

**Report
on
Activities of ICWG III/IVa (Disaster Management)
17 December 2023 to 1 November 2024**

Activities

1. Submitted a proposal 2024 ISPRS Educational and Capacity Initiatives:
 - Title: Empowering Education and Capacity Building on GeoAI and Computer Vision for Natural Disasters.
 - Accomplishments: We succeed this proposal, and the project is on going as we planned.

2. Submitted a proposal ISPRS Scientific Initiatives 2025:
 - Accomplishment: Results [TBD]

3. Submitted a proposal for Geospatial Week 2025 in the UAE:
 - Focus on Geospatial AI for Disaster Risk Reduction and Visualization: GeoIME.
 - Accomplishments: We succeed this proposal, and we will plan as the schedule.

4. Joint Conference Preparation:
 - Planning 8th EOEC and 10th GiT4NDM 2025 in China [tentatively]. Tentatively, we plan for June 2025 or December 2025. [TBD]
 - Accomplishments: We submitted a proposal with the collaboration of Shaoxing University and Shaoxing Technology Park, and we will plan as the schedule.

5. Plan to submit a proposal for a session at XXV ISPRS Congress in Toronto in 2026:
 - Focus on Enabled AI for Geospatial to Enhance Disaster Risk Reduction
 - Accomplishments: Submitted to Prof. Krishna [TBD]

6. ISPRS Symposium in Changsha, China (May 13 to 17, 2024):
 - Attended, presented papers, and conducted several meetings to promote ICWG III/IVa. For example, we attended BRICS Collaboration in Remote Sensing Applications to empower collaboration and the best capacity building potential and establish a foundation to write a joint BRICS proposal in future.



7. Mid-term Symposium of ISPRS Technical Commission IV, Perth, Australia. (October 22-25, 2024)

- Attended and delivered an invited talk titled "Digital Twin Empowers Intelligent Construction: A Case Study on Digital Construction of Bridges in the Mid-term Symposium of ISPRS Technical Commission IV.



8. Prepared and conduct Geo-Information for Disaster Management (Gi4DM) International Conference in collaboration with ISPRS Technical Commission III Mid-term Symposium ON

Remote Sensing and Sociedad Latinoamericana en Percepción Remota y Sistemas de Información Espacial XXI SIMPÓSIO INTERNACIONAL SELPER 2-3 November 2024 Belém, Brazil (<https://selperbrasil.org.br/events/gi4dm/>).

9. Conducting a session and workshop at the International Conference-United Nations World Geospatial Information Week, Natural Disaster Prevention and Emergency Management Session, October 22-24, 2024 (our session is on 24th October, Afternoon), Deqing Geospatial Information Town, Zhejiang Province, China.



10. Conducted a workshop on Smart Data and Smart Cities, Athens, Greece (June 4-7, 2024)
-Attended and had a presentation at the 8th International Conference on Smart Data and Smart Cities. We were awarded one of the best papers in the conference for our paper entitled "Safety assessment of cycling routes in urban environments".



11. UN-GGIM 2024 Attendance:

- As an advisory board role at UN-GGIM Academic Network: GeoAI Ethics and Disaster Services.



12. Special Issue Launches:

- "GeoAI and Earth Observation Advances and Future Trends" in International Journal of Applied Earth Observation and Geoinformation.

- "Advanced Application of Geoinformatics and AI on Disaster Risk Management" in Sustainability.

"Advanced Geoinformatics and Remote Sensing Technologies for Early Warning and Disaster Management" in Remote Sensing

- ""Next-Generation Geospatial Technologies: Advanced Deep Learning Approaches for Disaster Risk Reduction using Geospatial Data"" in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing.

13. Open Datasets and Sources on the ISPRS WG website:

- Released various datasets and code sources on the website (<https://www2.isprs.org/commissions/comm3/icwg-3-4a/datasets/>), for example, Water Segmentation Datasets, Tensor-based Relative Radiometric Normalization (RRN) and its optimization using TRR and GA (codes and dataset), Keypoint-based Relative Radiometric Normalization (RRN) etc.

