

Large-scale delineation of flood prone areas and risk estimation: Results from the RESCUE_SAT project

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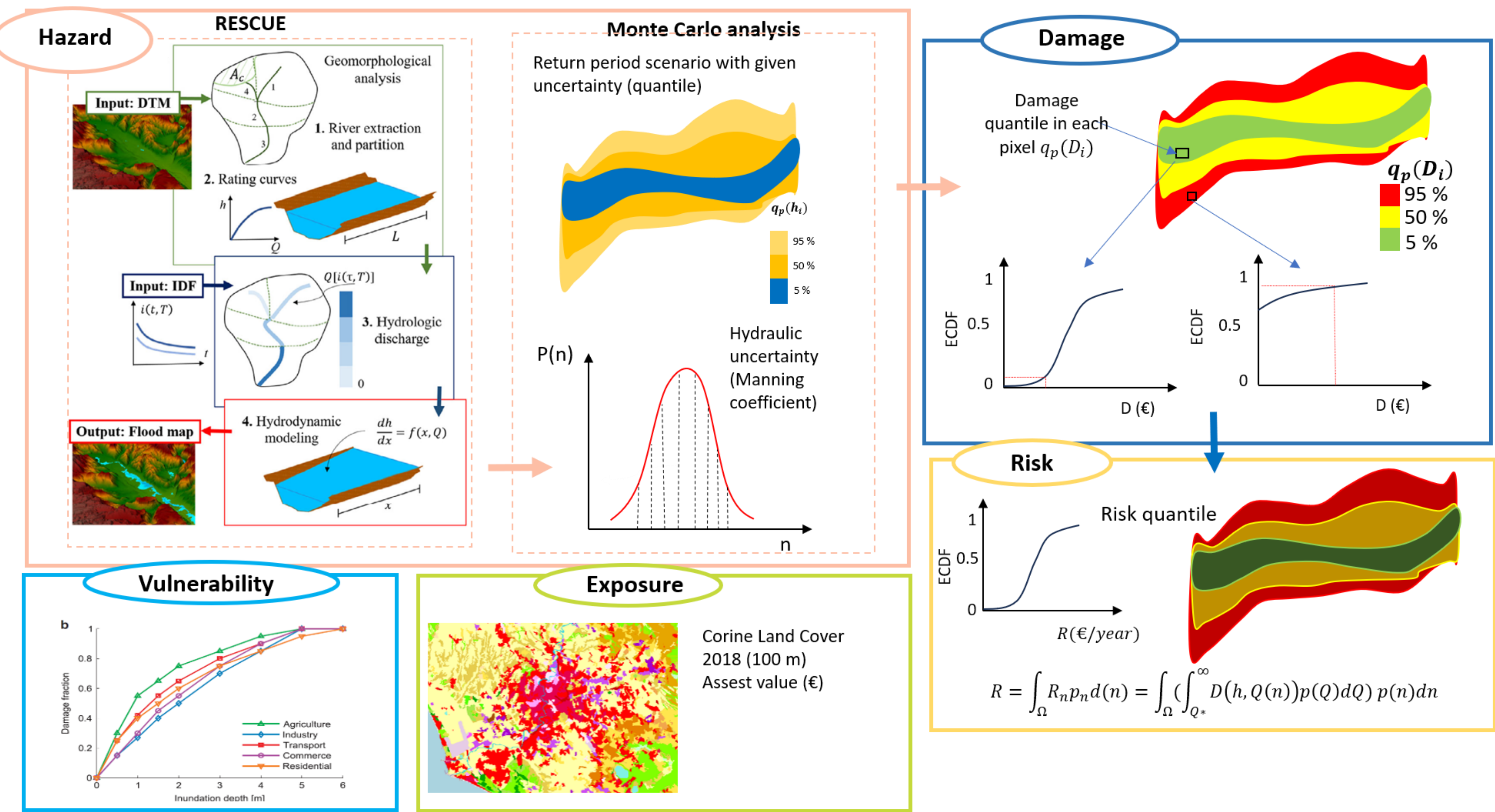
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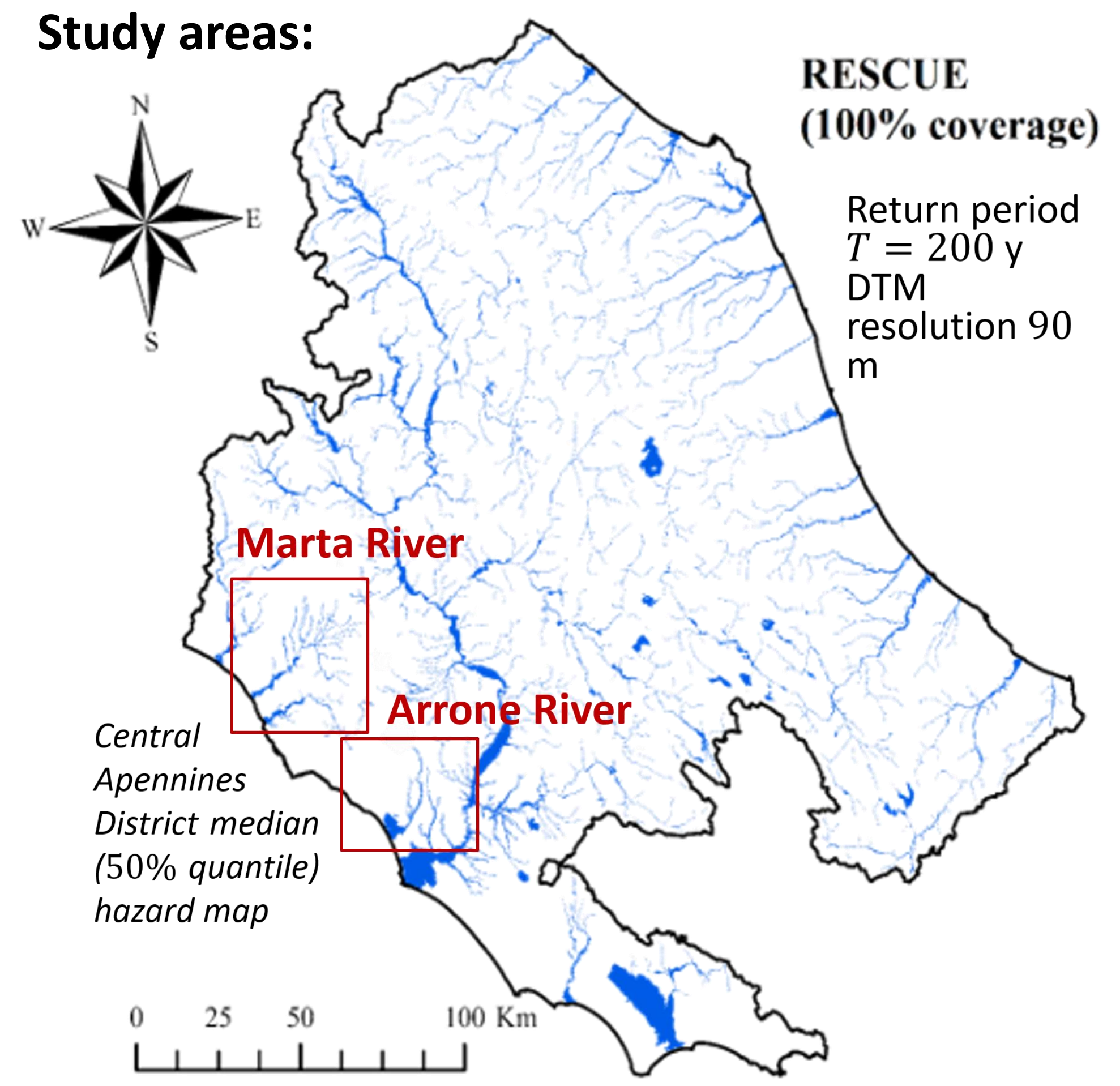
Introduction

