ISG-ISRS NATIONAL SYMPOSIUM 2025

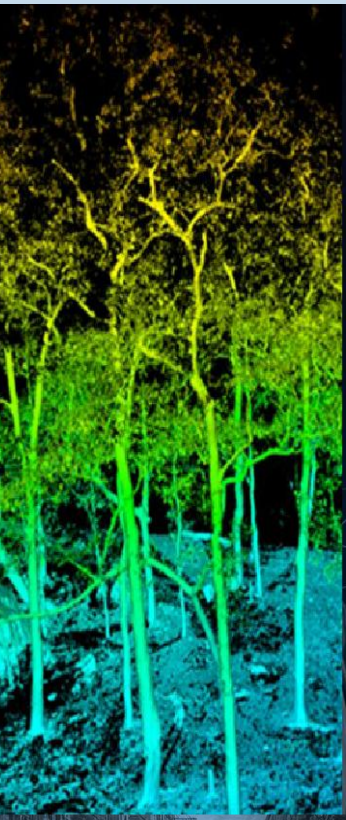
on

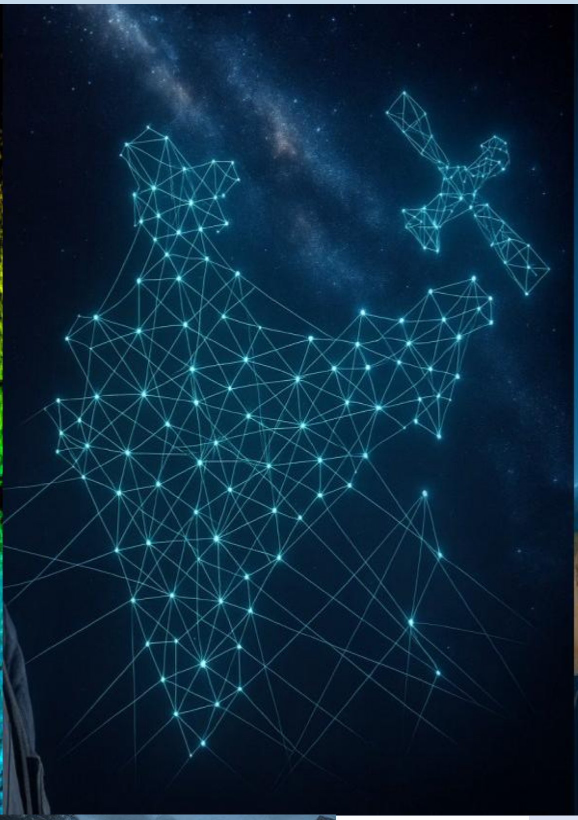
Geomatics and space innovations towards **Atmanirbhar Bharat**: *Insights and Frontiers*

Summary of Abstracts

November 25-27, 2025

IIT KHARAGPUR RESEARCH PARK, KOLKATA



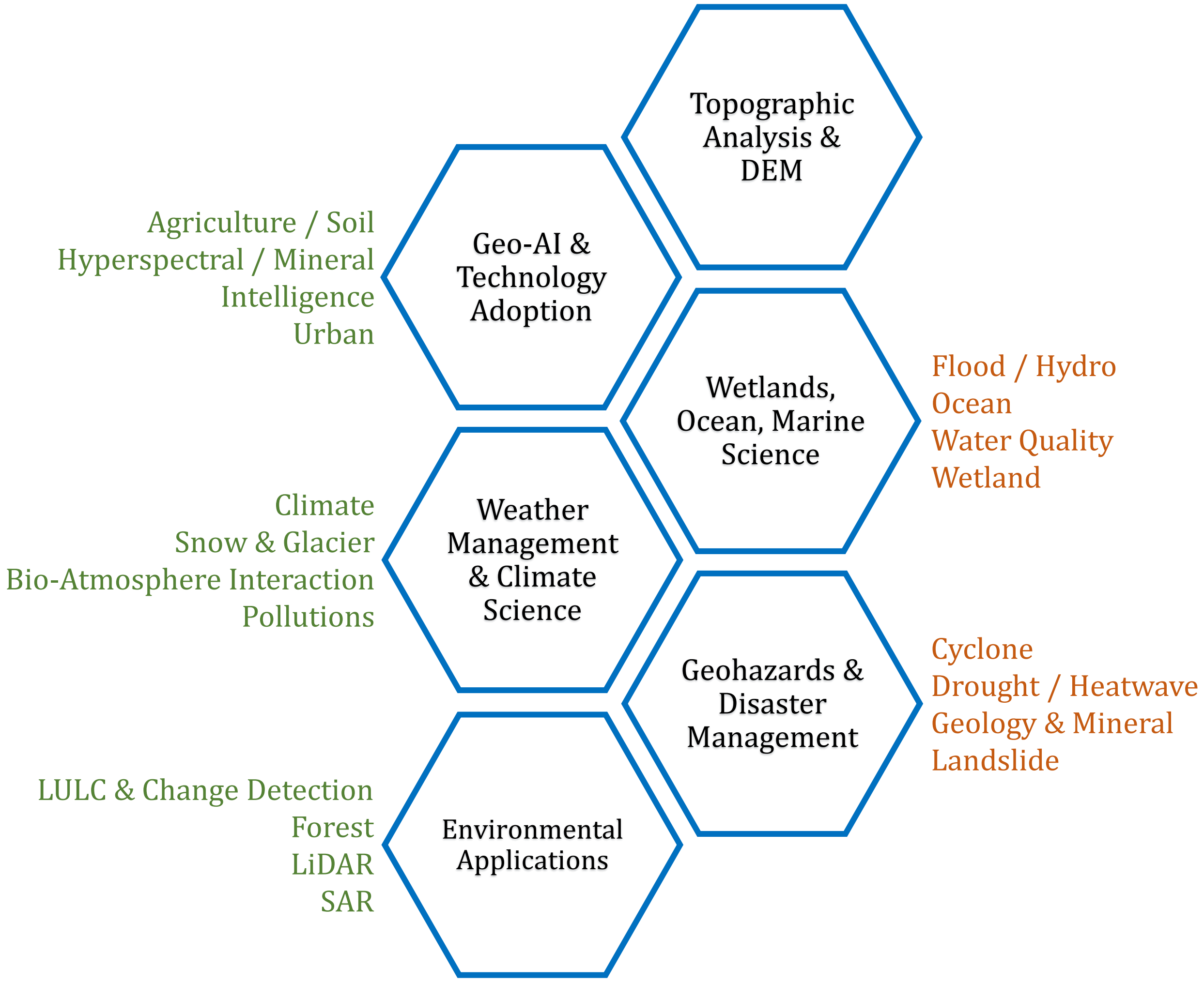


Email: isgisrsn2025@gmail.com

Website : https://isgisrs2025.com

ABOUT THE PROGRAMME: 25-27 November 2025

The **ISG-ISRS National Symposium 2025** sits at the forefront of geospatial innovation, where experts, researchers, and practitioners gather to explore the cutting edge of geospatial science and technology. Set against the backdrop of rapidly evolving Earth observation tools and AI-driven analytics, the symposium offers a dynamic platform for presenting groundbreaking research. We are dedicated to sharing practical applications and fostering cross-disciplinary collaboration. This year's event emphasises various insights and frontiers in Geomatics and Space Innovation towards achieving Atmanirbhar Bharat. Whether you're a seasoned researcher or an emerging scholar, ISG-ISRS 2025 is your opportunity to connect, contribute, and be inspired. The vast body of research that will be celebrated at the symposium has been classified into core areas of application and innovations.



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INDIAN SOCIETY OF GEOMATICS

Cordially Invites You for the

21st Millennium Lecture

On

"Viksit Bharat needs Geospatial Bharat"

by

Shri Srikant Sastri

Chairperson, GDPDC

Venue: *Auditorium, IIT-Kharagpur Research Park, Kolkata*
Date: *November 25, 2025 (Tuesday)*
Time: *17:00 - 17:45 hrs*

RSVP
Secretary, ISG

Brief Biography of Shri Srikant Sastri

Shri Srikant Sastri is Chairperson of 'Geospatial Data Promotion & Development Committee (GDPDC)', Government of India. By background, he is an entrepreneur, an eco-system builder, an author, and an educator. He studied at IIT Kanpur & IIM Calcutta and spent the first ten years of his career in the corporate world. He then became an entrepreneur wherein he built two large services companies in India & SE Asia.
These companies spanned six countries, and had 18000 employees. Both companies were acquired by large global corporations.
During the 2020 pandemic lockdown, Srikant co-led a 20-member taskforce that built a world-class ICU ventilator in 90 days. This unique experience has now been captured in a bestselling book that he co-authored, 'The Ventilator Project'.

Presently he has four roles:
1). Chairman-GDPDC
Ensuring that the National Geospatial Policy 2022 translates into real economic benefits for the country through multi-faceted programs, starting with 'Operation Dronagiri' pilot projects.
2). Startup ecosystem builder
An active board member at several leading startup incubators. He is a Past President of TiE Delhi-NCR chapter, TiE being the world's largest network of entrepreneurs.
3). Board member & Advisor
Advising public and unlisted companies on business and growth strategies.
4). Educator
Visiting Faculty at IIT Kanpur, IIM Calcutta, BITS School of Management, and Ashoka University.

LinkedIn: srikantsastri1/
Twitter: @srikantsastri
Youtube: @MentorOnAMission

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INDIAN SOCIETY OF REMOTE SENSING

Cordially invites you for the

34th Vikram Sarabhai Memorial Lecture – 2025

on

Space Technology and Applications: Vision for Viksit Bharat

by

Dr. V. Narayanan

Secretary, Department of Space, Chairman, Space Commission, and Chairman, Indian Space Research Organization

Organized by: Indian Society of Remote Sensing

Venue: Auditorium, IIT-Kharagpur Research Park, Kolkata
on November 27, 2025 from 14:30-15:30 Hours

RSVP
Secretary, ISRS

Brief Biography of Dr. V. Narayanan

Dr. V. Narayanan born in Melakattuvilai, Kanyakumari District, Tamil Nadu holds his MTech. (Cryogenic Engineering) from prestigious IIT Kharagpur with first rank & IIT Silver Medal and PhD in Aerospace Engineering from IIT Kharagpur in 2001.

Dr. Narayanan joined ISRO in February 1984, and during his distinguished career spanning four decades, he has contributed in various key positions in ISRO and led the successful development of cryogenic propulsion systems in ISRO's Programmes. His early work at Vikram Sarabhai Space Centre was in solid propulsion for sounding rockets, ASLV and PSLV. Later, he moved to liquid cryogenic propulsion domain at the Liquid Propulsion Systems Centre, where he was the Project Director of C25 Cryogenic Project and thereafter took over as its Director in 2018. On January 13, 2025, he assumed charge as Secretary, Department of Space; Chairman, Space Commission and Chairman, Indian Space Research Organization.

As a propulsion expert in the Launch Vehicle and Spacecraft, he made significant contributions for various programmes and projects of ISRO. He developed the C25 Cryogenic Propulsion System for ISRO's LVM3 Launch Vehicle and made it operational. As the Chairperson of the National Level Expert Panel for the root cause analysis of Chandrayaan-2 hard landing, pinpointed the reasons for the Chandrayaan-2 failure and provided necessary recommendations to overcome the problem in Chandrayaan-3. Dr. Narayanan was instrumental in the successful soft landing of the historic Chandrayaan-3 near the south pole of the Moon. Delivered propulsion systems for 50 launch vehicles and 45 satellite missions, and contributed to important missions including Chandrayaan-3, Aditya L1 and has made outstanding contribution to the Gaganyaan systems development. As Secretary-DoS, Dr. Narayanan provided a leadership role and accomplished space docking, 100th Launch Vehicle mission, NASA-ISRO Synthetic Aperture Radar (NISAR) satellite mission, provided technical insights to ensure the safe travel of the first Indian Gaganyaatri to the International Space Station (ISS), besides Spacecraft Operations for Sindoor Operation, etc. As a visionary leader, Dr. Narayanan generated Roadmap of propulsion, launch vehicle and Indian Space activities for the next 20 years. He is currently guiding the team and executing various space missions for civilian and strategic applications, Human Spaceflight missions and developing the Next Generation Launch Vehicle.

Dr. Narayanan contributed as Member of the Board and Governing Council (GC) of Indian Institute of Space Science and Technology (IIST) and currently functioning as the Chairman of IIST GC. He has also finalized the proposal for establishing the Global Space Institute in India and submitted the proposal for the Government's approval.

Dr. Narayanan is a recipient of 40 meritorious awards, including the Distinguished Alumni Award 2018 and Life Fellowship Award 2023 of IIT Kharagpur; Ram Mohan Puraskar 2025; Dr. Kondala Rao Memorial Award 2025; G P Birla Memorial Award 2025; Seventh APJ Award 2025; Gold Medal from ASI, Chandrayaan-3 Award from IAA and Global Space Leader recognition from IAF, among others.

He is Fellow of various professional bodies, including Member of IAA, INAE, ICC, AeSI, Institution of Engineers (India), ASI, Honorary Fellow of IETE and IEI, Council of Vibration Specialists and currently serving as Member of various committees in the Government of India, including the Empowered Technology Group (ETG). He has also been conferred with 8 Honoris Causa from Distinguished Academic Institutions.