14. Educational Materials on the ISPRS WG website:

- Uploaded various workshop presentations and lectures, like Review on Education and Capacity Building Initiative, Climate Change etc. have been prepared, designed and uploaded on the website (<https://www2.isprs.org/commissions/comm3/icwg-3-4a/educational-materials/>) to support our project indicated in item 1.

15. Developing course

- Advanced Research & Applications in Geospatial Artificial Intelligence

Course outline

Class/Date/Time	Topic	Assignment/Test/Due date
C1/23 Nov 8:10-11:50	Course overview and introduction-Overview of Earth observation and linkage to GIS and what's about today?	Group sign-up and students' introduction
C2/23 Nov 14:00-17:00	Where we stand, GeoAI applications for disasters management	No Assignment
C3/24 Nov 8:30-12:00	Cartographic principles and how to make good maps/AI for good - Geospatial capacity development	No Assignment
C4/25 Nov 8:30-12:00	<u>How to write scientific research papers</u>	
C5/25 Nov 14:00-17:00	Fundamental of LiDAR and applications- Remote sensing images and point clouds processing techniques: Support Vector Machine (SVM)	No Assignment
C6/26 Nov 8:30-12:00	Remote sensing computer vision and GeoAI: satellite images for dynamic maps in agricultural mapping	No Assignment
C7/27 Nov 8:30-12:00	Applications and examples of the use of images and GIS for generating dynamic maps in a specific application, research for a specific purpose and project and writing an article	No Assignment
C8/29 Nov 8:30-12:00	Imagery in action, GeoApps and story maps, big data and data structure, data acquisition including open data and scripting in Python etc. using API open sources extracted from Google, Open ArcGIS, GitHub and ML Hub-Radiant etc.	No Assignment

16. Conducted local seminars and workshops

- Delivered workshops on disasters and various cross-disciplinary seminars related to disasters and posted on the website (<https://www2.isprs.org/commissions/comm3/icwg-3-4a/news/>). For example, seminar at University of Texas at San Antonio, China University of Petroleum, Qingdao, Shandong University, Qingdao, Nanjing Normal University, Shaoxing University.

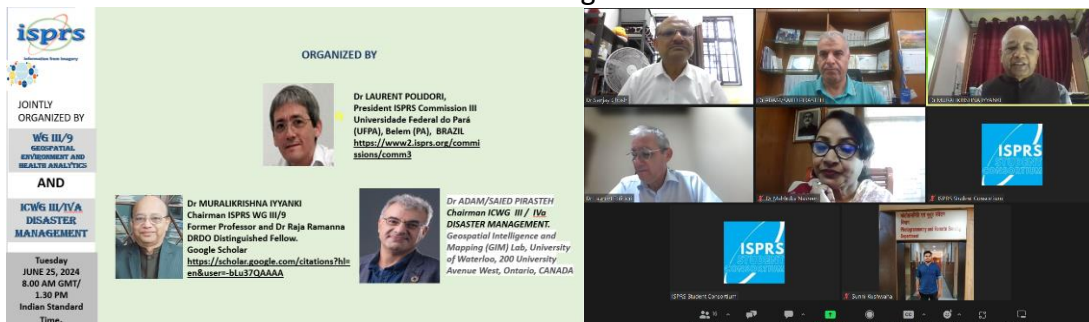


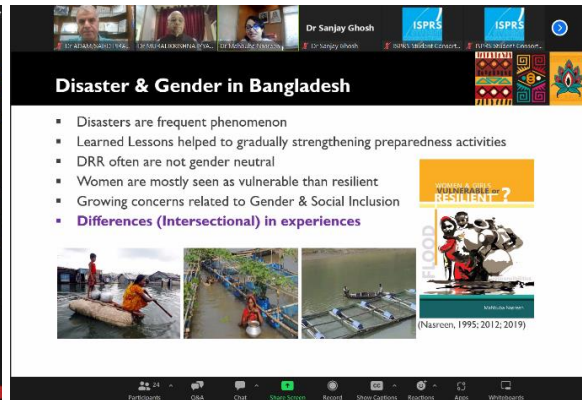
- Conducted a workshop to boost collaboration and enhance disaster management research, Nanjing Normal University, China, 7-8 September 2024.



