

# Role of flow regime characteristics on biogeomorphic patterns in the Po River

Riparian vegetation and fluvial landforms are strongly interconnected by feedback mechanisms between plants, flow and sediment transport. Plants can promote the creation of fluvial landforms such as bars by modifying the flow structure and mediating the rate of sediment transport. In turn, plant growth and mortality depend upon the flow discharge, groundwater depth, and microclimate conditions. This study focuses on the evolution of riparian vegetation in the Italian Po River, between Boretto and Borgoforte (Fig 1). Previous works highlighted the interannual variability of the riparian vegetation linked to the hydrological characteristics, but a quantitative investigation of floodplain evolution trajectories in the context of global warming is still missing.

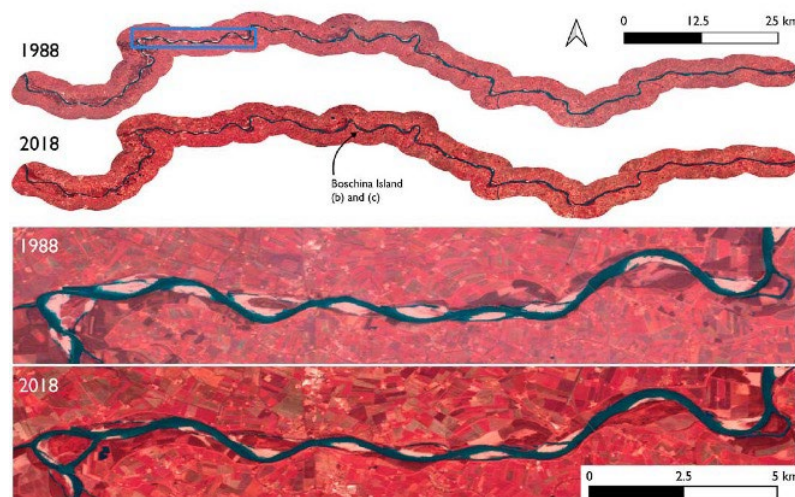


Fig. 1: Po River (from Boothroyd et al., 2021)

The goal of this work is to reproduce the riparian vegetation dynamics in the Po River by applying a modelling framework based on the software BASEMENT. The student will (i) setup and apply a hydrodynamic model of the study site, (ii) use a state-of-the-art vegetation model integrated in BASEMENT to simulate vegetation dynamics, and (iii) compare model results with existing dataset (i.e. aerial images and flow records). This project requires an affinity for numerical simulations and data analysis. General scripting skills are helpful.

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**Remarks:** Research-oriented thesis; Prior attendance of River Morphodynamic Modelling course is preferred