Topographic Analysis and Digital Elevation Model

Synoptic Summary

Understanding terrain dynamics is crucial for various fields-engineers rely on it to design safe infrastructure, ecologists use it to interpret habitat patterns and species distribution, and hydrologists utilise it to model runoff, rivers, and sediment movement. In mountain regions, where tectonic uplift, monsoon-driven erosion, glacial activity, and human pressures constantly reshape the landscape, accurate topographic information becomes essential for hazard preparedness and climate adaptation. Modern geospatial technologies are transforming how we study these evolving terrains. High-resolution DEMs, InSAR-based deformation mapping, UAV photogrammetry, smartphone elevation tools, and cloud-computing platforms now offer accessible, detailed, and process-aware data. These tools help identify landslide-prone slopes, map river incision and knickzones, understand glacial-fluvial valley shapes, and monitor areas affected by erosion or slope instability. These methods work together to provide a better understanding of how mountain landscapes have evolved. They highlight zones of active uplift, reveal the long-term signatures of surface processes, and show how monsoon rainfall influences river behaviour and sediment transport. By combining multisensor data with geomorphic analysis and numerical modelling, researchers and planners can better anticipate risks, support sustainable development, and make informed decisions in some of the world's most dynamic and fragile mountain environments.

Gaps and Opportunities

Despite such technological advances, persisting gaps affect many sectors. Traditional surveys remain resource-intensive and infrequent, leaving rapidly changing environments without updated information. Differences in DEM accuracy across terrain types create uncertainty for users who depend on reliable elevation models. Consumer devices, though widely available, introduce vertical errors that limit their standalone performance and effectiveness. Highly dynamic environments such as wetlands, mudflats, mountainous terrains, and unmanaged landfills lack consistent, long-term monitoring systems. These gaps highlight the need for combining multiple data sources, improving validation workflows, and establishing sustained observation frameworks that support diverse disciplinary needs.

Discussions

Selected studies collectively signal a shift toward integrated, multi-layered approaches to topographic understanding. Satellite imagery and altimetry enhance water-body and reservoir assessments, while smartphone datasets-when validated-expand spatial coverage in ways previously unattainable. UAV photogrammetry offers granular detail for landfills and small-scale features, complementing broader satellite-derived spatiotemporal image processing models. Beyond mapping, computational modelling tools-ranging from hydrodynamic simulators to landscape evolution models-provide insight into the processes driving topographic change. This coupling of remote sensing, field-based data, and model-driven analysis allows professionals across disciplines to better anticipate hazards, understand geomorphic processes, and support sustainable planning.

What to Learn?

A central takeaway is that modern terrain analysis benefits from **multi-sensor integration**, where each data source strengthens the others. Cloud platforms enhance scalability and reproducibility, enabling workflows that can be adapted by hydrologists, ecologists, urban planners, and geomorphologists alike. Selecting the right DEM for a specific region or application remains essential, and emerging datasets offer increasingly accurate options.

These works collectively point toward a future where topographic monitoring is more automated, interdisciplinary, and forward-looking. By leveraging diverse datasets and analytical techniques, multidisciplinary teams can better address environmental risks, support resilient infrastructure, and deepen scientific understanding of changing landscapes.

Geo-Intelligence and Technology Adoption (Agriculture & Soils)

Synoptic summary

Geospatial intelligence has become a cornerstone for managing agricultural and urban systems, offering precise and timely information for planning, monitoring, and policy decisions. As landscapes face stress from climate variability, resource scarcity, and fragmented land use, modern remote sensing and analytics are increasingly relied upon to fill critical information gaps. Across the studies, satellites, drones, spectroscopy, and AI-based tools consistently show their value in enhancing visibility of crop conditions, soil health, water demand, and environmental risks.

Gaps and Opportunities

Even with expanding technological capabilities, challenges persist in data quality, consistency, and representativeness. Many applications suffer from limited ground truth, fragmented datasets, inconsistent crop records, and variability across agro-climatic regions. Techniques like soil nutrient estimation, prevented sowing detection, and yield modelling often require stronger calibration or multi-source validation. Highly heterogeneous and cloud-prone landscapes complicate reliable mapping, and fine-resolution approaches such as UAV surveys remain difficult to scale operationally.

Discussions

Selected studies highlight a clear movement toward hybrid geospatial frameworks that fuse EO data, field observations, and advanced algorithms. Sentinel-1/2 data form the backbone of many workflows, enabling crop mapping, stress detection, soil moisture retrieval, and productivity assessment. Machine learning and deep learning approaches-ranging from Random Forest and XGBoost to ConvGRU and A-BiGRU-demonstrate strong performance in capturing nonlinear patterns and temporal signals. Multi-modal data integration, such as combining drones with crowdsourced inputs or merging FTIR-MIR with pXRF, enhances accuracy and broadens application potential.

What to Learn?

Collectively, these studies emphasize that geospatial intelligence benefits greatly from integrated, multi-sensor approaches rather than isolated data streams. Machine learning and spectral techniques expand the capability to diagnose soil and crop conditions quickly and non-destructively, while process-based models strengthen yield and water requirement predictions. Village-level geoinformatics, operational crop surveillance platforms, and climate-linked assessments show that localized decision systems are both feasible and impactful. The overarching message is that geospatial technologies-when combined thoughtfully-enable more resilient, data-driven agricultural and environmental management across diverse landscapes.

Geospatial Intelligence and Technology Adoption (Hyperspectral)

Synoptic summary

Hyperspectral remote sensing has become a critical enabler for fine-scale environmental assessment, agricultural diagnostics, urban analytics, and precision resource management. By capturing hundreds of narrow spectral bands, hyperspectral systems reveal chemical, physiological, and structural properties that conventional multispectral imagery cannot detect. Across the collected studies, hyperspectral intelligence supports early disease detection, species discrimination, yield-relevant biophysical assessment, and enhanced image processing-demonstrating its rising relevance for multidisciplinary professionals in agriculture, forestry, environmental monitoring, and geospatial technology development.

Gaps and Opportunities

Despite its capabilities, hyperspectral technology faces practical limitations. Field and greenhouse spectral data often suffer from limited sample sizes, class imbalance, and variability caused by crop phenology and environmental conditions. Spaceborne hyperspectral missions-while powerful-frequently provide lower spatial resolution, challenging detailed mapping in heterogeneous landscapes. Radiometric distortions, limited ground truth, and the difficulty of scaling laboratory findings to real-world agricultural fields also pose constraints. Additionally, operational use is hindered by the need for advanced data processing, calibration, and sophisticated modelling frameworks.

Discussions

The combined research highlights strong advancements across hyperspectral analytics. Studies demonstrate how sensitive spectral regions across the visible, NIR, and SWIR domains can distinguish biotic stresses like brown planthopper damage from abiotic stresses in rice. Machine learning techniques, including Spectral Discriminant Analysis, Jeffries–Matusita distance, and hyperspectral-informed vegetation indices, support early disease identification in fibre crops and rice ecosystems. Transformer-based models, U-Net architectures, GAN-driven augmentation, and spatio-spectral super-resolution networks illustrate rapid progress in hyperspectral deep learning-for both classification and image enhancement tasks. Field and CubeSat innovations-including IoT-enabled miniature satellite platforms-show how hyperspectral concepts extend into compact, real-time monitoring architectures. Forest species mapping studies emphasize that spatial resolution enhancement significantly improves classification accuracy in complex habitats, especially for monitoring invasive species.

What to Learn?

Across applications, three themes stand out: multi-modal integration, spectral–spatial modelling, and operational scalability. Synthetic augmentation, deep neural networks, and spectral-domain feature selection can overcome data scarcity and improve discrimination across crop and forest classes. Hyperspectral super-resolution frameworks hold promise for bridging the gap between rich spectral information and high-resolution spatial detail. Field spectroscopy remains crucial for calibration, validation, and translating satellite hyperspectral products into actionable insights. Overall, these studies demonstrate that hyperspectral geospatial intelligence-when paired with machine learning, advanced image processing, and computational enhancements-can deliver transformative capability for precision agriculture, ecological monitoring, urban applications, and next-generation satellite system design.

Geospatial Intelligence and Technology Adoption (Intelligence)

Synoptic summary

Geospatial intelligence is rapidly emerging as a foundational layer for decision-making in national development, public safety, environmental governance, and digital transformation. As India advances toward technological self-reliance, the integration of AI, drones, GNSS, satellite imagery, spatial analytics, and web-based decision systems strengthens its ability to manage societal, infrastructural, and ecological challenges. The collected studies illustrate how geospatial intelligence supports diverse applications-from autonomous agricultural monitoring and crash prediction to disaster geocoding, health accessibility, and dynamic digital twins-demonstrating its value for multidisciplinary professionals.

Gaps

Despite significant progress, several systemic challenges limit the full-scale operationalization of geospatial intelligence. Many models face domain-specific biases, limited ground truth, class imbalance, and gaps in real-time data integration. Urban–rural heterogeneity, spectral ambiguity, and infrastructure constraints complicate accurate mapping tasks such as LULC classification, cloud–shadow detection, and road extraction. In applied domains, issues such as inaccessible terrains, incomplete socio-economic datasets, and uneven digital capabilities hinder equitable service delivery. Moreover, evolving threats like GNSS spoofing and rapidly changing environmental conditions demand more resilient and adaptive geospatial systems.

Discussions

Across the studies, a strong pattern emerges: the move toward AI-augmented, multi-source geospatial ecosystems. UAV-based autonomous plant monitoring leverages YOLOv8 detection and ripeness classification, while deep learning architectures-U-Net, Vision Transformers, Graph Attention Networks, Mask R-CNN, and SAM2-enhance tasks ranging from segmentation to crash prediction. Several works integrate spatial context, temporal patterns, and road topology using Voronoi-based graphs, LSTMs, and CSTIN++ networks. Equally significant are geospatial applications in governance: predicting district wealth from satellite imagery, modelling climate-resilient livelihoods, supporting maternal health accessibility, and mapping disease risks using AI-driven decision systems. LLM-based frameworks such as IndicGeoLLM and disaster geocoding models demonstrate how large language models can extract spatial knowledge from unstructured text with metric-backed reliability. Digital twins, campus navigation AR systems, and basin-scale hydrological modelling platforms illustrate the expansion of geospatial intelligence into immersive and interactive environments.

What to Learn?

The session highlights that effective geospatial intelligence emerges from the integration of AI, remote sensing, ground-based sensors, and socio-economic information. Hybrid deep learning models improve object detection, classification, accessibility analysis, and spatial prediction when tailored to domain-specific conditions. Web-based geospatial decision systems-from disease surveillance to crop monitoring-provide scalable and transparent platforms for real-time governance. LLMs, when trained with geographic context, can bridge the gap between textual information and spatial decision needs. Overall, the studies collectively point to a geospatial future that is data-rich, AI-driven, and operationally scalable, enabling multidisciplinary teams to address challenges in agriculture, public health, disaster management, infrastructure planning, and environmental sustainability with greater precision and adaptability.

Geospatial Intelligence and Technology Adoption (Urban)

Synoptic summary

Urban environments are becoming increasingly complex as rapid population growth, infrastructure expansion, and climate-driven stressors reshape the morphology and functionality of Indian cities. Geospatial intelligence offers a vital foundation for understanding these transformations by providing spatially explicit insights for planning, mobility, climate resilience, and heritage protection. Across the collected studies, remote sensing, GIS, AI/ML models, and advanced spatial analytics enable more informed decision-making-whether mapping heat islands, determining airport site suitability, monitoring student housing expansion, or extracting high-resolution urban features.

Gaps

Despite significant technological progress, urban geospatial applications still face persistent challenges. These include inconsistent or outdated land-use data, limited field validation, heterogeneous data quality across cities, and difficulties in scaling high-resolution analyses. Many studies highlight gaps in integrating socio-economic factors with spatial models, lack of privacy-preserving frameworks in urban digital systems, and the absence of standardized metrics for resilience, built-up growth, and transportation performance. Unplanned urbanization, fragmented development patterns, and spectral confusion between built-up and natural surfaces also constrain reliable urban monitoring.

Discussions

Selected studies reveal a strong shift toward AI-enabled, multi-sensor, and multi-parameter urban analytics. Machine learning and deep learning approaches like CNNs, Swin Transformers, U-Net, and LSTM-based traffic forecasting-enhance capabilities in object detection, road extraction, and predictive urban modelling. Urban heat studies link LST trends with changing morphology using NDVI, NDBI, and thermal metrics, while change detection and landscape metrics quantify fragmentation and peri-urban sprawl. Geospatial site suitability frameworks leverage AHP and multi-criteria inputs for infrastructure planning, such as secondary airports. Blockchain-based systems introduce secure and privacy-preserving mechanisms for disaster reporting in smart cities. Meanwhile, digital twin frameworks demonstrate how cloud-native, indigenous geospatial ecosystems can support resilience and urban management at scale.

What to Learn?

These studies collectively highlight that modern urban geospatial intelligence thrives on integrated analytics-combining satellite data, thermal observations, machine learning, socio-spatial indicators, and participatory or privacy-aware digital frameworks. High-resolution imagery paired with advanced AI models improves feature extraction and classification accuracy, while multi-criteria decision tools support strategic urban interventions. Urban heat mitigation, inclusive mobility, and infrastructure resilience require spatially explicit, data-driven approaches. Overall, the works underscore the importance of interoperable platforms, scalable analytics, and multidisciplinary collaboration in building smarter, climate-resilient, and citizen-centric urban systems.

