



REFLECTIONS



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



From the Director's Desk



Dr. S. P. Aggarwal
Director, NESAC

It gives me immense pleasure to present the upcoming edition of REFLECTIONS, the NESAC Newsletter, highlighting the significant milestones, achievements, and initiatives undertaken by NESAC in recent months. As we continue to strengthen the application of space technology for regional development, our collective efforts remain focused on addressing the unique challenges and opportunities of the North Eastern Region through innovation, collaboration, and capacity building.

The past quarter has been marked by several noteworthy accomplishments, including successful scientific events, outreach programmes, and research initiatives across diverse thematic areas. One of the most vibrant events conducted by NESAC and ISRO was the successful organization of NSSS-2026, which marked an important milestone for the Centre. The enthusiastic participation of researchers, government departments, stakeholders, and students in the symposium reflects the growing recognition of NESAC as a leading institution in the application of space science and technology for societal development.

NESAC remains committed to fostering scientific temper and nurturing young talent through training programmes, workshops, exposure visits, and student engagement activities. Such initiatives are vital in building a stronger ecosystem of innovation and promoting wider adoption of geospatial technologies in governance and decision-making. The use of UAV thermal imaging for assessment of farm-level canopy temperature and the development of innovative mineral exploration techniques using Remote Sensing and GIS are among the highlighted R&D activities of the Centre.

I would like to express my sincere appreciation to all employees, collaborators, and partner organizations whose dedication and teamwork continue to drive NESAC's mission forward. Their contributions have been instrumental in achieving excellence in both operational and research domains.

As we move ahead, let us continue to work with renewed enthusiasm and a shared vision to leverage space technology for societal benefit and national development. I hope this edition of REFLECTIONS provides valuable insights into our ongoing activities and inspires greater collaboration in the times to come.

HIGHLIGHTS:

- NESAC hosts 23rd National Space Science Symposium (NSSS-2026)
- NESAC receives award for Official Language Implementation

Farm level Canopy Temperature Assessment using UAV Thermal Data

Pradesh Jena, Francis Dutta & Bijoy K Handique

Rice farming in Meghalaya’s hilly terrain faces persistent challenges—fragmented fields, complex topography, and frequent cloud cover constrain conventional satellite-based crop monitoring.

This study addresses this limitation using drone-mounted thermal cameras to map crop stress at micro-field scale with high precision.

The study was conducted in Sung Valley, spanning West Jaintia Hills and East Khasi Hills districts. A DJI M600 hexacopter with a Zenmuse XT2 camera was used to capture both thermal and RGB images in a single flight on September 13, 2024. At just 13.4 cm ground sampling distance, the thermal sensor delivered canopy temperature maps with a level of spatial detail that satellite platforms simply cannot achieve over small, fragmented farmlands.

A key finding is that the rice transplanting date strongly affects canopy temperature. Analysis of 200 samples across four transplanting dates (June–July 2024) showed a clear difference ($F = 6.68$, $p < 0.001$), and Sentinel-1 SAR data identified these transplanting periods with 94.4% accuracy.

Thermal calibration with ground measurements was strong ($R^2 = 0.863$, $RMSE = 0.48^\circ\text{C}$). The maps showed canopy temperatures ranging from 17.8°C to 41.1°C , enabling clear differentiation between well-watered and water-stressed areas under comparable conditions.

Overall, the study shows that UAV thermal imaging can be a useful tool for irrigation planning, early stress detection, and real-time crop monitoring in Northeast India’s hill regions.

