Guwahati, was organized in collaboration with ISRO and the Department of Science, Technology, and Climate Change, Government of Assam. Approximately, 800 students and their teachers from 28 schools and colleges actively participated in the zonal programme.

NEWS & EVENTS

2nd Edition of NESAC User Interaction Meet (NeUIM-2024)

The 2nd Edition of the NESAC User Interaction Meet (NeUIM) took place on September 5-6, 2024 via hybrid mode. The event also marked the beginning of NESAC's journey into its yearlong Silver Jubilee celebrations, set to culminate in September 2025. NeUIM 2024 focused on utilizing Space Science and Technology to boost societal benefits, improve governance, enhance natural resource management, provide disaster management support, and foster outreach and networking with stakeholders, academia, and industry. The inaugural event on September 05, 2024 commenced with a lighting of the lamp followed by a welcome note by Dr. S.P. Aggarwal, Director, NESAC. The inaugural program was chaired by Dr. R. R. Navalgund, former Director of SAC and NRSC as Chief Guest. In his speech, he recalled the establishment of NESAC, starting with the decision to create a space application centre for the North Eastern Region in the late 20th century. He emphasized NESAC's intended role and highlighted how it has surpassed expectations in



transforming the region. Shri Shantanu Bhatawdekar, Scientific Secretary, ISRO, graced the inaugural event as the Guest of Honor via virtual mode, emphasizing the need to understand the challenges faced by departments, industry, and academia. He also commended NESAC for its outstanding contributions to geospatial applications that have fueled the region's growth. The event was honored by the presence of Dr. Prakash Chauhan, Director, NRSC, who outlined the significance of India's space policy in promoting geospatial development in the Northeast. He stressed the importance of engaging with academia for skill development and urged startups to partner with IN-SPACE to collaborate with stakeholders across the region. The inaugural event was further enriched by the esteemed presence of former NESAC Directors, Shri PLN Raju and Shri KC Bhattacharyya. Shri Angshuman Dey, IFS, Secretary, also addressed the participants virtually and praised NESAC for its valuable support to the northeastern region and the socio-economic transformation it has enabled. At NeUIM-2024, about 170 participants attended in person, while more than 1,000 tuned in virtually through video conferencing and YouTube streaming. The event featured 38 speakers representing NESAC/ISRO, various state and central departments, academic institutions, and industries, who delivered valuable insights during the two-day program.

NEWS & EVENTS

Celebration of National Voluntary Blood Donation Day



As part of the celebration of "National Voluntary Blood Donation Day", NESAC in collaboration with the Regional Blood Centre, Pasteur Institute, Shillong, organised a Voluntary Blood Donation Camp on October 18, 2024 at the Multipurpose Hall, NESAC Residential Complex, Umiam. The Campaign slogan for this year is "Celebrating 20 years of giving: Thank you, blood donors!".

Student Visits to NESAC



MSc students from Royal Global University had an exposure visit to NESAC on August 06, 2024



A group of 28 students, accompanied by faculty members from Eklavya Model Residential School, Jawahar

Navodaya Vidyalaya (JNV), and Kendriya Vidyalaya (KV), visited NESAC for a one-day scientific excursion under the Knowledge and Awareness Mapping Platform (KAMP) on October 07, 2024

A total of 37 students and 4 faculty members from various disciplines: physics, computer science, mathematics, chemistry and bio-chemistry from St Edmund's college, Shillong visited NESAC on September 13, 2024.

Achievement



ISRO/NESAC stall received the Best Stall Award on September 21, 2024, at Vibrant NE 2024 exhibition



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