Wetlands, Ocean, and Marine Science (Flood/Hydro)

Synoptic summary

Flood-prone river basins, coastal megacities, deltaic wetlands, and mangrove ecosystems are increasingly exposed to climate-driven hazards such as extreme rainfall, cyclones, sea-level rise, and sediment instability. Geospatial intelligence provides a critical foundation for anticipating these risks. Satellite remote sensing, hydrological modelling, and machine learning now enable rapid, scalable, and data-efficient monitoring of inundation, hydroclimatic extremes, soil erosion, and ecosystem stress-supporting proactive disaster management and climate-resilient development.

Gaps

Major limitations persist in achieving consistent, high-quality flood and hydro-environmental assessments. Regions with limited field data struggle with model validation, and heterogeneous landscapes complicate accurate hazard mapping. Traditional flood modelling often depends on expert-driven weighting or extensive datasets, restricting scalability across complex basins. Soil erosion and sediment transport remain challenging due to sparse observations, and integrated drought–flood cycle assessments are still underdeveloped. These gaps emphasize the need for multi-sensor integration, standardised workflows, and adaptable frameworks.

Discussions

The reviewed studies collectively demonstrate how multi-source geospatial data-SAR, optical imagery, DEMs, reanalysis climate data, and crowdsourced inputs-enhance flood vulnerability modelling across scales. Innovations include globally adaptable urban flood frameworks (e.g., UC-Flo), AHP-based and entropy-driven hazard models, cyclone impact analysis combining SAR and multispectral proxies, and automated AI/ML-driven flood mapping pipelines. Machine learning models such as CatBoost, XGBoost, Random Forest, and Vision Transformers consistently outperform traditional methods, offering robust spatial prediction for flood susceptibility, drought probability, and agricultural resilience. Soil erosion mapping advances through RUSLE-ML integration and transport-limited sediment modelling. Basin-scale studies using ERA5 and CMIP6 highlight shifting hydroclimatic extremes under future scenarios.

What to Learn?

Geospatial intelligence is most effective when integrating multi-sensor datasets with advanced analytics. SAR-optical fusion significantly improves flood mapping reliability; ML-driven models enhance classification accuracy and decision-support; and scenario-based erosion frameworks deliver more realistic watershed prioritisation. Climate-integrated modelling strengthens long-term risk forecasting across river basins and coastal systems. Together, these studies reinforce that modern flood and hydro-environmental resilience relies on scalable, AI-augmented, and data-rich geospatial workflows capable of guiding policymakers, planners, and environmental managers in high-risk, dynamic landscapes.

Wetlands, Ocean, and Marine Science (Ocean)

Synoptic summary

Oceans and coastal systems are critical regulators of climate, fisheries, and coastal livelihoods, making their continuous monitoring essential for national resilience and blue economy development. As sea temperatures rise, monsoon patterns shift, and marine ecosystems face increasing anthropogenic pressure, geospatial intelligence provides the most actionable, scalable, and real-time insights for understanding these dynamic environments. Satellite observations, ocean colour analysis, reanalysis datasets, and machine learning models enable early detection of harmful algal blooms, assessment of upwelling productivity, mapping of coastal landform changes, and tracking of atmosphere–ocean interactions shaping cyclone energetics.

Gaps

Operational marine monitoring faces persistent challenges: retrieval algorithms require regional tuning; atmospheric correction in coastal waters remains a major bottleneck; and many critical processes-such as HAB precursors, SST anomalies, and coastal erosion-lack dense in-situ validation. Inter-sensor inconsistencies complicate long-term SST trend analysis, and complex coastal zones suffer from mixed pixels, turbidity effects, and reduced accuracy. Early-warning frameworks for blooms and cyclones still rely on limited biological and physical integration, highlighting the need for stronger cross-platform sensor fusion and improved coastal-resolution data.

Discussions

The studies collectively demonstrate rapid advancements in multi-sensor and AI-driven marine analytics. Object-based image analysis enhances coastal landform mapping in estuarine systems undergoing anthropogenic stress. HAB early-warning approaches leverage lagged SST–chlorophyll interactions, LSTM forecasting, and hydrodynamic modelling to provide 2–6 week predictive capability. Upwelling and CO_2 flux assessments reveal regional contrasts in productivity and atmospheric exchange under warming trends. Comparative analyses confirm the strong performance of OCM-3 for chlorophyll retrieval in the Arabian Sea. Long-term evaluations of the Arabian Sea Mini Warm Pool and monsoon-driven circulation highlight rising ocean heat content, shifting upwelling zones, and their influence on cyclone intensity and biological productivity. Inter-sensor SST validation reinforces the need for harmonized datasets in climate studies. Studies on Westerly Wind Bursts underscore the value of high-frequency satellite data for characterizing intraseasonal ocean–atmosphere variability.

What to Learn?

Key lessons include the importance of multi-sensor fusion-combining SAR, optical, SST, and wind datasets-to enhance accuracy across marine applications. Machine-learning approaches significantly strengthen HAB and cyclone-related early warning, while long-term reanalysis products improve understanding of warming impacts on circulation and productivity. Accurate SST validation and region-tailored algorithm refinement remain essential. Overall, these technologies support a more predictive, climate-aware approach to marine ecosystem management and inform sustainable resource planning and coastal resilience strategies.

Wetlands, Ocean, and Marine Science (Water Quality)

Synoptic Summary

Water quality in wetlands, rivers, aquaculture systems, and coastal zones is increasingly threatened by nutrient enrichment, industrial pollution, hydrological alterations, and ecosystem degradation. The studies collectively demonstrate the power of geospatial intelligence-spanning multispectral, SAR, thermal, and machine learning techniques-to monitor water quality parameters such as turbidity, chlorophyll-a, temperature, nitrate contamination, and suspended sediments. These approaches enable scalable, real-time, and spatially detailed assessments crucial for managing inland fisheries, tracking eutrophication, evaluating groundwater contamination, and supporting blue-carbon initiatives. Together, they highlight the expanding role of remote sensing and data-driven modelling in safeguarding aquatic ecosystems and informing sustainable water governance.

Gaps

Despite rapid advancements, several limitations remain in operational water quality assessment. Many regions lack dense in-situ measurements, limiting calibration of satellite-based models. Atmospheric correction challenges in optically complex and turbid waters reduce the accuracy of spectral retrievals. Pollution mapping often requires integration of socio-economic and hydrological data, which is inconsistently available. Machine learning and shallow learning models depend heavily on training quality, and spatial resolution constraints hinder monitoring of small or heterogeneous water bodies. Additionally, deep groundwater contamination processes-such as nitrate mobility or coal mining impacts-require improved coupling of remote sensing with subsurface data.

Discussions

The reviewed studies highlight a diverse suite of geospatial methodologies. Multisensor fusion (Sentinel-2, Landsat-8/9, Sentinel-1, ALOS PALSAR) strengthens the extraction of indices such as NDCI, NDTI, NDVI, FAI, and SAR backscatter for characterizing water quality. AI/ML techniques-including Random Forest, Gradient Boosting, linear and nonlinear regressors, shallow neural networks, and feature-selection algorithms-demonstrate strong predictive capabilities for nitrate pollution, turbidity mapping, and blue-carbon estimation. Hydrological and geophysical validations, such as Electrical Resistivity Tomography (ERT) and in-situ chlorophyll sampling, enhance reliability of model outputs. Remote sensing frameworks also support temporal assessments, capturing seasonal changes in eutrophication, lake productivity, and aquaculture suitability. Bibliometric analyses further clarify the landscape of available spectral indices, offering practical guidance for wetland degradation assessments.

What to Learn?

These works collectively underscore the importance of integrating multi-sensor data, AI-driven modelling, and targeted field validation for robust water quality monitoring. Remote sensing provides a scalable foundation for detecting early ecological stress, supporting aquaculture planning, identifying contamination hotspots, and strengthening groundwater management. Machine learning improves predictive accuracy across diverse hydro-ecological settings, while feature-optimization and spectral index guidance streamline operational workflows. The overarching lesson is clear: geospatial intelligence-when applied through harmonized datasets, validated models, and ecosystem-specific interpretation-offers a powerful pathway for enabling sustainable water resource management and long-term ecosystem resilience.

Wetlands, Ocean, and Marine Science (Wetland)

Synoptic summary

Wetlands are among the most productive and climate-sensitive ecosystems, supporting biodiversity, regulating hydrology, filtering pollutants, and sustaining local livelihoods. The studies collectively demonstrate how geospatial intelligence-spanning optical, microwave, multispectral, machine learning, and multi-sensor fusion-enables accurate monitoring of wetland condition, aquatic vegetation, sedimentation, turbidity, species habitats, and fishing potential. These approaches provide high-resolution, scalable, and frequently updated insights essential for managing Ramsar sites, sustaining aquaculture, tracking degradation, and guiding restoration. Together, they highlight a maturing ecosystem of remote sensing tools that strengthen wetland conservation and inform data-driven policy.

Gaps

Despite strong progress, persistent gaps limit operational wetland monitoring. Turbid and urban lakes show poor correlation between depth and optical/SAR signals, reducing bathymetry accuracy. Many wetlands lack dense in-situ validation for calibrating optical indices and ML models. Mapping small water bodies remains challenging due to their dynamic nature and small spatial footprint. Habitat-mapping studies often rely on moderate-resolution imagery, which may miss fine-scale ecological features. Risk-assessment frameworks require better integration of socio-ecological indicators, and species-based studies need long-term datasets to capture seasonal and interannual shifts.

Discussions

The reviewed studies reveal diverse applications of geospatial intelligence. Machine learning (RF, SVM, XGBoost, LGBM) enhances detection of small water bodies, fishing zones, contamination risk, and wetland vulnerability. Multi-sensor data-Sentinel-1 SAR, Sentinel-2 MSI, Landsat-8/9 thermal and optical imagery-improve monitoring of aquatic vegetation, land–water transitions, and seasonal changes in wetland dynamics. Object-based and index-based approaches enable habitat mapping for coastal bivalves, while feature-selection techniques optimize turbidity and water-quality modelling. Wetland-risk assessments demonstrate how ML and MCDA frameworks identify zones under greatest anthropogenic pressure. Multi-sensor correlations at Sambhar Lake show the power of combining LST, NDVI, and SAR backscatter to track moisture and vegetation interactions in saline wetlands.

What to learn?

The combined work underscores that wetland monitoring benefits most from multi-sensor integration, AI-driven modelling, and targeted field validation. Machine learning greatly enhances the accuracy of waterbody extraction, ecological risk mapping, and aquaculture assessments. Spectral indices remain central for monitoring vegetation, turbidity, and habitat condition, but require ecosystem-specific thresholds. SAR–optical–thermal fusion improves the ability to track seasonal hydrology and vegetation dynamics. Overall, geospatial intelligence provides a scalable foundation for protecting wetlands, supporting sustainable fisheries, guiding restoration, and enhancing climate resilience across diverse wetland landscapes.

Weather Management and Climate Science (Climate)

Synoptic summary

Climate science increasingly depends on geospatial intelligence to understand the behaviour of precipitation, temperature, atmospheric interactions, and land–ocean–atmosphere feedbacks. The studies collectively demonstrate how satellite datasets, reanalysis products, land surface models, deep learning frameworks, and multi-sensor fusion reveal climate variability across scales-from Kerala's rising temperature extremes and altered rainfall patterns to upper-ocean stratification in the Lakshadweep Sea, evolving wind–SST coupling in the Arabian Sea, and the influence of surface materials on local microclimates. Advances in precipitation retrievals, high-resolution thermal reconstruction, monsoon rainfall simulation, and cyclone cloud classification strengthen our capacity to detect climate shifts, refine forecasts, and support climate-resilient planning.

Gaps

Despite growing sophistication, challenges persist in representing climate extremes, retrieving precipitation accurately, and generating consistent high-resolution datasets. Satellite-based rainfall products often underestimate intense rainfall and overestimate low-intensity events across diverse terrains. Urban and coastal microclimates remain poorly resolved due to coarse temporal or spatial thermal data. Land surface schemes in regional climate models show strong sensitivity to LULC inputs, affecting monsoon simulations. Atmospheric correction issues, cloud contamination, and inter-sensor inconsistencies limit the accuracy of SST, BT, and thermal datasets. Biases in CMIP6 projections necessitate hybrid correction frameworks, and missing or inconsistent rainfall data continue to hinder long-term trend analysis.

Discussions

The studies highlight major methodological advances. Multi-sensor precipitation assessments integrate microwave, infrared, and radar datasets to refine rainfall retrievals. GAN-based and ConvLSTM models achieve high-resolution, gap-free thermal reconstructions for UHI and LST studies. Machine learning–based bias correction enhances CMIP6 climate projections for South Asia, revealing significant warming and altered monsoon timing. Comparative assessments of land surface schemes in WRF reinforce the need for region-specific LULC datasets. Hydrological and statistical analyses reveal intensifying rainfall and temperature extremes in Kerala, while long-term oceanographic studies show rising SSTs, enhanced stratification, and ENSO-linked salinity anomalies. Nowcasting experiments demonstrate the complementarity of physics-based optical flow and ConvLSTM systems for short-term rainfall prediction.

What to learn?

Climate monitoring benefits most from fused multi-sensor observations, hybrid AI–physics approaches, and region-specific calibration. Machine learning significantly improves bias correction, rainfall imputation, and nowcasting accuracy, while deep learning enables high-resolution thermal and LST mapping essential for urban climate studies. Long-term satellite archives help track climate-driven changes in rainfall, heatwaves, ocean stratification, and wind–SST coupling. Improved land–atmosphere representation in models strengthens monsoon simulation skill. Overall, geospatial intelligence-integrating satellite observations, modelling, and AI-provides a powerful backbone for climate risk forecasting, vulnerability assessment, and resilient climate planning across India and the broader monsoon-influenced region.

