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Geospatial Digital Twins for Climate-Resilient River Basin Governance: Connecting Science, Planning and Decision-Making

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Abstract

Climate change is increasing the complexity of river basin management, requiring public authorities to address flood risk, drought, water availability and competing demands through integrated planning. Geospatial digital twins can support this transition by connecting territorial information, monitoring networks and analytical tools within a shared framework for decision-making.

Drawing on the experience of the Central Apennine River Basin District Authority in Italy, which covers about 42,000 km² across seven regions and more than 900 municipalities, this keynote will show how a geospatial digital twin can support the transition from fragmented information to coordinated basin-scale governance. Particular attention will be given to the integration of geospatial data and environmental observations, the relationship between hazard mapping and spatial planning, and the use of digital tools for water resource management and the prioritisation of interventions.

The presentation will also discuss the contribution of artificial intelligence and the requirements it brings in terms of data quality, interoperability and institutional coordination. Finally, it will consider which elements of this experience can be transferred to basin agencies working in different institutional and climatic contexts, and what is needed to turn digital tools into more informed and transparent public decisions.