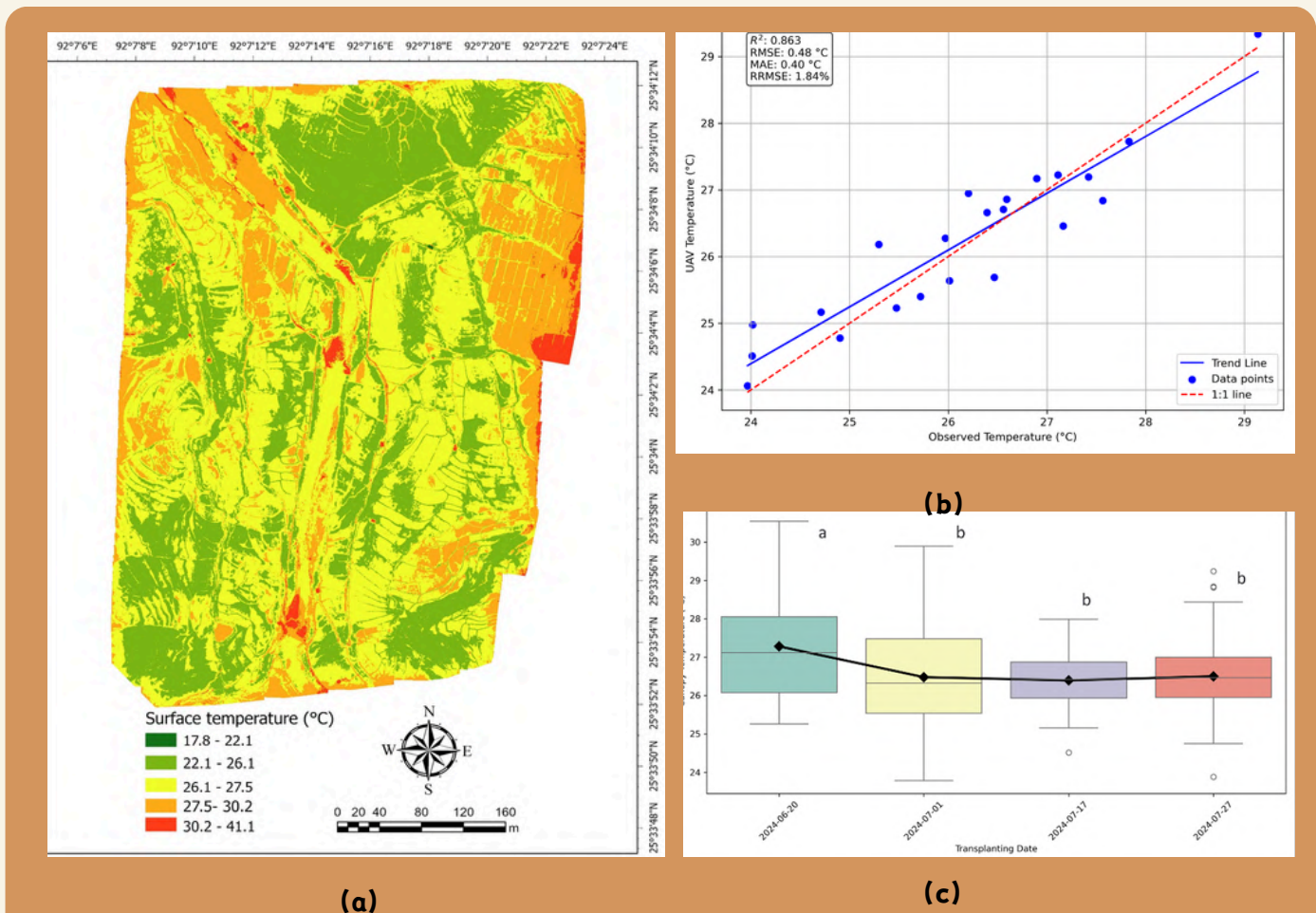
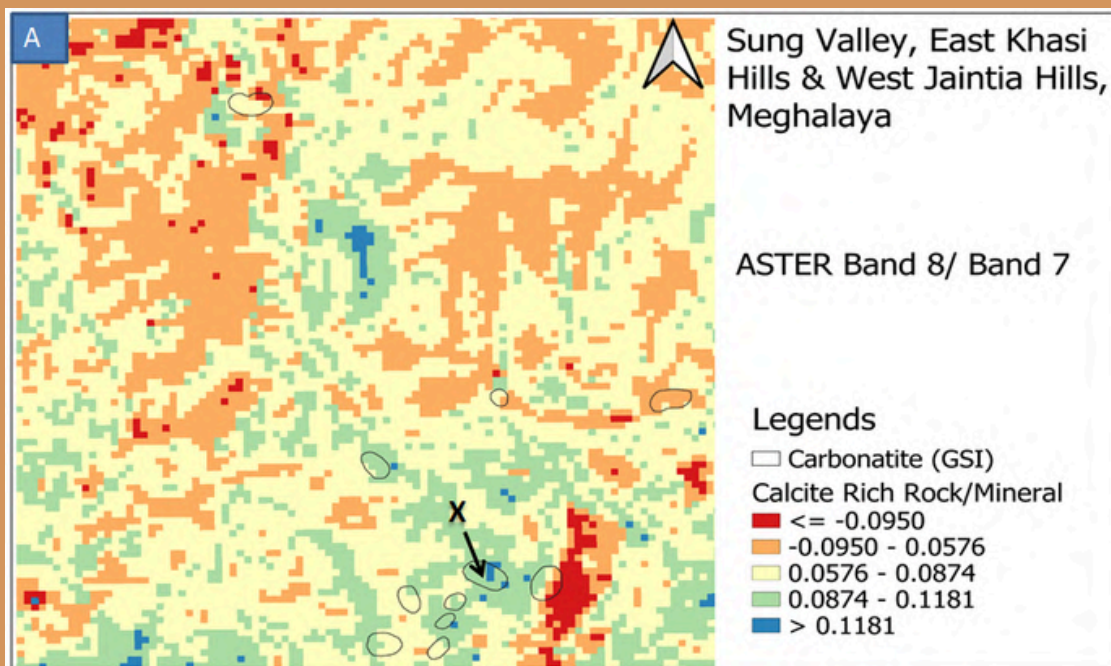