Weather Management and Climate Science (Snow/Glacier)

Synoptic summary

Snow and glacier systems in the Himalayas form a critical component of India's freshwater security, influencing downstream hydrology, agriculture, and climate resilience. The studies collectively demonstrate how geospatial intelligence-spanning optical remote sensing, SAR-based velocity mapping, GNSS-IR monitoring, and multi-sensor machine learning approaches-provides powerful tools for understanding snow distribution, glacier dynamics, and debris-cover behaviour in high-altitude terrain. These technologies enable long-term cryosphere monitoring, support hydrological forecasting, and strengthen climate-adaptation planning in regions where field-based observations are limited due to harsh terrain and extreme weather.

Gaps

Despite advances, challenges remain in operational cryosphere monitoring. Snow cover retrieval varies with slope, terrain shadow, and atmospheric effects. Glacier velocity estimation is hindered by coherence loss in InSAR and the need for frequent acquisitions. GNSS-IR systems require careful terrain correction and sensitive calibration to overcome signal distortion in rugged landscapes. Debris-cover mapping suffers from spectral ambiguity and spatial heterogeneity, limiting the accuracy of solely optical datasets. Across studies, limited in-situ validation restricts the refinement of remote sensing products, and long-term monitoring networks remain sparse in many Himalayan regions.

Discussions

The reviewed works highlight several methodological advancements. The HIMCHITRA portal demonstrates how harmonised Landsat-series data and NDSI retrievals can provide 30-year snow cover trends stratified by elevation and slope classes, aiding water resource management. SAR-based offset tracking using Sentinel-1A enables multi-year glacier velocity retrieval, revealing accelerating ice flow in parts of Sikkim post-2022. GNSS-IR emerges as a promising technique for continuous snow-depth monitoring, offering high-frequency and autonomous measurements with RMSE values within 8 cm. Multi-sensor debris-cover mapping-integrating Sentinel-1 backscatter with Landsat-8 spectral bands through Random Forest classification-achieves over 89% accuracy, effectively distinguishing thin versus thick debris layers and their melt implications.

What to learn?

These studies collectively emphasise that cryosphere assessment benefits most from multi-sensor integration, terrain-stratified analysis, and hybrid AI–remote sensing techniques. SAR provides all-weather capability for glacier motion detection, while optical datasets capture long-term snow distribution patterns. GNSS-IR offers a scalable, low-maintenance solution for snow-depth monitoring in high-altitude regions. Machine learning significantly improves debris-cover mapping by combining textural and spectral information. Overall, geospatial intelligence provides a robust foundation for advancing Himalayan cryosphere science, enhancing climate-risk preparedness, and supporting sustainable water management in vulnerable mountain ecosystems.

Synoptic summary

Exchanges of carbon, water, and energy between the land surface and atmosphere govern regional climate behaviour, ecosystem health, and hydrological stability. The studies collectively highlight how geospatial intelligence and flux-based measurements-ranging from eddy covariance observations to entropy-based climate diagnostics, evapotranspiration modelling, and multi-source vegetation productivity assessments-are improving the understanding of biosphere–atmosphere coupling in India. These approaches reveal the influence of monsoon dynamics on carbon uptake, the role of thermal variability in precipitation complexity, and the sensitivity of vegetation health to climatic drivers. Together, they demonstrate how integrating remote sensing, machine learning, and in-situ flux systems can advance climate-resilient land management and refine the representation of surface–atmosphere interactions.

Gaps

Despite methodological advancements, several limitations persist. India lacks a dense and long-term eddy covariance (EC) tower network, restricting robust quantification of carbon and water fluxes across diverse ecosystems. Precipitation retrieval and thermal datasets remain affected by spatial biases, sensor inconsistencies, and atmospheric contamination. Evapotranspiration models such as SEBAL exhibit sensitivity to anchor-pixel selection and input variability, introducing uncertainty in water-use estimates. Vegetation–climate interaction studies are limited by coarse climate datasets and incomplete representation of nonlinear climatic responses. Dust-laden or polluted atmospheres reduce the accuracy of biophysical retrievals such as chlorophyll estimation, highlighting the need for regionally calibrated models.

Discussions

The reviewed works show methodological diversification across climate–land interaction studies. EC flux tower synthesis across Indian ecosystems illuminates monsoon-driven carbon uptake patterns, water-use efficiency differences among forests, croplands, and grasslands, and ecosystem transitions between sink and source behaviour. Entropy-based analysis in the Krishna River Basin identifies growing precipitation complexity linked to thermal instability. SEBAL sensitivity assessments quantify how spatial scale and parameter variation affect evapotranspiration outcomes-informing improved model reliability. Machine learning–based explainable modelling (PDP, SHAP, permutation importance) reveals key climate controls on vegetation greenness. Intercomparison of multi-source GPP products against flux towers strengthens understanding of model performance in tropical forests. Studies on dust-linked reflectance distortion emphasise the need for local calibration of chlorophyll retrieval algorithms in industrial regions.

What to learn?

These studies underline that surface–atmosphere exchange assessments benefit from combining in-situ flux measurements with remote sensing, climate models, and machine learning. Region-specific calibration improves the accuracy of biophysical retrievals and ET estimates. Explainable AI frameworks enhance confidence in climate–vegetation predictions by clarifying variable influence. Multi-source GPP benchmarking supports the development of more robust carbon assimilation models. Expanding flux tower networks, improving spatial resolution of climate datasets, and integrating thermal, optical, and microwave observations will greatly enhance the understanding of biosphere–atmosphere interactions. Overall, geospatial intelligence provides a powerful pathway for strengthening climate adaptation, ecosystem sustainability, and evidence-based environmental policy.

Weather Management and Climate Science (Pollution/Ozone)

Synoptic summary

Air pollution and ozone variability play a critical role in shaping environmental health, human well-being, and regional climate behaviour across India. The compiled studies demonstrate how geospatial intelligence-integrating satellite observations, machine learning models, trend diagnostics, and multi-sensor atmospheric analysis-enables detailed monitoring of aerosols, trace gases, particulate matter, and ozone dynamics. These approaches capture the influence of urban traffic, agricultural burning, large-scale circulation, industrial emissions, and sudden stratospheric warming events on air quality and ozone behaviour. Together, they highlight the importance of multi-platform atmospheric surveillance in supporting pollution mitigation, climate assessments, and sustainable urban planning.

Gaps

Despite rapid advances, several challenges hinder operational pollution and ozone monitoring. Satellite-derived aerosol and trace-gas retrievals face uncertainties due to cloud cover, atmospheric interference, coarse temporal sampling, and mixed-pixel effects-particularly in dense urban areas or optically complex regions. Agricultural fire detection from polar-orbiting satellites often misses significant diurnal burning activity. PM2.5 prediction accuracy depends heavily on feature availability and regional calibration, while ozone reanalysis products display large biases over northern India due to limitations in tropospheric chemistry representation. Soil and land contamination assessments require stronger integration of geospatial and in-situ datasets. Overall, limited ground truthing and sparse long-term monitoring networks restrict high-confidence model validation.

Discussions

The studies showcase a diverse set of atmospheric intelligence approaches. Multi-year AOD and NO_2/CO trend analysis reveals strong associations between urban traffic growth and deteriorating air quality in expanding cities. High-frequency geostationary fire detection highlights shifting stubble-burning patterns, complementing polar-orbiting datasets and exposing diurnal hotspots. Machine learning and SHAP-based interpretation effectively identify the dominant drivers of PM2.5 concentrations, with DEM, LST, and precipitation emerging as key variables. Comparative evaluations of reanalysis ozone datasets (TCR-2, CAMSRA, ERA5) underscore the importance of multispectral satellite reference products like IASI+GOME2 for India. Analyses of Arctic ozone enhancement link stratospheric warming events to increased polar ozone accumulation, while ocean–atmosphere studies reveal exponential relationships between wind speed and marine aerosol production. Sentinel-5P–based SO_2 and NO_2 monitoring emphasizes strong winter pollution peaks and industrial influences across Delhi.

What to learn?

The combined findings underscore the value of multi-sensor fusion, AI-assisted modelling, and region-specific calibration for robust pollution and ozone assessments. Geostationary sensors are essential for capturing diurnal fire dynamics, while satellite–ground data integration strengthens urban air quality diagnostics. Explainable AI improves transparency in particulate matter modelling, and multispectral ozone retrievals provide stronger references for reanalysis validation. Understanding stratospheric–tropospheric interactions is increasingly important for tracking ozone extremes under climate change. Ultimately, geospatial intelligence provides a scalable, data-rich foundation for improving air quality management, enhancing atmospheric forecasting, and supporting science-informed environmental policy across India.

Geohazards and Disaster Management (Cyclone)

Synoptic summary

Cyclone-related hazards along the Indian coastline pose persistent threats to lives, infrastructure, ecosystems, and critical facilities such as ports and nuclear installations. The studies collectively demonstrate how geospatial intelligence-integrating Earth Observation (EO), real-time seismic feeds, SAR analytics, multi-temporal optical datasets, and atmospheric diagnostics-strengthens cyclone preparedness and post-event assessment. These approaches enable dynamic flood mapping, track-based disaster analysis, coastal vulnerability monitoring, mangrove resilience assessment, and improved cyclone-track prediction using wind and vorticity fields. Together, they highlight the growing operational value of geospatial data for anticipatory action, rapid response, and long-term resilience planning in cyclone-prone regions.

Gaps

Despite significant advances, several limitations continue to challenge cyclone-related disaster management. Many early-warning systems rely on empirical relationships that require region-specific refinement for accurate wave-height and arrival-time estimation. Flood-inundation mapping accuracy is affected by cloud cover, varying sensor resolutions, and incomplete validation data during storms. Mangrove-damage assessments depend heavily on spectral indices, which may not fully capture structural degradation. Forecast models still struggle with representing complex factors such as β-induced drift, multi-level atmospheric steering, and compound hydro-meteorological extremes. Additionally, socio-economic exposure data remain sparse, limiting fully integrated risk assessments.

Discussions

The studies reveal substantial methodological diversification across cyclone science. A GIS-enabled tsunami early-warning portal demonstrates how real-time earthquake feeds, bathymetry, and wave-propagation models can support rapid decision-making for the Tamil Nadu coast. EO-based analyses of Super Cyclone Amphan and Cyclone Yaas illustrate how GEE-integrated systems use IBTrACS tracks, ERA5 wind fields, IMERG rainfall, and Sentinel-1 flood layers to assess multi-event cyclone exposure and agricultural damage. Mangrove-resilience studies show how multi-temporal NDVI metrics from Sentinel-2 capture vegetation loss and multi-year recovery, providing insights into spatial variations in vulnerability. Satellite-derived wind and vorticity products from INSAT-3D/3DR help quantify β-effect-driven drift, enabling improved cyclone-track prediction in the Indian Ocean.

What to learn?

These works highlight that effective cyclone hazard management increasingly relies on multi-sensor fusion, dynamic modelling, and ecosystem-specific interpretation. EO-based flood mapping strengthens district-level disaster planning; multi-temporal vegetation indices support ecological recovery assessments; and atmospheric diagnostics improve track-modelling accuracy. Real-time geospatial platforms provide scalable, cost-efficient tools for early warning, while SAR and optical imagery enable actionable insights even under extreme atmospheric conditions. Ultimately, integrating geospatial intelligence with predictive models and validated field data forms a robust pathway for reducing cyclone impacts and enhancing long-term coastal resilience.

Geohazards and Disaster Management (Drought/Heatwave)

Synoptic summary

Droughts and heatwaves represent some of the most consequential climate extremes in India, deeply affecting agriculture, water availability, public health, and ecosystem stability. The studies collectively highlight how geospatial intelligence-spanning remote sensing indices, machine learning models, atmospheric diagnostics, and cloud-based analytics-enhances monitoring and prediction of heat stress, drought propagation, surface-temperature anomalies, and multi-hazard vulnerability. These approaches enable early warning, quantify land–atmosphere feedbacks, identify hotspots of thermal stress, and support climate-resilient adaptation in both urban and rural landscapes. Together, they underscore the need for integrated, data-rich drought and heatwave intelligence systems.

Gaps

Despite advances, key challenges persist in representing spatial heterogeneity, atmospheric influences, and non-linear climate responses. Land Surface Temperature (LST) retrievals remain sensitive to urban geometry, emissivity variations, and cloud contamination. Drought indices on monthly scales often fail to capture rapid sub-seasonal propagation, complicating early warning efforts. Many models lack dense in-situ validation, limiting their calibration across diverse agro-ecological zones. Fire- and heatwave-related assessments are constrained by inconsistent ancillary datasets (e.g., soil moisture, groundwater, and socio-economic exposure). Multi-hazard vulnerability frameworks require improved integration of climatic, infrastructural, and demographic layers to capture compounding risks.

Discussions

The studies reveal broad methodological innovation. Machine learning models (RF, CNN, ANN, XGBoost) effectively integrate spectral indices such as NDVI, SAVI, NDBI, NDMI, and drought indices to estimate LST, drought severity, and vegetation stress. SIF-based monitoring demonstrates significantly earlier drought detection than NDVI, improving agricultural early warning. Heatwave analyses in West Bengal highlight extreme Tmax anomalies and land–atmosphere coupling through soil moisture deficits and suppressed rainfall. Season-adaptive GeoAI frameworks capture drought propagation with physically interpretable predictors such as aridity index and antecedent streamflow. Multi-hazard vulnerability mapping for Andhra Pradesh shows the combined impact of drought with cyclones and floods. Forest-fire susceptibility studies integrate drought-linked indicators to map ignition risk. Multi-sensor drought frameworks in Purulia and EO-based drought assessment in Odisha demonstrate the value of SPEI, VHI, RAI, and machine learning for spatial drought characterization. Wet-heat stress modelling combines UHI and UMI indices to evaluate combined thermal–moisture stress in urban environments.

