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## THE USE OF REMOTE SENSING IMAGES IN FLOOD MONITORING

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## **Abstract**:

Disaster management and the creation of hazard maps are activities that come to minimize the damage caused by disasters through processes to prevent the destruction and degradation of the environment. Floods represent one of the most dangerous disasters and are frequently encountered in different areas of the Earth's surface. The causes of these phenomena can be natural or the result of inappropriate exploitation of human activities. Among the most frequent causes of flooding are heavy rains, storms or melting snow. The present research evaluated remote sensing methods and techniques combined with the science of geographic information systems in the analysis of floods in the Western area of Romania, as well as in the estimation of the areas affected by these floods. The studied area is located near the town of Lugoj in Timis county - Romania. Radar images (SAR) taken from the Sentinel-1A remote sensing system were used to analyze and create maps of the flooded areas. The images are not influenced by weather conditions and can be taken both during the day and at night, which provides a good source of high-resolution datasets. In conclusion, this study can provide answers to the reason for the expansion of floods in the studied area and to a more rigorous planning in order to reduce and manage risks in periods of high flood risk. **Key words:** GIS, images, remote sensing, SAR, Sentinel 1A

### Introduction

In recent years, flood disasters have occurred frequently around the world, causing great damage. Satellite remote sensing technology is widely used in flood monitoring, because it can effectively and accurately observe the occurrence of flood events, facilitate rapid response to floods, and reduce unnecessary damage.

Compared with the traditional flow measurement methods for flood monitoring, remote sensing technology can quickly access a wide range of land surface spatial information in realtime for effective disaster prediction. Water information extraction is one of the most important uses of remote sensing for fast and accurate flood hazard assessment because satellites provide vast instantaneous coverage and periodic repeatability. Multiple water information extraction methods have been developed, including the thematic classification, single-band threshold, inter-spectrum relation, and water index methods.

#### Material and method

For this project the main tool that was used to create and process the data is SNAP. The Sentinel Application Platform (SNAP) is a common architecture for all Sentinel Toolboxes. The software is developed by Brockmann Consult, Skywatch, Sensar and C-S.

## Results and discussions





The Study Area considered was around the Bega River flow, near Balint, Bethausen, Manastiur and Dumbrava Localities, Timis County, Romania.





#### Conclusions

In conclusion, the collaboration between SNAP, SENTINEL-1, and ArcGIS Pro proved invaluable in assessing the impact of the flood near Balint, Romania, and informing both immediate response efforts and long-term resilience planning initiatives. By leveraging the capabilities of these technologies, we can enhance our ability to mitigate the impacts of future flood events and build more resilient communities.