

## ABSTRACT

The MultiGIS4Rivers project represents a groundbreaking endeavor that merges multidimensional and multiscale data with artificial intelligence tools and geospatial analysis to revolutionize water resource management methodologies. Its effectiveness will be evaluated across diverse water ecosystems worldwide, including regions in Brazil, Poland-Czech Republic, and Spain, each facing diverse challenges like floods, fragmentation, pollution, and land abandonment.

This initiative harnesses recent advancements in remote sensing, artificial intelligence, data science, and environmental modelling to develop a comprehensive, predictive, and adaptable platform for water resource management. The project employs deep learning models for data acquisition, in situ monitoring systems for detailed scale information gathering, and AI-based geostatistical analysis for decision-making support.

By integrating state-of-the-art computing techniques tailored for processing spatiotemporal data, machine learning, and deep learning algorithms, MultiGIS4Rivers aims to uncover the main drivers behind the deterioration of freshwater ecosystems. The project's innovative approach and methodologies can be replicated in other regions worldwide facing similar challenges, extending its applicability beyond water resource management to various areas of interest. The platform to be developed will serve as a versatile tool for managing datasets, executing modelling methods, and exploring both raw data and predictive model results.