What to learn?

Effective heatwave and drought management depends on integrating multi-sensor remote sensing, climate diagnostics, and AI-driven modelling. Photosynthesis-sensitive indicators like SIF improve early drought detection, while explainable ML frameworks strengthen understanding of environmental drivers. High-resolution LST and moisture indices enable identification of urban heat pockets and agricultural hotspots. Season-aware models outperform static temporal approaches in monsoon-influenced drought forecasting. Multi-hazard perspectives-considering drought, heat, fire, and socio-economic vulnerability together-are essential for operational disaster planning. Overall, the system provides a powerful, scalable foundation for forecasting, mitigating, and adapting to heatwave and drought risks across India's diverse climates.

Geohazards and Disaster Management (Geology/Mineral)

Synoptic summary

Geological and mineral-related geohazards-ranging from terrain instability to resource-driven environmental risks-are increasingly being assessed through integrated geospatial intelligence. The collected studies show how remote sensing, gravity analysis, spectral characterization, and AI-driven modelling provide powerful tools for understanding landscape evolution, deep-crustal processes, and mineralization controls. From testing tectonic aneurysm hypotheses in the Eastern Himalayan Syntaxis to mapping trace-metal speciation in deep-sea sediments and identifying subsurface mineralizing structures in India's metallogenic belts, these works demonstrate how multi-sensor geospatial workflows improve interpretation of geological processes, support mineral exploration, and strengthen environmental risk assessments.

Gaps

Despite strong methodological progress, several limitations persist. High-relief terrains pose challenges for accurate DEM-based geomorphic interpretation, while landscape evolution models require careful parameter tuning due to sparse field validation. Deep-sea metal speciation studies lack long-term chemical and biological monitoring to fully understand mining-related impacts. Hard rock aquifers remain difficult to characterize due to heterogeneous lithology and limited subsurface data. Mineral exploration studies face constraints in resolving fine-scale lithological variability using moderate-resolution satellite data alone. Across cases, multi-disciplinary calibration-linking geophysical, geochemical, and remote sensing datasets-remains essential but is not always available at operational scale.

Discussions

The reviewed works illustrate robust innovation across geohazard and mineral intelligence applications. Geomorphic modelling of the Eastern Himalayan Syntaxis highlights how river capture events may initiate or enhance tectonic aneurysm development, linking surface incision with deep crustal flow. Deep-sea metal speciation analysis in the CIOB provides insights into the stability of Cu, Ni, and Co in sediments and the likely limited release of labile metals during polymetallic nodule mining. AI-driven groundwater security mapping in the Chhotanagpur Craton integrates CNN modelling with hydrological and geophysical layers, showing high predictive skill and confirming subsurface connectivity through ERT. Remote sensing–ERT–spectral fusion techniques demonstrate strong potential for manganese exploration in the Eastern Ghats, while integrated lineament, gravity anomaly, and field spectroscopy approaches in the Singhbhum Copper Belt effectively delineate structurally controlled mineralization zones. Together, these studies show how combining spectral, structural, and geophysical datasets enables deeper geological insights and improves mineral targeting.

What to learn?

These studies highlight that geological and mineral-related intelligence benefits most from multi-sensor integration, physically informed modelling, and strategically placed field validation. Combining DEM-based geomorphology with landscape evolution modelling enhances understanding of crustal processes. Spectral and geochemical analyses improve mineral discrimination and environmental risk evaluation. AI-driven frameworks help interpret complex lithological variability in hard rock terrains. Gravity–remote sensing fusion provides strong constraints on subsurface structure. Overall, geospatial intelligence strengthens both hazard assessment and exploration strategy, offering cost-effective, scalable pathways for understanding India's dynamic geological systems.

Geohazards and Disaster Management (Landslide)

Synoptic summary

Landslides, seismic activity, land subsidence, and terrain instability pose escalating risks across the Himalayas, Western Ghats, and north-eastern India. The studies collectively show how geospatial intelligence-using optical and SAR remote sensing, InSAR deformation mapping, machine learning, DEM-based modelling, and object-based change detection-enhances the understanding of slope failures, subsidence dynamics, and associated infrastructure vulnerability. From reconstructing catastrophic debris flows such as the 2024 Wayanad event to long-term landslide evolution in the Mandakini catchment, and automated SAR-based monitoring across India, the body of work establishes a strong foundation for improving hazard preparedness and supporting risk-informed planning in fragile mountain systems.

Gaps

Despite growing methodological sophistication, key challenges persist. Landslide simulations remain highly sensitive to DEM resolution and rheological parameters, particularly in rugged mountain terrain. Statistical and MCDA models require high-quality, consistent landslide inventories-which are often incomplete. SAR-based monitoring suffers from coherence loss in vegetated or snow-covered regions, limiting near-real-time detection. Seismic hazard models still face uncertainties due to clustered earthquake catalogues, while ML-based declustering demands extensive training data. Tourism- and infrastructure-focused vulnerability assessments require more socio-economic and exposure datasets, and subsidence studies call for tighter coupling between InSAR outputs, hydrological data, and sediment budgets. Overall, limited in-situ validation remains a constraint across most regions.

Discussions

The reviewed works highlight significant advances. RAMMS-based simulation of the 2024 Wayanad disaster demonstrates the value of high-resolution DEMs and friction–turbulence calibration for debris-flow reconstruction. Probabilistic and MCDA frameworks (WoE, f-AHP, Entropy, GRA, TOPSIS) effectively map susceptibility across Kerala, Sikkim, Meghalaya, and Himachal Pradesh, identifying slope gradient, rainfall intensity, drainage, lithology, and anthropogenic modification as dominant controls. ML models (ANN, SVM, RF, XGBoost, EBM) improve nonlinear susceptibility prediction and infrastructure exposure mapping in the Western Ghats. Automated Sentinel-1 workflows and NISAR-ready pipelines offer reproducible national-scale landslide surveillance. Long-term OBIA–RF mapping in the Mandakini catchment reveals decadal patterns of slope adjustment, while InSAR analyses in Hyderabad and the Kallada delta underscore the role of groundwater extraction and sediment load decline in subsidence dynamics. Seismic studies using LSTM-AE and ML-based declustering improve precursor detection and hazard estimation.

What to learn?

Effective landslide and terrain-hazard management benefits most from multi-sensor data fusion, hybrid modelling, and consistent validation. High-resolution DEMs and SAR coherence mapping strengthen early detection and dynamic monitoring. MCDA and ML frameworks enhance susceptibility mapping by integrating geomorphology, hydrology, and climatic drivers. InSAR-based deformation tracking is essential for understanding subsidence hotspots and slope precursors. Long-term landslide inventories and OBIA methods support temporal evolution studies, while explainable AI and ML-driven declustering improve seismic hazard interpretation. Ultimately, geospatial intelligence provides a scalable, data-rich foundation for strengthening early warning, infrastructure resilience, and sustainable development in hazard-prone mountain regions.

Environmental Applications (LiDAR)

Synoptic summary

LiDAR has emerged as a transformative geospatial technology for environmental applications, offering unmatched precision in capturing three-dimensional structural information across vegetation, crops, and engineered surfaces. The studies collectively demonstrate how UAV-borne LiDAR, terrestrial/mobile LiDAR, and consumer-grade portable LiDAR provide scalable, non-destructive alternatives for detailed biophysical retrieval, biomass estimation, crop phenotyping, and infrastructure condition assessment. From tree-level height, DBH, and canopy extraction in plantation agroecosystems to highly accurate crop structural measurements in controlled environments, and comparative evaluations of LiDAR versus SfM for pavement distress detection, these works highlight LiDAR's growing relevance across agriculture, ecology, and transportation engineering.

Gaps

Despite its strengths, LiDAR adoption faces several operational challenges. High-density point clouds require intensive computation and specialized workflows, and accuracy can be influenced by occlusion within dense canopies or cluttered environments. Portable LiDAR sensors, while convenient, can have limitations in range and feature resolution. In pavement applications, LiDAR and SfM each show sensitivity to environmental conditions, motion artifacts, and surface reflectance, requiring careful calibration. Cost and access to high-end LiDAR platforms also limit large-scale deployment. Most studies note the need for broader ground validation and integration with spectral or RGB datasets to improve biophysical variable retrieval and distress classification.

Discussions

UAV- and MMS-LiDAR fusion demonstrated strong correlations with field-measured tree height and DBH (R^2 0.87–0.98), enabling accurate above-ground biomass estimation in complex horticultural and coffee plantations. Portable iPad-based LiDAR produced highly reliable canopy height measurements for tomato crops under polyhouse conditions, with RMSE values as low as 0.003–0.012 m . These applications underscore LiDAR's value for rapid phenotyping and precision agriculture. In infrastructure studies, LiDAR and SfM reveal complementary strengths: LiDAR excels in geometric precision and noise robustness, while SfM offers cost-effective, high-resolution imaging using accessible photogrammetric workflows. Mobile mapping systems that integrate both sensors show promise for operational pavement distress detection.

What to learn?

The combined studies emphasize that LiDAR's true power lies in multi-sensor integration, thoughtful workflow design, and application-specific calibration. For vegetation and biomass studies, combining LiDAR with multispectral or RGB imagery improves canopy delineation and biophysical modelling. Portable LiDAR platforms can significantly enhance crop monitoring when validated against field measurements. In infrastructure surveys, LiDAR and SfM should be selected according to accuracy needs, budget, and survey conditions, with hybrid systems providing optimal performance. Ultimately, LiDAR-based geospatial intelligence offers a robust, scalable foundation for environmental monitoring, precision agriculture, and resilient infrastructure management.

Environmental Applications (Forests)

Synoptic summary

Forests are vital ecological assets, supporting biodiversity, carbon sequestration, hydrological regulation, and local livelihoods. The compiled studies show how geospatial intelligence-using Sentinel optical data, SAR backscatter, GEDI LiDAR, UAV-LiDAR, machine learning, multi-sensor fusion, and automated phenology-enhances the monitoring of forest structure, biomass, species composition, degradation, and ecological dynamics. These works demonstrate strong capabilities in mapping mangroves, quantifying above-ground biomass (AGB), detecting deforestation, reconstructing vegetation time series, and evaluating ecosystem services across diverse Indian forest landscapes, including the Sundarbans, Western Ghats, semi-arid systems, and plantation agroforestry systems.

Gaps

Several limitations affect operational forest monitoring. Species-level discrimination is difficult in dense or mixed canopies, even with high-resolution imagery. Biomass estimation faces model transferability issues and inconsistent field calibration across varied forest types. Deforestation detection requires long-term, cloud-free data, often limited in monsoon regions. SAR–optical fusion improves biomass mapping but struggles with saturation in dense forests. Multi-sensor approaches need broader ground validation, and neural-network-based AGB models depend heavily on high-quality training datasets. Automated phenology systems also require improved resilience to variable illumination and atmospheric effects.

Discussions

The studies highlight significant methodological advancements. Multi-year NPP validation confirms strong agreement between Sentinel-2 and in-situ measurements, reinforcing sensor reliability. UAV-LiDAR accurately extracts understory plantations in multi-tier canopies. A self-weighted de-noising algorithm enhances NDVI/EVI time-series quality. Mangrove species mapping reveals erosion-accretion driven shifts. The FRAMS platform integrates AI-based deforestation alerts for real-time forest governance. Multi-sensor ML models achieve high AGB accuracy in wetlands and dryland forests, while BFAST analysis detects illegal deforestation. Canopy-density studies indicate post-mining regeneration, and neural networks show strong potential for Sundarbans biomass prediction. Phenocam systems support automated phenology monitoring, and NIRv–PhenoCam comparisons clarify satellite-ground coherence. Forest ecosystem valuation in the Western Ghats quantifies critical ecosystem services. Deep-learning U-Net models demonstrate potential for forest-fire forecasting.

What to learn?

Forest monitoring benefits most from multi-sensor fusion, AI-based modelling, and targeted ground validation. LiDAR and GEDI substantially enhance structural and biomass estimates; machine learning improves AGB prediction, species mapping, and fire-risk assessment; and long-term time-series datasets strengthen change detection. Operational tools like FRAMS show how geospatial intelligence supports governance. Overall, harmonizing in-situ, optical, radar, and LiDAR observations enables robust, scalable insights for conservation planning, carbon accounting, restoration monitoring, and sustainable forest management.

Environmental Applications (Land Use/Cover)

Synoptic summary

Land use and land cover (LULC) dynamics play a defining role in shaping environmental sustainability, urban growth, ecological resilience, and climate interactions. The studies demonstrate how geospatial intelligence-integrating high-resolution satellite imagery, machine learning, deep learning, cellular automata modelling, and hydrological–geomorphic diagnostics-supports detailed monitoring of landscape change across urban, rural, coastal, wetland, and high-altitude environments. Applications range from transformer-based urban classification and wetland ecotope mapping to ravine evolution assessment, shoreline dynamics, forest-cover transitions, and energy-infrastructure impacts. Together, these works highlight the expanding capacity of geospatial tools in guiding sustainable development, heritage preservation, climate adaptation, and land-resource governance.