- Conducted a workshop to boost collaboration with industry and technological park, Shaoxing, China, 18 October 2024.

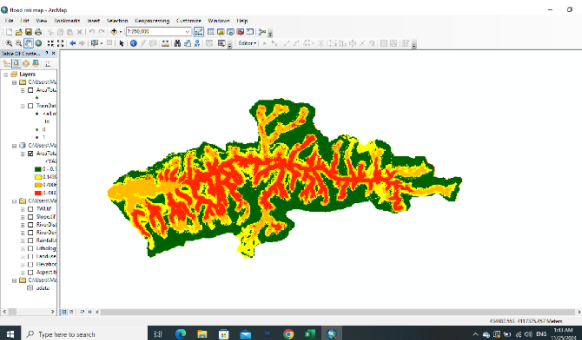
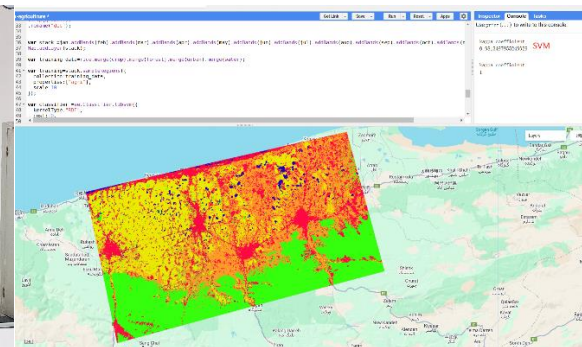
- Jointly organized Webinar: ISPRS Working Group III/9 AND ICWG III/IVa, 25 June 2024: Environmental & health concerns & disaster management.





- Conducted a workshop on Advanced Research & Applications in Geospatial Artificial Intelligence at Chengdu University of Technology, China from 21-29 November 2024.

- Accomplishments: Delivered hands-on workshops on a. GeoIME, b. Landcover classification using machine learning algorithms in Google Earth Engine, and c. Modeling Flood Risk with Machine Learning Algorithms and Python in GIS.



17. New Members

Volunteer Recruitment:

- Welcomed two volunteers from China, Germany and Pakistan.

Challenges:

1. Data Collection and Integration:

- Challenge in standardization, resolution, and temporal alignment across diverse data sources.

2. Real-time Monitoring:

- Hindered by funding and infrastructure limitations for accurate data in some regions.

3. Automated Image Analysis:

- Ongoing challenge for complex disaster scenarios and diverse environments.

4. Crowdsourced Data and Social Media:

- Focus on data sharing; challenges in leveraging crowdsourced data for disaster management.

5. Big Data Challenges:

- Difficulty in handling large volumes of remote sensing data during disasters due to lack of relevant datasets.

6. Financial:

- We have faced challenges to secure financially those talented young people who are supporting our working group behind the scenes. For example, students.

7. Arranging national and international workshops and conferences:

- Many events are conducted by ISPRS and its collaborative institutes, but selecting a date for our WG events remains a significant challenge. The availability of co-organizers, hosts, and participants is a key issue that requires flexibility from ISPRS leadership to facilitate collaboration. For example, we are planning an international event at Qatar University, which will host and financially support it. However, they have their own regulations and schedules that need to be considered. We seek your advice on how to manage this issue effectively.

New Developments:

1. Machine Learning and AI:

- Applied for socio-economic and ecological studies in Iran and Qatar.