Figure: (a) Spatial distribution of canopy temperature in the study area (b) Calibration of UAV thermal image with ground observations (c) Statistical significance of canopy temperature variation across different transplanting dates

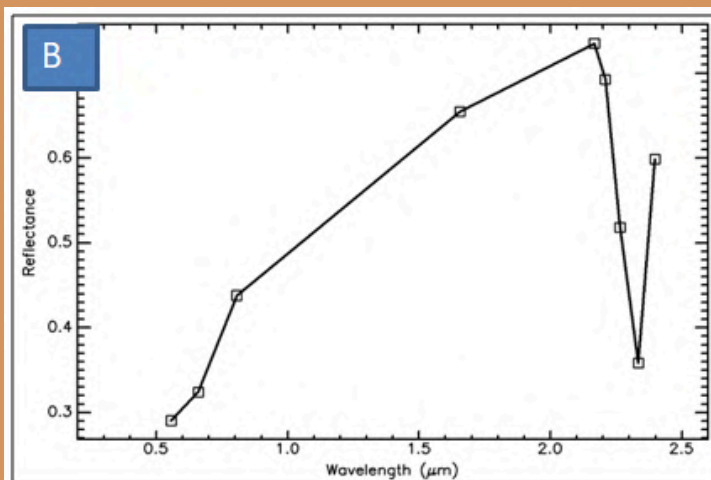
Earth Observation Based Mineral Mapping in Sung Valley, Meghalaya

Rahul Pratap & M Somorjit Singh

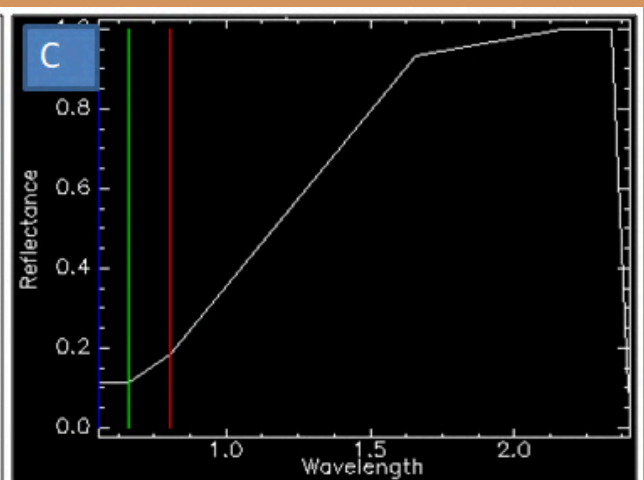
The study investigates the potential mineral of the Sung Valley in Meghalaya, using multispectral Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER). Remote sensing technique band ratio applied for finding potential carbonatite rocks in the valley. As carbonatite are known for hosting Rare Earth Elements (REE) . The study focused on identify calcite , using band ratios (Band 8/Band 7) as carbonatite rock is rich in carboanate minerals. The result shows values in negative and postive for the carbonate deficient and rich respectively. the value greater than 0.1181 indicate calcite rich carbonatite rock in blue colour (Figure A). Also spectra from X location from sung valley matching with United States Geological Survey (USGS) spectral library for calcite (Figure B & C).



