Mapping river corridors at the network scale for integrating natural infrastructures into rural/urban spatial planning

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The “green infrastructure” metaphor have put a new emphasis on river spatial planning as a mean to protect fluvial corridors on the long term (Kline and Cahoon, 2010) as they provide ecosystem benefits such as flood expansion zones or better functioning ecological networks. In order to provide support data for strategic planning at the regional or national scales, we have developed automated mapping tools of fluvial corridors and floodplains based on high-resolution DEM and landcover datasets. Our goal is to characterize the continuity of fluvial corridors in the longitudinal and lateral dimensions and produce indicators on their integrity.

Following the work done by Alber and Piégay (2011) and Roux et al. (2015), we produced high-resolution detrended DEM (height maps) that support the delineation of valley bottoms, can be used for 0D flood risk mapping or to identify potential wetlands. Based on the hypothesis that fluvial processes imprint the modern landscape, even in the presence of human-driven disturbance, we have also developed a novel landcover continuity analysis method. These continuity maps provide insights on the spatial scale of river processes and the amount of space, if not natural, that is still well connected to the river and is eventually available for floodplain restoration. Finally, we explored the possibility to disseminate our results through a web platform to share the database across scales for promoting participative approaches and land use planning.

At the intersection between fluvial risks mitigation, water resource preservation, and biodiversity and landscape conservation, this strategy is rooted in the concept of “freedom of space” and unifies the concepts of greenways, waterways and floodways in a common approach to making room for the river and working with natural processes, integrating the concept of natural infrastructures that has been proposed in the 1990s (Mermet, 1993). This holistic view insists on river corridors and floodplains as multifunctional spaces. It is expected that this spatial knowledge will in turn raise awareness and encourage local authorities to better protect river corridors as green infrastructures through land planning.

Further perspectives include studying how the intended recipients of our approach, such as local authorities or river practitioners, appropriate the produced maps and information, and to what extent they contribute to an effective protection of river corridors. This understanding should prove useful to integrate such data into regional observatories and communicate a more integrative view of the river.