Flood risk assessment at large scales remain challenging, despite recent advances in hydrology and hydrodynamic modeling that have improved the representation of flood hazards – from empirical methods to sophisticated hydrodynamic simulations. Yet, flood hazard estimates still carry substantial uncertainty. In this context, simple and computationally efficient large-scale models are essential for hazard and risk mapping, to perform comparative analyses and prioritize interventions.

RESCUE: laRgE Scale inUndation model



- Integrating satellite data and physically-based hydrological-hydraulic modelling
- Improving the performance of the RESCUE flood model by integrating variable resolution DEMs derived from high-resolution satellite imagery
- Enabling more accurate flood estimation at the intersections of watercourses with typical structures and infrastructure (bridges, levees, etc.)
- Offering a detailed land use classification
- Effectively supporting risk management efforts

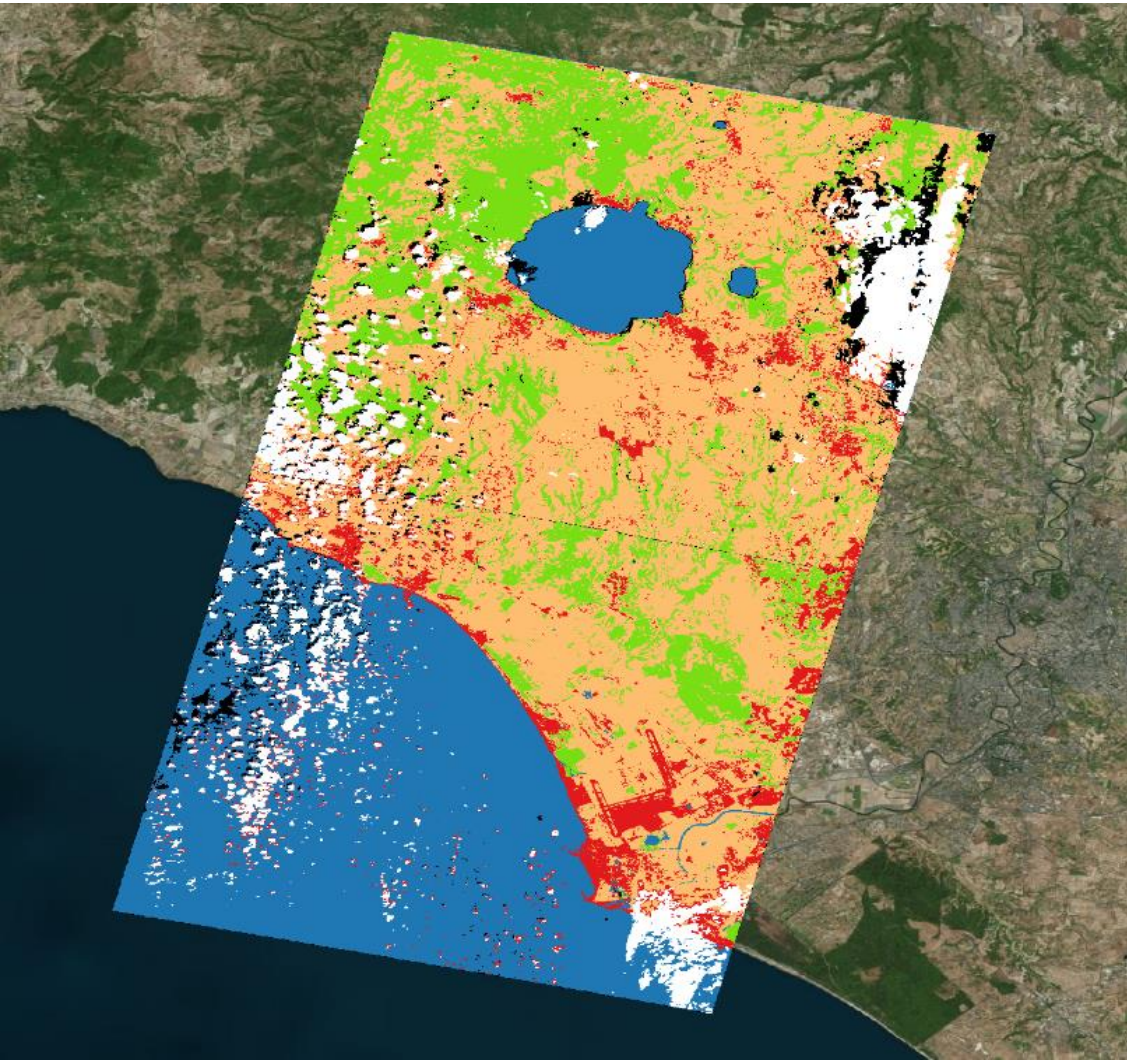


RESCUE_SAT: laRgE Scale inUndation model integrating SATellite EO

EO Satellite data

RESCUE_SAT implements multi-source EO satellite data:

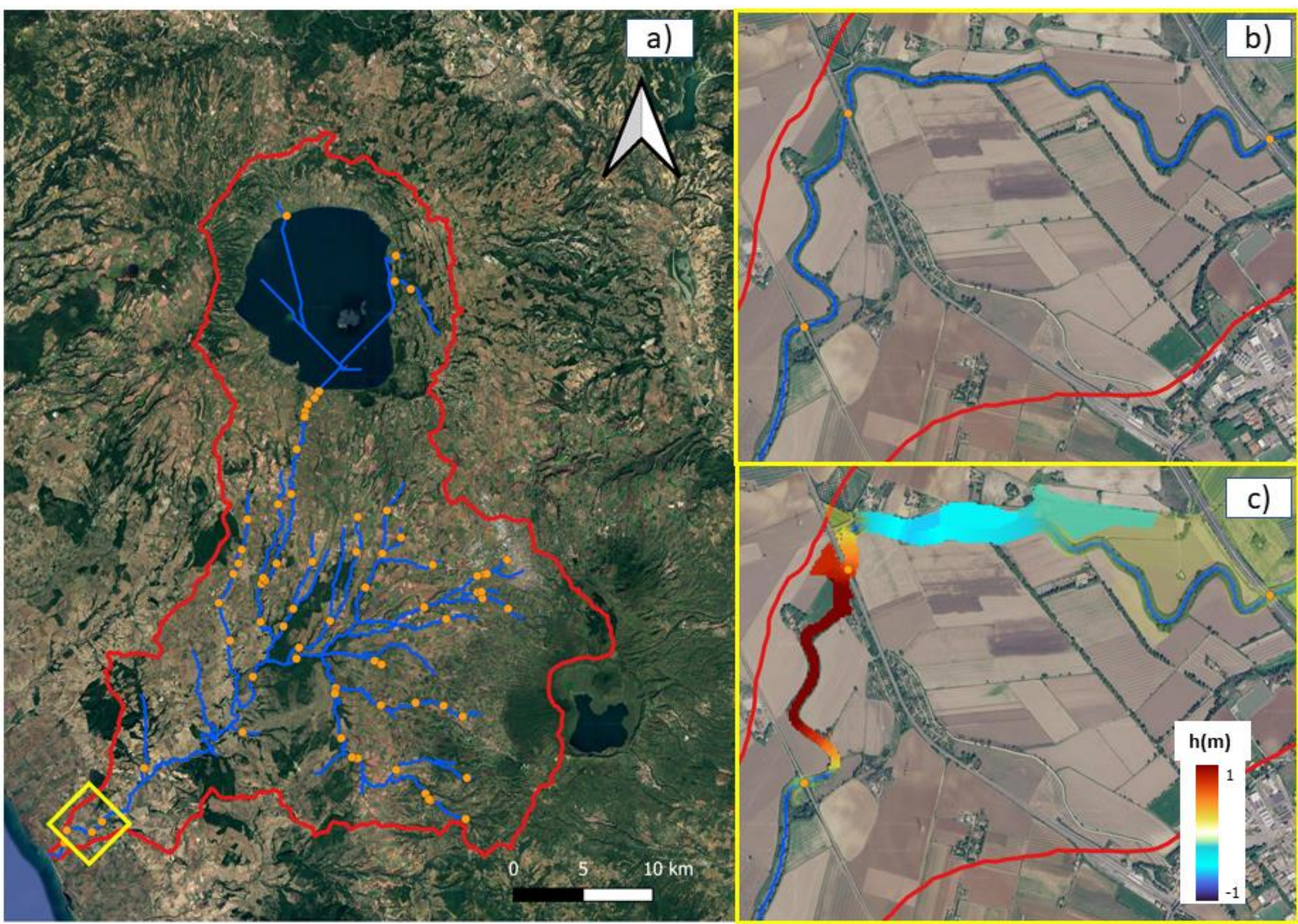
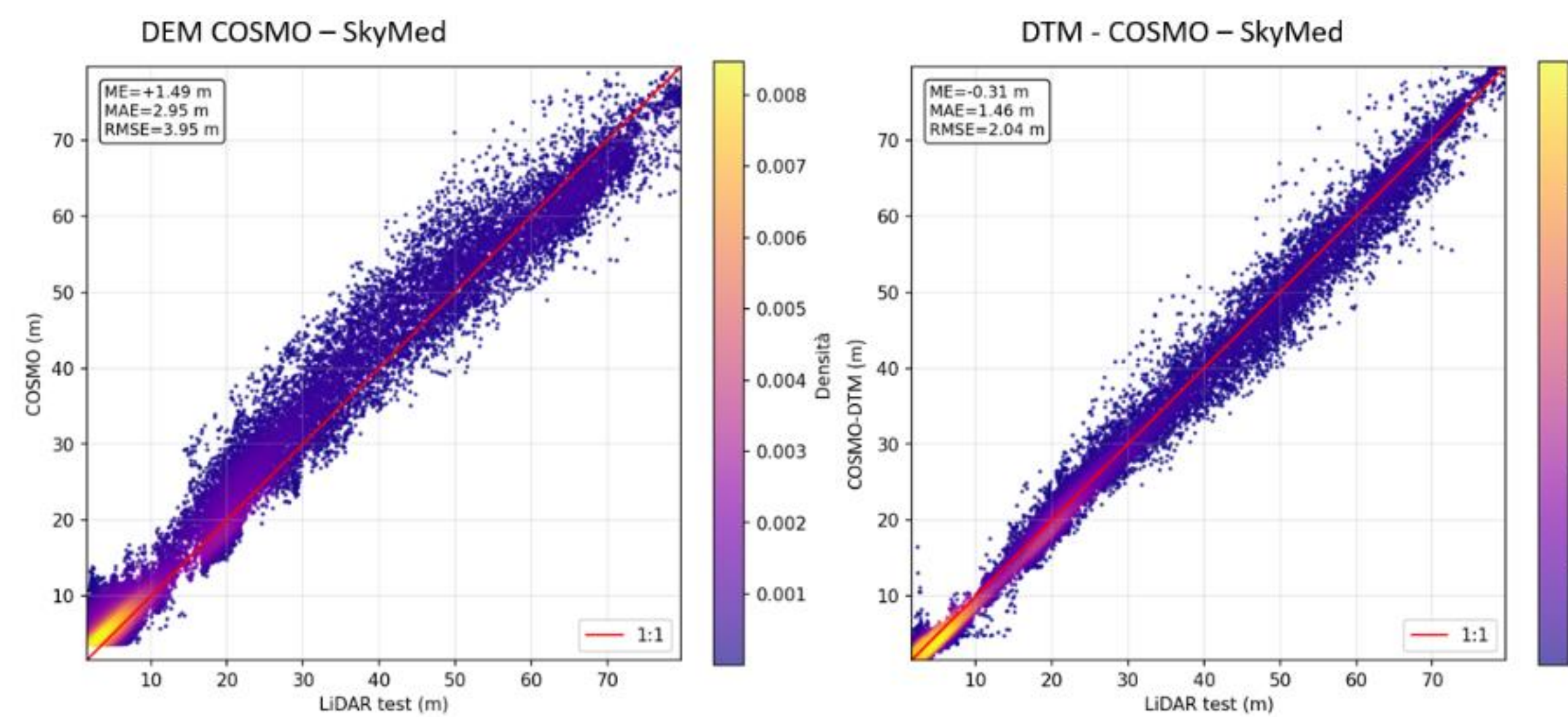
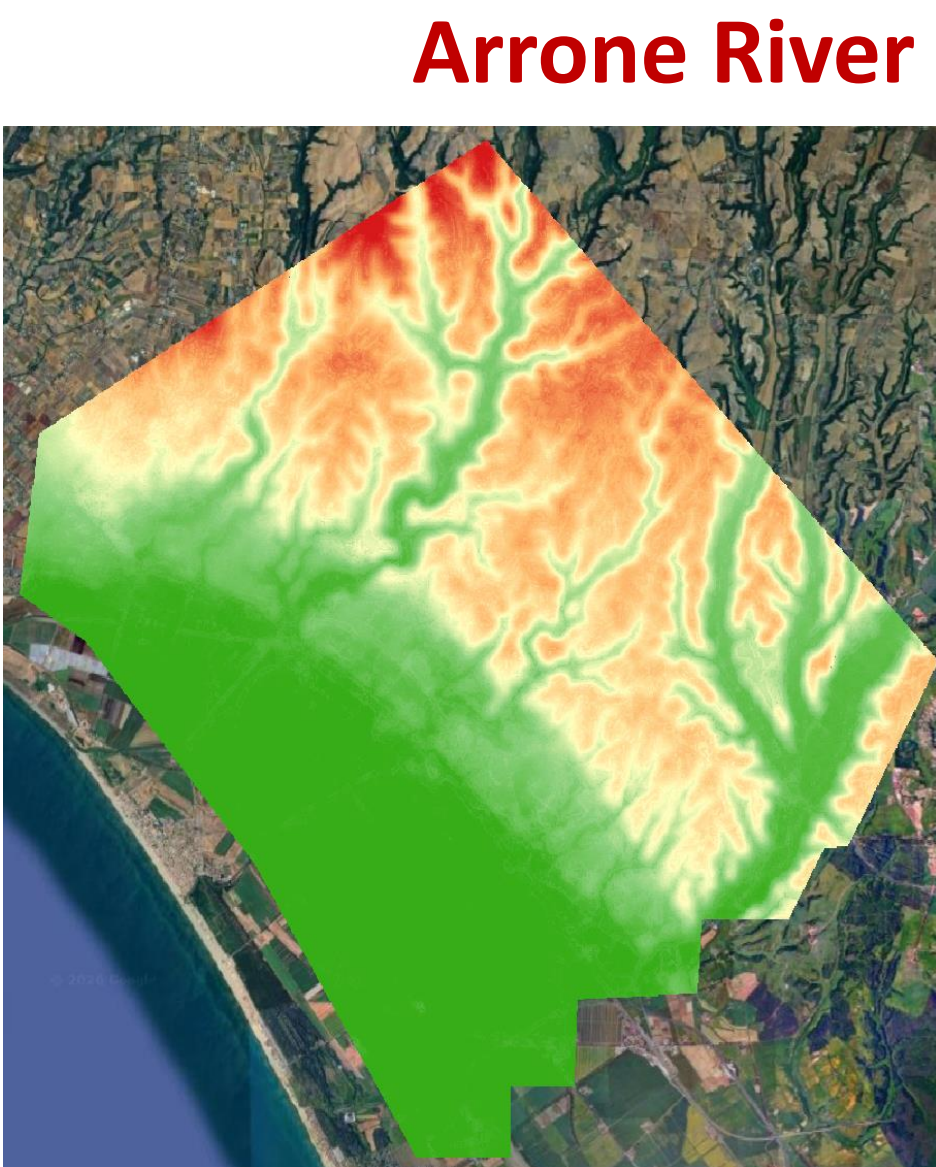
- **COSMO-SkyMed** (1st and 2nd generation): High-resolution SAR imagery from 3 m (Stripmap mode) to 1 m (Spotlight mode)
- **PRISMA (ASI)**: Hyperspectral products (VNIR and SWIR) with 30 m spatial resolution; panchromatic band with 5 m resolution



2. Land Cover analysis using PRISMA hyperspectral data based on classification techniques
3. Detailed spatial analysis of river crossings with existing structures and infrastructure networks

Methodology

1. DEM Generation from high-resolution interferometric SAR image pairs (Synthetic Aperture Radar Interferometry)
 - Supervised ML to obtain the DTM COSMO-SkyMed
 - Fusion & Blending with HR-DTM Lidar-Tinitaly at 10 resolution
 - Hydrologic Conditioning DTM



4. WebGIS platform (with mobile interface) design and development for data management, visualization, and dissemination.
5. Engagement of relevant stakeholders and definition of case studies of interest (e.g., River Basin Authorities, Municipalities, Regional Administrations).