(A) Band Ratio indicating Calcite rich rocks in Blue Colour



(B) USGS Spectra for Calcite



(C) Calcite Spectra in Study Area X

NESAC hosts 23rd National Space Science Symposium (NSSS-2026)

North Eastern Space Applications Centre (NESAC) jointly with the Indian Space Research Organization (ISRO) and in collaboration with Government of Meghalaya organized the 23rd National Space Science Symposium (NSSS-2026) at NESAC during 23rd to 27th February 2026, marking a significant milestone for the Centre and for the scientific community of the North Eastern Region (NER) of India. The Symposium, a premier biennial event of the ISRO, India's foremost national platforms for scientific deliberations in atmospheric sciences, space and planetary sciences, astronomy, astrophysics, and enabling technologies brought together leading scientists, academicians, industry representatives, and students from across the country for five days of intensive scientific deliberations.



Fig. Glimpses of NSSS-2026

The inaugural ceremony was graced by Shri A. S. Kiran Kumar, Former Chairman, ISRO / Secretary, Department of Space and Chair of the National Organizing Committee, as the Chief Guest. Dr. V. Narayanan, Chairman, ISRO / Secretary, Department of Space, addressed the gathering online. In his welcome address, Dr. S. P. Aggarwal, Director, NESAC and Chairman, Local Organizing Committee (LOC), welcomed the distinguished dignitaries, delegates, and students to NESAC. All the dignitaries highlighted the significance of hosting NSSS-2026 in the NER and emphasized NESAC's commitment to strengthening space science research, regional capacity building, and national integration through scientific collaboration.

Dr. V. Narayanan emphasized the importance of NSSS as a platform for presenting and critically examining results from India's major space science missions, including Aditya-L1, XPoSat, and the Chandrayaan programme, and for aligning national scientific efforts towards Space Vision 2047. Shri M. Ganesh Pillai, Scientific Secretary, ISRO, Prof. Dipankar Banerjee, Vice Chancellor, IIST, Dr. Tirtha Pratim Das, Director, Space Science Programme, ISRO HQ also addressed the gathering. The inaugural program ended with release of the abstract Volume of NSSS-2026 and inauguration of the Space Exhibition.

NESAC conducted an intensive year-long Regional Outreach Programme across nine locations covering all eight North Eastern States, engaging 867 students, out of which 30 meritorious students were selected to participate in the Symposium. In addition, 50 meritorious undergraduate and postgraduate students from other parts of the country were selected through a structured process. These 80 students were sponsored to attend a dedicated Students' Session. This edition also witnessed participation from start-ups and private industries working in the space sector in technical sessions and exhibitions, fostering stronger academia-industry synergy.



Fig. Glimpses of various technical sessions of NSSS

The technical programme of NSSS-2026 recorded an unprecedented participation in the history of the Symposium. The presentations were organized across six parallel sessions covering different thematic areas including a dedicated Students' Session. NSSS-2026 had four plenary sessions, four interdisciplinary talks and two special talks delivered by eminent speakers like Dr. Ajit Kembhavi, Former Member, Space Commission and Former Director, IUCAA, Dr Prakash Chauhan, Director, NRSC, Dr Anil Bhardwaj, Director, PRL, Dr Annapurni Subramaniam, Director, IIA, etc. Two public lectures were also delivered by Shri A S Kiran Kumar, Member, Space Commission at Royal Global University, Guwahati, Assam and by Dr D Banerjee, VC, IIST at NIT-Meghalaya, Sohra.

Dedicated interaction sessions were arranged between senior ISRO scientists and participating students, including special interactions with Shri A. S. Kiran Kumar and Gaganyatri Group Captain Shubhanshu Shukla. Scientific results derived from data of India's space science missions, reflecting the growing utilization of national mission datasets for academic research. The Space Exhibition, organized alongside the Symposium, attracted significant interest, including visits by approximately 300 school students from six local institutions. NSSS-2026 concluded with the valedictory session on 27th February 2026. The Symposium provided a comprehensive platform for scientific self-assessment, generation of new ideas and concepts, and nurturing of an inspired pool of young researchers.