Gaps

Despite advanced frameworks, several limitations persist in LULC assessment. Long-term time series remain affected by cloud cover, sensor inconsistency, and limited in-situ validation. Species-level or fine-scale discrimination is challenging in heterogeneous landscapes. High-resolution urban mapping requires strong auxiliary datasets, while deep learning depends on high-quality annotations. Forecasting frameworks like CA-based models may struggle with rapidly changing socio-economic drivers. Wetland and coastal studies need better integration of hydrological, geomorphic, and field datasets for resilience assessment. Heritage and encroachment studies require improved access to archival maps and cadastral records. Region-specific calibration and cross-sensor harmonization remain essential challenges.

Discussions

The reviewed works show wide methodological diversity. Transformer architectures (SegFormerB2) improve urban classification by capturing fine spatial detail, while UAV and auxiliary layers enhance contextual interpretation. Weighted overlays, hydraulic modelling, and geomorphic indicators support sustainable tourism planning in Himalayan foothills. DSAS-based shoreline analysis quantifies erosion in coral reef islands, while multi-decadal MODIS trends highlight forest loss and resilience patterns in Northeast India. Multi-sensor approaches assess sea-level rise drivers, while geospatial–cartographic integration reconstructs historical landscapes under urban pressure. MGNREGA studies show ecological recovery through drought-proofing, afforestation, and water-harvesting. Automated wetland classifiers demonstrate the power of cloud-based unsupervised methods. Deep learning (U-Net, SAM) strengthens encroachment detection, while EO diagnostics reveal ravine evolution linked to soil mineralogy. Additional studies examine estuarine control on coastal stability, mangrove phenology, river morphology changes, solar-park thermal impacts, and UHI intensification with urban expansion.

What to learn?

Effective LULC intelligence depends on multi-sensor integration, physics-aware modelling, and machine-learning-based interpretation. Transformer and deep learning models improve classification in complex terrains. Long-term archives remain essential for tracking degradation and resilience. DSAS and geomorphic metrics strengthen coastal-change monitoring, while spectral–geophysical fusion clarifies landform evolution. Field-calibrated indices and explainable AI enhance environmental programme evaluation. Cloud-based automated frameworks simplify work in remote regions. Overall, geospatial intelligence provides a scalable, evidence-driven foundation for sustainable land management, climate-resilient planning, and ecosystem conservation.

Environmental Applications (Radar)

Synoptic summary

Radar remote sensing has become central to environmental applications due to its all-weather, day-night imaging capability and sensitivity to surface roughness, structure, and moisture. The compiled studies show the versatility of SAR-from L-band biomass retrieval under the NASA–ISRO NISAR mission to cyclone-induced crop damage mapping, mangrove biophysical estimation, and tectonic geomorphology assessments in the Western Ghats. Additional applications include vessel-activity forecasting, crop phenology reconstruction through SAR–optical fusion, rice-sowing window detection using multi-sensor C-band data, earthquake deformation mapping with InSAR, waterlogging assessment in Mumbai, and real-time oil-spill detection along the Kerala coast. Collectively, these works illustrate radar's expanding role in environmental monitoring, disaster assessment, agriculture, marine surveillance, and geophysical hazard interpretation.

Gaps

Several limitations persist despite methodological advances. SAR-based biomass estimation is affected by soil moisture, canopy dielectric variability, and scattering-model sensitivity. Crop-damage and waterlogging assessments require dense temporal sampling and robust field validation. C-band SAR saturates in dense vegetation, limiting biophysical estimation. Phenology reconstruction from SAR alone struggles with sparse temporal overlap with optical imagery. InSAR deformation mapping faces coherence loss in vegetated or heterogeneous terrain. Maritime-activity forecasting is challenged by uneven vessel detections and long revisit intervals in low-traffic regions. Oil-spill detection must account for look-alike signatures, requiring multi-sensor confirmation. Operational scalability across domains depends on improved calibration, ground truthing, and multi-platform fusion.

Discussions

The studies highlight strong innovation across radar-based environmental intelligence. Multi-temporal L-band simulations for NISAR show promising biomass-retrieval accuracy using modified scattering models. Sentinel-1 time-series analysis captures cyclone-driven crop losses via VV/VH ratio dynamics. XGBoost-based mangrove modelling demonstrates the value of combining polarimetric backscatter, textural metrics, and radar-derived indices. Geomorphic analysis in the Western Ghats shows fault-controlled landscape evolution. Maritime forecasting benefits from adaptive spatial-temporal aggregation applied to millions of SAR detections. SAR–optical integration enhances paddy phenology mapping by bridging cloud-related optical gaps. RISAT-1A and Sentinel-1 fusion improves rice-sowing detection. InSAR mapping using ASAR retrieves earthquake deformation at low cost. SAR-based waterlogging detection supports urban flood modelling, while oil-spill detection demonstrates the operational readiness of C-band SAR.

What to learn?

Radar intelligence is most effective when integrated with multi-sensor fusion, machine learning, and physically informed modelling. L-band SAR will expand biomass and forest-structure retrieval capabilities. Time-series C-band analysis strengthens agricultural monitoring and disaster assessment. SAR–optical fusion improves phenology and crop-stage mapping. InSAR remains essential for deformation and seismic hazard studies. Maritime surveillance benefits from adaptive modelling of spatial-temporal variability. Urban waterlogging and coastal-pollution assessments highlight SAR's importance for rapid response and resilience planning. Overall, radar-based geospatial intelligence offers a scalable, reliable foundation for environmental monitoring, hazard management, and decision-support systems.

List of Abstracts

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Topographic Evolution of the Western Himalayan Syntaxis: Testing Tectonic and Climatic Forcing with Landscape Evolution Models	Abhishek Kashyap
Data-Driven Modelling of Seasonal Variations in landfill leachate Using Artificial Intelligence Approach	Salma Sultana
Investigating the Morphological Changes in Mudflat Topography across the Gulf of Khambat	Rajnee Ranjan
Volume and Stability Analysis with Leachate Risk Assessment of Tarakeshwar Dumpyard	Rajarshee Roy

Theme 2: Geo-Intelligence and Technology Adoption

Title	Presenting Author
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Spatio-Temporal Monitoring of Jute Using Sentinel-1/2 Data in the Satellite Surveillance Module of the Jute Crop Information System	Pruthivi Raj Behera
A Deep Learning-based Approach for Object Detection and Segmentation in Geospatial Imagery Using YOLOV11 and SAM2	Aniruddha Khatua
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Assessment of Urbanization-Driven Ecosystem Service Value Changes in Kolkata and Mumbai (1995-2022) Using Machine Learning Techniques	Manali Pal
Quantifying the Impact of Urban Expansion on Green Spaces in Ahilyanagar: A Land Use Land Cover Change Analysis using GIS	Aditi Bhalekar
Deciphering Urban Heat Dynamics Through Advanced Geospatial Modelling: A Multi-Parametric Study of Climate Change in Shillong Agglomeration, India	Toushif Jaman
Satellite Image Super Resolution Using Generative Artificial Intelligence	Arati Paul
Assessing and Validating the Site Suitability of Secondary Airport using Geoinformatics: A Case of Bengaluru Metropolitan Region, Karnataka, India	Chandan M C
Rapid, Non-Destructive Estimation of Soil Available Nitrogen Using Reflectance Spectroscopy and Hyperion Satellite Imagery: An Evaluation of Preprocessing Transformations and ML Regressors	Mowshika J
Development of Agro-geoinformatics system at village level is a possibility: An experience	Nageswara Rao DVK
Enhancing Disaster Response in Smart Cities Through Blockchain-Enabled Secure Location Sharing	Amulya Sri Pulijala

Rapid estimation of soil organic carbon using combined spectral reflectance and color imaging	Rachna Singh
Deep Learning for Object Detection in Urban Area using High Resolution Imagery	Minakshi Kumar
Multi-Modal Data Integration and Augmentation for Robust Soil Organic Carbon Estimation using FTIR-MIR spectroscopy and pXRF spectrometry	Ushasi Dam
Integrating Sentinel-2 Data with Machine Learning for Accurate Pineapple Yield Prediction in Assam's Smallholder Systems	Shovik Deb
Ionospheric TEC Anomalies Detection using LSTM Autoencoder Analysis: a case of 2010 El Mayor-Cucapah Earthquake	Suryanshu Paul
AI-Powered Autonomous Drone for Precision Plant Imaging and Remote Data Transmission.	Prakalp Raghav P P
Geo-Innovation for Self-Reliance: An Interactive GEE Application for Cumin Crop Monitoring in Arid Rajasthan	AK Behra
Differentiating Damage Caused by Brown Planthopper (BPH) (Nilaparvata lugens Stål) from Abiotic Stresses in Rice Crop Using Hyperspectral Remote Sensing Techniques	Saklain Musthaq
Horticultural Diversification Plan for Temperate Fruits utilizing Geospatial Technology	Rodali Lahon
Dynamic Spatio-Temporal Modelling Framework using Voronoi-based Graphs for Crash Prediction	Anubhav Mishra
SE-NET Enhanced Urban Mapping for Mumbai City From RGB and SAR Imagery	Ayushmaan Singh
Evaluating Prevented Sowing Status of Kharif Paddy using Satellite Earth Observations and Rainfall Data: Crop Insurance Perspective	Prabir Kumar Das
Forest species discrimination using PRISMA Hyperspectral remote sensing data in Semi-arid regions of Rajasthan	Rakesh Fararoda
A Geo-Intelligent Web Application for Satellite-Based Turmeric Crop Monitoring	Anima Biswal
Long-Term Assessment of Greening and Browning Dynamics in Maharashtra's Agricultural Landscapes Through Vegetation and Climatic Indicators (2000–2024)	Anima Biswal
Aatma Nirbhar Cloud-Based Digital Twin Framework for Urban Resilience and Building Footprint Generation	shreyas M
Detection of Archaeological Mounds using Geospatial Technology and validation by Geophysical Technique	Ashish Kumar Jain
Modelling Climate Resilient Alternative Livelihood Options Using AI-Driven Geospatial Approaches: Evidence from the Indian Sundarban	Santanu Ghosh
Solar Farm Segmentation Using Dynamic Balanced Batch Training on Hard-Negative-Enriched Resourcesat-2/2A LISS-3 Dataset	uday kumar
A Machine Learning Approach to Estimate Potato Yield in the Lower Indo-Gangetic Plains	Ujjwal Kumar Gupta
Determining Nitrogen content of fodder crops using Hyperspectral and multi-spectral remote sensing data	Sujay Dutta
Two-Stage Proximal RGB Imaging and Digital Soil Mapping Framework for Predicting Soil Organic Carbon	Ayan Das
Development of Web Application for Soil Property Prediction using Sensor Data and Artificial Intelligence	Mouli Sarkar
Study the impact of feature class variations on road surface temperatures and proximity areas using EOS08 EOIR thermal data	Abhijit Pillai
Integrating CROPWAT Modelling and Machine Learning for Accurate Estimation of Crop Water Requirement	Jitesh Chandra
Deep Learning-Based Radiometric Correction and Enhancement of High-Resolution Satellite Imagery	Girish Kumar T P

Mixed-Use Matters: Revisiting Building Function Classification for Indian Cities	Sourabh Barala
Assessment of reinforcement bars in concrete structures using ground penetrating radar (gpr) and synthetic modelling with gprSim	Sumit Panday
Geospatial Assessment of Morphological Determinants of Urban Heat Island of Planned and Unplanned Cities	Dipankar Dam
Socio-Technical Geomatics Framework for Smart Urban Mobility: Integrating Dynamic Traffic Management and Public Behavioural Nudges	Kashish Saini
Site Suitability Analysis for Muga Food Plants in Papumpare district of Arunachal Pradesh Using Geo-Spatial Technology	Akmaul Hoque
Discrimination of Poppy Cultivated Fields from Rabi Crops Using Remote Sensing, GIS, and Machine Learning Techniques Along Riverine Sandbars of Goalpara District in Assam	Pranjit Kalita
Forecasting Soybean Crop Yields in the Vidarbha Region: Integrating Remote Sensing and Machine Learning to Quantify Heavy Rainfall Effects	Awinash Singh
Moisture-Driven Soil Respiration in Arid Landscapes: Insights from Land-Use Variability in Jodhpur, India	Sushilkumar Rehpade
Soil Moisture Estimation from TIR data using Empirical and Deep Learning Techniques	Nupoor A. Chavda
Assessing hyperspectral responses of fibre crops in field and laboratory conditions using hand-held spectroradiometer for disease identification	Dhananjay Barman
Improving rice yield estimation at block level through advanced mathematical modelling and geospatial technology	Sarujinee Gogoi
NIRVANA: A Cloud-Connected CubeSat Platform for Environmental Monitoring and Border Surveillance	THAMAN S N
A Hybrid Flutter–Unity Framework for AR-Based Smart Campus Navigation Using Geospatial Intelligence	Shivansh Kaushik
From Photosynthesis to Productivity: Satellite-based Estimation of Rice Yield in the Parts of Indo-Gangetic Plain	Bristi Ghosh
Indicators for assessing Urban Transportation System Resilience: A Comprehensive Literature Review	Deepankar
Mapping Patterns in Motion: A Scalable Space-Time Framework for Human Movement Detection and Analysis – The IIT Kharagpur Case.	Umesh Chandra Yadav Bonagiri
Assessing Spatial Accessibility and Health Outcomes among Tribal Districts of India – A GIS and LISA-Based Analysis	Parul Suraia
Integrating Geomatics and Socio-Environmental Intelligence for Climate-Resilient Agriculture in Bihar	Ajeet Kumar
IRRIGATED AREA MAPPING INTEGRATING REMOTE SENSING AND ML TECHNIQUES	Alok Kumar Maurya
Automated Detection of Stubble Burning at Land Parcel Scale Using Sentinel-2 Imagery and Decision Tree-Based Classifier	Pulakesh Das
Causal Spatio-Temporal Attention Networks for Geospatial Prediction of Airline Delays Using Meteorological and Flight Network Data	Pucha Srinivasa Pavan
Assessing Spatial Equity and Accessibility of Maternal Health Services using the Enhanced Two-Step Floating Catchment Area Method (E2SFCA): A Case Study of Chitrakonda Block, Odisha	Kukil Sharma
Ballistic Threat Zone Geospatial Estimation for Civilian Early Warning System	Richa Ahuja
Implementation of Generative AI for Geocoding of Disaster Events from News Reports of North East India	Bryan Samuel Kharsohnoh
Integrating Geospatial and Socio-Economic Parameters to Develop a Food Insecurity and Vulnerability Information System for Alirajpur District, Madhya Pradesh	Madhumita Chowdhury