2. UAV and Drone Technology:

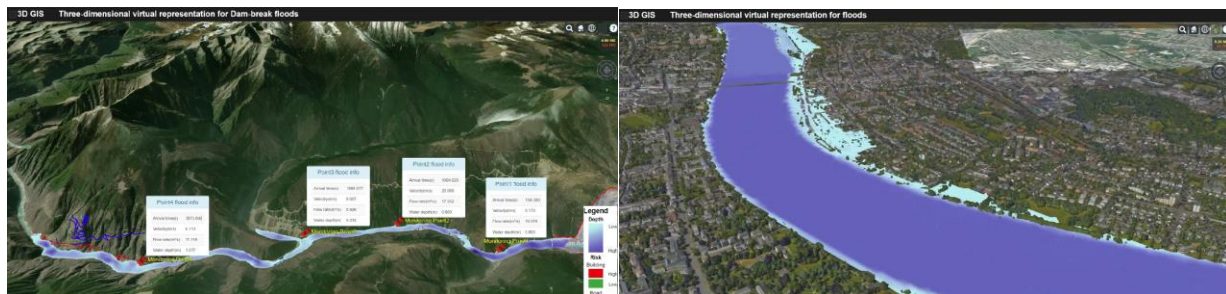
- Implemented for virtual 3D representation of disasters like floods in Germany and China.

3. Integration with GIS and GeoIME:

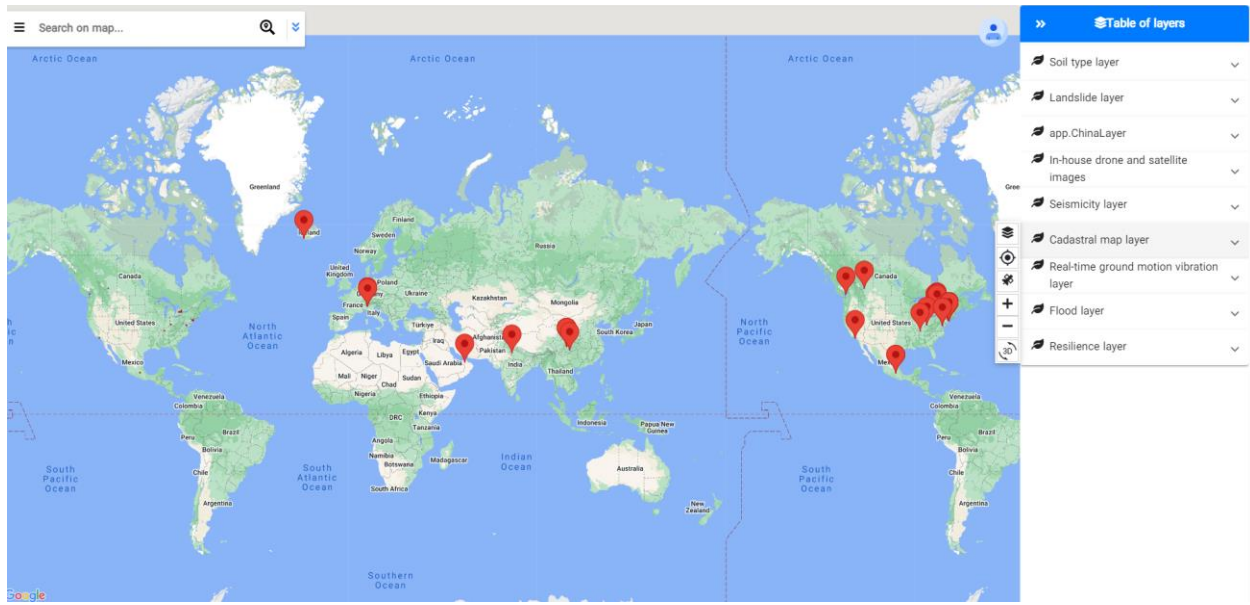
- Platform used for vulnerability assessment and risk estimation for earthquakes.

4. Emphasis on Resilience:

- Updating GeoIME Platform used for resilient environment development.



virtual 3D representation



GeolME Platform