Capacity Building and Outreach

NESAC conducts One-week Training for 47th Batch of ISS Probationers



NESAC organized a one-week training programme on “Applications of Geospatial Technology in Surveying, Monitoring and Programme Implementation” during February 16–21 for probationers of the 47th batch of the Indian Statistical Service (ISS) sponsored by the Ministry of Statistics and Programme Implementation (MOSPI). The training included lectures, demonstrations and hands-on sessions on various relevant topics.

NESAC organises “Basic Course on Remote Sensing and GIS”



NESAC successfully organized the “Basic Course on Remote Sensing and GIS” during March 9–20, 2026. The program was attended by 25 participants from various government departments, academic and research institutes and other private organizations. The curriculum combined theoretical lectures, practical sessions and hands-on training on various software & tools. Participants were exposed to applied geospatial workflows, integrating satellite data, GIS tools, and field knowledge for evidence-based decision making.

Special lecture on Fundamental of Microwave Remote Sensing and its Applications in Geology



As part of Outreach activity, NESAC Scientist Dr. Gopal Sharma delivered a special lecture on “Fundamentals of Microwave Remote Sensing and its Applications in Geology” to B.Sc, 6th Semester Geology students of St. Anthony's College, Shillong on 28th April 2026. A total of 30 students attended the lecture, covering part of their B.Sc (Geology) curriculum.

Exposure visit of Officer Trainees from NEPA



Nine Deputy Superintendents of Police from Mizoram & Nagaland and five Sub Inspectors from Manipur and Meghalaya who are trainees of the 56th Basic Course at North Eastern Police Academy (NEPA), Umsaw, Meghalaya, visited NESAC as part of their exposure visit to understand the activities and operation of NESAC on 12th March 2026.

NEWS & EVENTS

NESAC receives award for Official Language Implementation



NESAC received the Second Prize for the implementation of the Official Language Policy of the Union (for the year 2024–2025) at the Regional Official Language Awards Ceremony held on February 20, 2026, at Agartala, Tripura. Shri Shah Nikunj Kumar M., Administrative Officer, NESAC, received it from the hands of the Hon'ble Union Minister of State for Home Affairs, Shri Bandi Sanjay Kumar.

The second meeting of the Town Official Language Implementation Committee (TOLIC), Shillong was held at NESAC, Umiam



The second meeting of the TOLIC, Shillong-2 for the year 2025-26 was held on Thursday, 29th January 2026 at NESAC. Dr. Vivek Kumar Singh, Chief Manager of SBI, delivered the welcome address and provided information about the significance of TOLIC and the role of the committee in the promotion and use of Hindi.



Dr. S.P. Agrawal, Director, NESAC presided over the meeting along with the Deputy Director (Implementation) Shri Rajeev Kumar Nayak & Shri Rajesh Chaturvedi. The meeting was attended by Rajbhasha officers of Government of India offices in Guwahati and Shillong, as well as from various public sector banks and undertakings. The main objective of the meeting was to review the progress in the use of Rajbhasha in the functioning of member offices and to discuss the upcoming work plans.

NESAC celebrates Fire Service Week



Fire Service Week was observed at NESAC with the objective of promoting fire safety awareness and emergency preparedness among employees. The week saw awareness programs on fire hazards, practical demonstrations on the use of firefighting equipment for staff. Activities like Essay competition and Quiz competition were conducted to encourage participation and improve awareness. A safety inspection was also carried out to identify potential hazards and ensure proper functioning of fire safety systems.

Student Visits to NESAC



39 school students accompanied by 5 teachers from St. Xavier's School, Alipurduar, West Bengal visited NESAC as a study tour on 02nd April. Shri Anjan Debnath coordinated the visit.



28 BCA Information Technology (6th Semester) students of Martin Luther Christian University, Shillong visited NESAC on 13th March, coordinated by Md. Abu Sahin.



50 students from St. George Higher Secondary School, Shillong visited NESAC on 13th March, 2026. Sri Rosly Lyngdoh, Scientist, NESAC Coordinated the visit.

Upcoming Events

YUVIKA 2026

The 6th edition of ISRO YUva Vigyani Karyakram (YUVIKA) will be held at NESAC along with other ISRO Centers during May 11-22. 56 students from 4 states of Manipur, Meghalaya, Mizoram & Nagaland will attend the residential capacity building program at NESAC.

The objective of the program is to impart basic knowledge on Space Technology, Space Science and Space Applications to the younger students in emerging trends in space science and technology amongst the youngsters, who are the future building blocks of our nation.



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