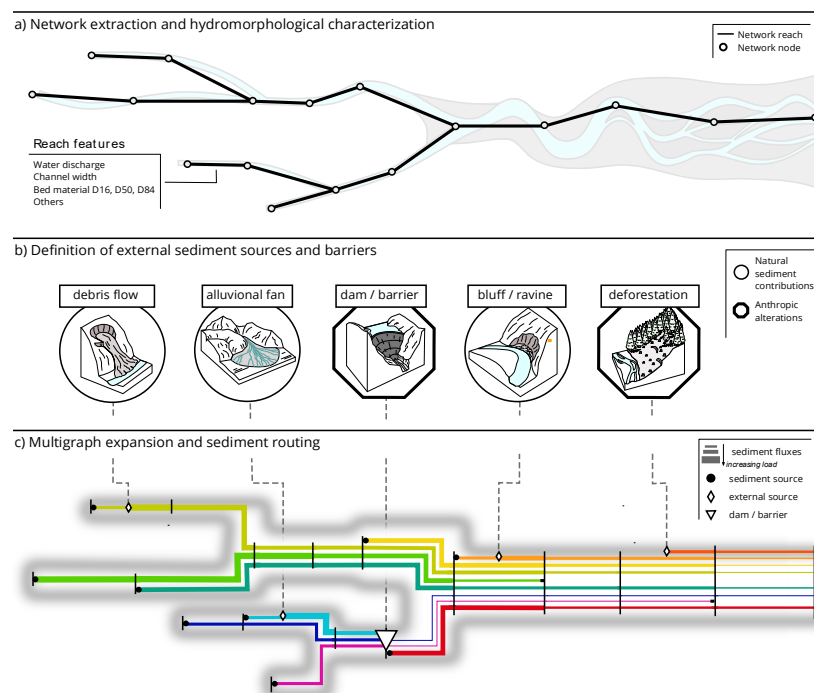


Increasing reliability of simulations of sediment connectivity and transport in river networks

(Proposer: Prof. Simone Bizzi)

Thanks to the availability of remotely sensed data and smart sensors of new generation, it is nowadays possible to characterize the transport capacity in river networks on a basin scale. However, great uncertainty remains in the quantification of the sediment production available to be transported in river networks. That undermines our current ability to realistically predict sediment transport and connectivity in river networks and then interpret coherently observable channel adjustments and patterns. These limits eventually lead to diminish our capacity to design effective sediment management plans under foreseeable scenarios of climate change and anthropic pressures.



This project aims to apply 'sensitivity analysis' techniques to existing network scale sediment transport models (such as CASCADE) to identify the most 'sensitive' parameters in the model simulations. Based on such modelling evidences the project aims to provide novel methods for their robust estimation through field and remotely sensed data analysis in order to improve the reliability of the simulations produced.

The network scale transport models and associated uncertainty estimates will be validated through field data collection in selected case studies (which will include the Po River basin in Italy) concerning for instance: grain size estimates of surface sediments, estimates of sediment inputs from slopes and tributaries, sediment transport estimates from DoD analysis, monitoring of sediment path lengths through tracers (e.g. RFID).

The Phd will spend a period in the Italian Water authority responsible for planning sediment management plan of the River Po with the aiming of sharing the case study results and exploiting their expertise and knowledge of the Po river basin.

The Phd will also spend a period abroad at the University of Bristol, Department of Civil Engineering Water and Environmental Engineering, Cabot Institute for the Environment, with Dr Francesca Pianosi to gain expertise on the use of the open-source SAFE Toolbox for sensitivity analysis.