Novel GeoAI Framework for Conversational Satellite Analysis using LangGraph and Google Earth Engine	Jayant Singhal
Use AI/ML urban transport planning traffic modeling.	Ajay
Climate physics of human-centric urban growth in Indian megacities	Nilabhra Mondal
Deep Learning Framework for Winter Crop Mapping in Fragmented Agricultural Landscapes Using Sentinel-2 Time-Series	Preetilata Murmu
Sustaining landscape: A GIS and Machine Learning Approach to Ecological Connectivity in Western Jharkhand	Neha Pandey
AI-Enabled Geospatial Solutions for Early Warning and Management of Transboundary Animal Disease Risks in Assam	SIddhartha Bhuyan
GeoAI-Driven Wetland Feature Mapping in the East Kolkata Wetlands Using Sentinel-2 and Deep Learning	Sayanna Kar
Zone–Adaptive Multivariate Causal (ZAM-Causal) Framework for Analyzing Forest Fire–Climate–Vegetation Interactions Across Agroclimatic Zones	Meenakshi Behera
Derivative Analysis of Powdery mildew affected tomato leafs using ground based hyperspectral data	Ginshibha Singh R
Integrated Assessment of Land Use and Climate Effects on Basin Hydrology using an Interactive Web-Based Modelling Platform	Jeba Princy Rathinaraj
Operationalisation of methodology developed for Rice acreage estimation in hilly ecosystem of north eastern states of India	B.K. Handique
Integration of Polarimetric Signatures and Machine Learning for Crop Mapping Using RADARSAT-2 Data	RUCHIKA GAJANANRAO RAMTEKE

Theme 3: Wetlands, Ocean, and Marine Science

Title	Presenting Author
Spatio-temporal assessment on Sonbeel wetland, Sribhumi District (Karimganj), using geospatial technology.	Namita Sharma
Soil Erosion Modeling in the Chittar River Basin Using RUSLE–GIS and Machine Learning Techniques	JEILANI M
Evaluating the potential of Optical and Microwave Remote Sensing for estimating the bathymetry of Turbid Waterbodies	S. Jayalakshmi
Assessment of Annual Water Yield and Sediment Dynamics in the Similipal Biosphere Reserve, India	Ritikesh Maurya
Multi-temporal Sentinel-1 and Sentinel-2 based assessment of flood-induced jute crop damage in north-eastern India	Rajyasri Adhikari
Bridge site selection through the analysis of multitemporal channel dynamics of a sector of Ramganga River in District Shahjahanpur, Uttar Pradesh, India	Aniruddha Uniyal
Scenario based Soil Erosion Modeling for Prioritization of Sub-Watersheds- A Sustainable Approach for Soil and Water Conservation in for Beas Basin, NW India	Koyel Sur
Mapping Small Water Bodies in Sub-Humid Tropics using Machine Learning in Google Earth Engine: A Case Study of Bolangir District, Odisha	Saidutta Mohanty
Early Detection of Harmful Algal Bloom (HAB) Precursors in the Bay of Bengal Using Lagged Interactions Between Sea Surface Temperature and Chlorophyll-a from Satellite Time-Series	Ashlesha Passi
Real Time Water Quality Monitoring at Bengaluru Urban: by Geospatial Intelligence	jagannatha Venkataramaiah

Marine heatwave activity in the Lakshadweep Sea	Neethu Chacko
Estimation of Vertical Wind Speed Exponent using In-Situ Measurements at Kalpakkam for Radiological Impact Assessment	Dipan Kundu
Integrated Global Framework for Estimating Urban Flood Vulnerabilities in Coastal Megacities using UC-Flo Model	Arnab Mondal
Determination of Eutrophication Pattern Around the Coast of Bay of Bengal using Sentinel-2 Data	Subhadip Dey
Relationship between upwelling, productivity and Air–Sea CO_2 Exchange in the Arabian Sea: Regional Contrasts and Recent Warming Effects	CHIRANJIVI JAYARAM
Assessing Flood Hazard in the Indian Koshi River Basin	MOULI ADAK
Flood Hazard Assessment in The Indian Rapti River Basin	Debopriyo Bhattacharya
Urban Flood Vulnerability Mapping and Assessment of Delhi: A GIS–AHP Integration Approach	Aaditya Pratap Sanyal
Machine Learning Based Assessment of Potential Losses in Kharif Crops due to Extreme Rainfall Induced Flood Events in parts of Punjab, India	Sashikanta Sahoo
Allometric versus Machine Learning Models for Blue Carbon Estimation Using Multi-Sensor Geospatial Data in the Bhitarkanika Coastal Mangrove System, Odisha	Subhankar Naskar
Mapping of potential Fishing Zones (PEZs) over the Estuarine Region of Sundarbans	Kanu Mohamed
National Level mapping and community zonation of Indian mangroves	Nikhil Lele
Assessing the impact of cyclones on the Mangrove ecosystem and species, Lothian Island, Sundarbans	Sharanya Sarkar
Comparative Analysis of OCM-3 Algorithms for Chlorophyll-a Retrieval in the Southeastern Arabian Sea	Anand M Vijayan
Automatic Flood Inundation Mapping Using AI/ML and SAR Data	Girish Kumar T P
Spatial Modelling of Soil Erosion and Deposition Using a Transport-Limited Sediment Accumulation Algorithm: A Case Study of the Mahi Upper Catchment	Sagar Subhashrao Salunkhe
Predictive Modelling of Nitrate Pollution in Groundwater using AI/MLTechniques in Jharkhand State, India	Ankit Choudhary
Monitoring Temporal Dynamics of Aquatic Vegetation in Urban Water Bodies Using Optical Satellite Data	Imran Sk
Multi-Sensor Analysis of Monthly Wetland Dynamics at Sambhar Lake Ramsar Site, India	Basant Bijarniya
Study of geomorphological control on flood susceptible in coastal alluvial region using remote sensing and geoinformatics	Bibek Saha
GIS-Based Multi-Criteria Evaluation of Groundwater Recharge Potential Zones Using Remote Sensing and GIS techniques in Ludhiana District, Punjab	Ishita Sharma
Assessment of Risk in the East Kolkata Wetland using Random Forest	Abhisek Santra
Assessing Spatio-temporal dynamics of water quality parameters in inland water bodies for sustainable aquaculture using remote sensing	Anisha Anil
Advancing Flood Risk Intelligence Through Multi-Algorithm Machine Learning: A Case Study for Climate Resilient Agriculture in Khagaria District, Bihar	Ronald Singh
Optimized Flood Hazard Mapping Framework Using Multi-Source Satellite Data and Machine Learning in Assam,India	Rahul Das
Remote Sensing and Reanalysis-Based Assessment of the Arabian Sea MiniWarm Pool and Associated Cyclone Dynamics (1982–2022)	Anupam Kumar

Integrated Multi-Sensor Modeling of Flood and Drought Probabilities Using MachineLearning: A Decadal Analysis for Patna District, Bihar (2014–2024)	Madhulika Singh
Inter-sensor Comparison and Validation of satellite derived Sea Surface Temperature with the reference of in situ data over the Indian Ocean	Triyasha Chakraborty
GeoAI-Driven Route Optimization and Augmented Reality Visualization for Flood Response: A Case Study of Kerala, India	Tazmin Sultana
Data-driven Digital Twin for Tso Moriri Lake: Linking 2015–2024 Water Extent Dynamics to Climate variables with Scenario Forecasting	Sumit Kumar
Monsoon-Driven Variability of the West India Coastal Current and Coastal Upwelling in the Eastern Arabian Sea: Insights from Satellite Observations	Debadrita Ray
Earth Observation Derived Spectral Indices For Water Quality Dynamics And Their Application To Examine Wetland Degradation	Saikat Patra
Geospatial Intelligence for Assessing Water-Quality Dynamics in Wetland Ecosystems: A Remote Sensing Framework for Sustainable Aquaculture Management	ARNAB MULLICK
Satellite-Based Characterization of Westerly Wind Bursts and Their Oceanic Impacts over the Equatorial Indian Ocean (2007–2024)	Shivam Mani Tripathi
A Hierarchical Classification Framework for Wetland-Specific Land Use/Land Cover for Sustainable Management Practices	Surajit Ghosh
Analysis of the flood-affected areas in Punjab during the 2025 monsoon season	Gulab Singh

Theme 4: Weather Management and Climate Science

Title	Presenting Author
Small-scale (~2 km) Characteristics of the Global Precipitation Using Concurrent Microwave and Thermal Infrared Measurements from TRMM satellite	Atul Varma
Biosphere-Atmosphere Exchanges of Carbon, Water and Energy in India: Insights from Eddy Covariance Measurements	Pramit Kumar Deb Burman
Spatio-Temporal Analysis of Aerosol Optical Depth and Air Quality In Correlation with Urban Traffic in Tiruchirappalli City Corporation of Tamil Nadu	Vaishaly S
Geospatial Assessment of Terrain-Based Snow Cover Distribution in Ladakh Using HIMCHITRA	Sachchidanand Singh
Improved CMIP6 Projections for South Asia Using Bias Corrections based on Machine Learning	Thejshri Ananda Kumar
Estimation of Glacier Surface Velocity using Sentinel-1A SAR Data over Eastern parts of Sikkim (Mangan District) during the year 2016 to 2024	Shubhendu Karmakar
In-season assessment of progressive paddy residue burning and GHG emission: An experience over Punjab & Haryana during post-kharif seasons	Abhishek Chakraborty
Evaluation of Spatial Displacement in NCEP-NOAA 6–24 h Precipitation Forecasts Against CMORPH Satellite Estimates Over India	Apala Majumder
Influence of LST and Air temperature on precipitation complexity in Krishna River Basin: An entropy-based approach	Krishna Rawat
Carbon Flux Dynamics and Ecosystem Sustainability in Groundnut (Arachis hypogaea L.) Agroecosystem: Insights from Eddy Covariance Measurements in Semi-Arid Tamil Nadu	Ahamed Jeelani
Effect of contamination in soil : A comparative study of seasonal variation (Monsoon and Post-monsoon) of dump and non dump soil in Dhanbad.	Saurav Suman

Spatiotemporal Variability and Trend Analysis of Climate Extremes in Kerala (1965–2024): Insights from ETCCDI, GPD, and RClimDex-based Statistical Approaches	SUDESHNA GAYEN
Understanding the March 2024 Arctic Total Column Ozone (TCO) high Using Multi-Sensor Observations	Anjali Sathyanath
Preliminary Investigation of GNSS-IR-Based Snow Depth Estimation in the Indian Himalayas	RAAJ Ramsankaran
Spatio-temporal Reconstruction Of Brightness Temperature At High Resolution, and Half Hourly Interval Using A Mix Of Statistical And Deep Learning Techniques	Harsh Khatarkar
Characterizing Urban Heat Island (UHI) Intensity with a ConvLSTM-Generated Land Surface Temperature (LST)	Pradip Patelia
Decoding Urban Thermal and Air Quality Dynamics Through Machine Learning and SHAP Analysis: A Multi-City Study in the Aravalli Range	Bhawna Yadav
Variability and Trend Analysis of Rainfall over Burhidihing River Basin, India using Reconstructed Time Series	Jinee Gogoi
Evaluation of Satellite-Based Precipitation Estimates over the East Coastal States of India Using Multi-Criteria Performance Assessment	Sabyasachi Swain
Leveraging GeoAI to Assess Climate-Driven Changes in Vegetation Dynamics Across India	Neeti Neeti
Enhancing Geospatial Precision through Nontidal Atmospheric Loading Correction in CORS Networks of the Himalayan Region	Aniket Sisodia
Two Decades of Upper Water Mass Variability in the Lakshadweep Sea Revealed by Remote Sensing Observations	SREEJITH K S
Evaluation of reanalysis surface ozone in India using multispectral satellite observations	Anagha K S
Quantifying Climate-Vegetation Relationship through Explainable Random Forest Regressor and Uncertainty Analysis	Swadhina Koley
Precipitation Nowcasting using Data-Driven AI and Optical Flow-Based Approaches	Kuldeep Kurte
Variability and Trends in the Thermodynamic Indices over Eastern India Associated with Pre-monsoon Thunderstorm Variability	Bhishma Tyagi
Quantifying the Impact of Spatial Scale and Input Variability on SEBAL (Surface Energy Balance Algorithm for Land) Evapotranspiration Estimates	NOUFIA M A
Geospatial and Temporal Analysis of Predicted Cyclone Severity in Bay of Bengal Region	Richa Ahuja
Multi Satellite Assessment of Agricultural Fires and its Influence on Aerosol Particulate Matter Variability over North India	Nilanjana Sengupta
Evaluation of Noah and Noah-MP Land Surface Schemes in WRF-RCM for Simulating Northeast Monsoon Rainfall	Prachi Khobragade
Integrated Remote Sensing Approach for Identifying Precipitating Clouds in Tropical Cyclones over the Indian Ocean	A Aswin
Towards Improved Gross Primary Productivity Estimates: Intercomparison of Multi-Source GPP Products with Eddy Covariance Flux Measurements in Indian Tropical Forests.	Shivani Deshmukh
Satellite-Based Assessment of Wind–Sea Surface Temperature Coupling and Seasonal Variability in the Eastern Arabian Sea (1993–2024)	A Ipsita
Radiometric Correction of Thermal Infrared observations from Unmanned Aerial Vehicle for Land Surface Temperature Retrieval	Dharanya Thulasiraman
Assessing the Reliability of Chlorophyll Retrievals from the Sentinel-2 Simplified Level-2 Prototype (SL2P) Processor under Dusty Environments	Avinash Kumar Ranjan
Multi-Sensor Approach for Debris Cover Mapping Over Himalayan Glaciers	SALAH UD DIN

Quantifying the Cooling Effects of Urban Green and Blue Spaces Using Multi-Sensor Remote Sensing and GIS	Sukriti Sanawar
Impact of blue-green spaces on urban micro-climate of Kolkata Metropolitan Area	Bibekananda Das

Theme 5: Geohazards and Disaster Management

Title	Presenting Author
Season-Adaptive GeoAI Framework for Drought Propagation Prediction in Monsoon Climates	Shalini Balaram
Integrating Remote Sensing and GIS for Multi-Hazard Vulnerability Assessment in Andhra Pradesh	Amulya Sri Pulijala
Orbital Detection of Rare Earth Elements hosted by Peralkaline Igneous rocks in North-western India	Hrishikesh Kumar
Geospatial AI for Landslide Susceptibility and Infrastructure Vulnerability Mapping in the Western Ghats	Raghavendra S P
Remote Sensing Indices and Machine Learning-Based Model to Characterize and Validate Land Surface Temperature for Mysuru Region, India	Chandan M C
EVALUATING SEISMIC HAZARDS IN HIMACHAL PRADESH USING MCDM MODELS	Shreya Halder
Can Google Satellite Embeddings Bridge the Gap in Fire Severity Estimation Beyond Multispectral Limits?	Srishti Sarkar
Understanding Wayanad debris flow dynamics using Rapid Mass Movement Simulation (RAMMS)	Shah Masudul Islam
EO-Data Utilisation for Monitoring Recent Volcanic Activity of Barren Island, Andaman Territory, India	Nivedita Sinha
Multi-Criteria Evaluation of Seismic Hazards in Kolkata, West Bengal	Rishita sasmal
PRISMA data utilization in detecting different igneous components and associated alteration: Its implication for rare earth exploration	ARINDAM GUHA
Record-Breaking April-May 2024 Heatwave in West Bengal: Multi-Parameter Assessment of Intensity, Duration, and Land-Atmosphere Anomalies	Anup Upadhyaya
Geospatial Modelling of Landslide Susceptibility in Kerala, India	Saikati Saha
Mapping Landslide Susceptibility in Sikkim, India Using Geospatial Techniques	ADITI HALDER
Forest Fire Susceptibility Zonation Using Integrated MCDM Models in Chhattisgarh, India	Suparna Chakraborty
Do large-scale capture episodes drive aneurysm? Geomorphic Insights from the Eastern Himalayan Syntaxis	Abhishek Kashyap
Development of Online Web Portal using Geospatial Technologies for Early Tsunami Warning to Tamil Nadu Coast around Kalpakkam Nuclear Complex	Deepu Radhakrishnan
Impact of Polymetallic Nodules Mining on Trace Metal Speciation (Cu, Ni, Co) in Surface Sediments of the Indian Ocean Nodule Field, Central Indian Ocean Basin.	Lamjahao Sitlhou
Probabilistic Geospatial Modeling of Landslide Susceptibility in the Western Ghats of Kerala Using the Weight of Evidence (WoE) Framework	Subhankar Naskar
Imprints of compound height heat extremes in the Northern Bay of Bengal	Naresh Krishna Vissa
Spatio-temporal Repetition of Forest Fire Alerts in the Uttarakhand Himalaya, India (2019-2024)	Sandhya Farswan

Geospatial Assessment of Landslide Susceptible Zones in Himachal Pradesh, India.	Riya Bhaduri
Scalable landslide mapping using deep learning, a Human in the Loop (HITL) framework	Nirdesh Kumar Sharma
Estimation of Composite Drought Index using Meteorological and Satellite Remote Sensing Employing Data Science Techniques: A Case Study	Jagadamba Prasad Singh
Integrating Remote Sensing and AHP for Landslide Susceptibility Mapping in a Rainfall-Intense and Tectonically Active Terrain of the East Khasi Hills, Meghalaya	Atul Kumar Singh
GOSSAN MAPPING USING EARTH OBSERVATION DATA IN PARTS OF EASTERN INDIA	Ganavena Kavyasri
Combined analysis of Remote Sensing, ERT and Spectral data for mineral prospecting.	Vivek Vikash
Landslide Vulnerability Assessment of Infrastructure in Tourist Circuits of Northeastern India : A Geospatial Analysis for Sustainable Tourism Development	Joyshree Das
Integrating Geospatial Techniques for Forest Fire Danger and Vulnerability Mapping in Meghalaya	Suraj Kumar Swain
Enhancing Quality of Life in Earthquake-Prone Regions: A Review on Mass-Spring Systems for Seismic Resilience	Aashima .
Enhancing Seismic Hazard Models with Machine Learning Based Declustering: Performance Evaluation on a Novel Frontal Himalayan Arc Dataset.	ADARSH KUMAR PASWAN
Evaluation of urban heat island and urban moist island to uncover the wet heat stress of a moist Indian city	Rajesh Singh Rana
Multi-temporal InSAR analysis to unravel land subsidence in Kallada delta, Kerala state, India	Aswathi P
Cloud-Driven Drought Dynamics and Vulnerability Prediction Using Multi-Sensor Indices and Ensemble Learning in Purulia District	Sudipto Halder
Assessing the β-Effect on Tropical Cyclone Track Dynamics over the Indian Ocean Using Satellite-Derived Wind and Vorticity Fields	A Aswin
Economic worth of forest ecosystems in the Aghanashini Watershed	Tulika Mondal
EO-Based Assessment of Agricultural Drought Dynamics in Odisha (2018) Using Google Earth Engine for Drought Risk Reduction	Anuva Chowdhury
EO data-based assessment of cyclone-induced disasters in the coastal area of West Bengal	Sneha Kour

Theme 6: Environmental Applications

Title	Presenting Author
The NASA-ISRO SAR Mission - Potential to leverage multi-temporal L-band backscatter for biomass estimation	Unmesh Khati
Validation of NPP estimates with Sentinel-2 and its relation to carbon component dynamics in Bay of Bengal region, India	LOUWIN ANAND D
Beyond the Core: Leveraging Auxiliary Data for Urban Dynamics Modelling	Vikash Kumar
Riverside Tourism Development Using Geospatial and Engineering Techniques In The Part Of Central Himalayas	Anubhav Maurya
Machine Learning-Based Forest Biomass Estimation from Sentinel-2 Data in Google Earth Engine: A Case Study of Jaypur and Bishnupur Forests	SUDIPTA DUTTA
Remote Sensing and GIS-Based Reconstruction of Bijapur's Historical Landscape during the Adil-Shahi Dynasty	Sandipta Das

Crop Damage Assessment Using Sentinel-1 SAR During Cyclone Dana in Kendrapara, Odisha	Sukanya Mukherjee
Classification of Understory Coffee Plantations in Multi-tier Vegetation Canopies Using UAV-based LiDAR 3D Point Cloud Data	Shashidhar Kadad
High-quality reconstruction of multi-year EVI/NDVI time series using self-weighted de-noising approach	Niraj Priyadarshi
Estimating Biophysical Parameters of Mangrove Forests of Indian Sundarbans using Extreme Gradient Boosting with C-band SAR data and Ground Measurements	Tanumi Kumar
MGNREGA as a Pathway to Environmental Management: A Case Study from Andhra Pradesh, India	Aneesah Rahaman
Shoreline Dynamics of A Reef Island: A Case Study of Van Island, Tamil Nadu, India	Anuya Ramteke
Nature-Based Rural Development under MGNREGA: Geospatial Assessment of Drought-Proofing and Vegetation Resilience in Telangana	Joshi Sai Prakash Chowdary Mothineni
Investigating Firn Aquifer using Radar Scatterometry over Antarctic Peninsula	Lipika Dutta
Morphotectonic Assessment of the Kuppam and Tejaswini River Basins (KRB & TRB) in the Western Ghats of Kerala Using Geospatial Technology	Lijitha C P
Towards Geospatial Intelligence Framework for near real-time Forest Resource Monitoring and Decision Support System in Manipur	Puyam Singh
Geospatial Assessment of Citrus Gene Sanctuary of Meghalaya, India	Trishna Maheshwari
UAV and LiDAR Integrated Retrieval of Tree Biophysical Parameters for Above Ground Biomass Assessment in Plantation-based Agroecosystems	Vinod P V
Forest Cover Dynamics and Ecosystem Resilience in the North-Eastern region of India	Radha Srivalli Cheraku
Automated LULC Classification of High-Altitude Himalayan Regions Using Sentinel-2 Data and Geospatial Techniques	Biplab Das
A Cellular Automata Approach for Predicting Land Use Change Using Geospatial techniques	Navmuniyammal Muthu
Synergistic Use of EOS-04 (RISAT-1A) and Sentinel-1A SAR Data for Improved Detection of Rice Sowing Window in the Krishna Delta, India	Srikanth Poloju
Tracking Shoreline Dynamics and Cyclone-Driven Change in Eastern Indian Coast using Earth Observation and Explainable ML Frameworks	Vijay K. Kannaujiya
Spatial Variability and Drivers of Sea Level Rise along the Indian Coasts: Observations and Model Projections	Vijay K. Kannaujiya
Adaptive Selection of Spatial and Temporal Resolution for Forecasting Maritime Activity from SAR Observations	Bharat Jayaswal
Enhanced Detection of Kharif Paddy Phenology stages through Synthesized Continuous Vegetation profile from SAR–Optical Data Integration	Sharmistha B Pandey
Evaluating Neural Network Architectures for Estimating Above-Ground Biomass Integrating Optical Spectral Indices in the Indian Sundarbans	Sinchan Banerjee
LiDAR Technology – a Potential Tool for Assessment of Height and Biomass Estimation in Tomato, Solanum lycopersicum Mill.	Satisha GC
Sensitivity Assessment of Airborne P-Band Synthetic Aperture Radar (SAR) Data for Selected Applications	Saroj Maity
Mapping Deforestation using the BFAST Algorithm and Time-Series Data in the Jhargram and West Midnapore Districts	Aniket Saha
Integrated High-Resolution Satellite and UAV-Based Assessment of Forest Damage Following a Windthrow Event in Tadvai Forest Division, Telangana, India	Arshad A

Environmental Degradation and its mitigation measure - a case study from Northern Part of Lalitpur District of Bundelkhand Region, Uttar Pradesh	Amrit Lal Haldar
Spatio-Temporal Greening of Mangrove Forests and Its Biophysical Impacts on Phenology: A Synergistic SEM–BRT Framework for Climatic Attribution	Kariya Ishita Bhaveshkumar
Improving Aboveground Biomass Estimation in Teal Carbon Ecosystem of a Semi-Arid Region of India Using Multi-Sensor Remote Sensing and Machine Learning Algorithms	Shubham Kumar
Study of the significance of estuarine environment in stabilization of coastline in coastal regions of East Medinipur district, West Bengal, India using remote sensing and geophysical techniques	Abhilash Sen
Morphological Changes of Rivers draining into Vembanad Lake, Kerala state using Geospatial Technologies and preparing towards Disaster Risk Reduction Strategies	NOOBIYA C
Assessing the Impact of Solar Parks on Land Surface Characteristics over India	Dikshika Mahapatra
Machine Learning-Driven Estimation of Mangrove Above Ground Biomass Using Multi-Sensor Satellite Imagery in Parts of the Sundarbans, India	Mitali Mondal
Comparative Analysis of LiDAR and SfM Based Photogrammetry for Highway Pavement Distress Detection: A Comprehensive Review	Ravindra Singh Bisht
State of art early warning system for fisherman in deep sea over equatorial region	Shubhadeep Biswas
Evaluation of Landmass Dynamics in Relation to Vegetation Cover in Kazrianga National Park using Geospatial Technology	Suraj Dutta
Spatiotemporal Analysis of Land Use and Land Cover Changes and Urban Heat Island in Kharagpur, India during last two and half decades.	Gokul Gobind Bag
Does Temporal Context Matter? Evaluating Satellite-Derived Vegetation Phenology Using PhenoCam Observations	Avinash Kumar Ranjan
Cartographic and Geospatial Approaches for Monitoring Mangrove Ecosystem: A Case Study on the Sundarbans using Secondary Data	Sana Taskeen
Spatiotemporal Dynamics and Prediction of Land Use Land Cover Change in a Himalayan Watershed Using Land Change Modeler	Anindita Debnath
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