LiDAR and field surveys for channel morphology analysis

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The study focuses on the variation of headwater channel geometry under bankfull conditions, and the most likely link among morpho-geometric variables in the upper Cordevole basin (Eastern Italian Alps) for different types of channel morphologies. The basin is characterized by a developed ephemeral colluvial network and by a main alluvial channel dominated by rapids and step pool morphologies.

The research considered the relationships between morphological parameters such as channel width at bankfull stage (B) and local slope (S) and some variables as contributing drainage area (A) and stream power (Ω, where A is considered as a surrogate of the discharge), both for the whole hydrographic network, both for the main recognized channel bed morphologies (step pools, rapids, plane beds).

Several field surveys were carried out along the alluvial channel and in small tributaries, with the aim to quantify geometric (B) and morphometric (S) parameters. The hydrological variables (A, Ω) were computed on an high resolution LiDAR derived DTM (1 x 1 m grid size).

Starting from the DTM, the relationships between morphological and hydrological variables have been investigated and then applied to the whole network in a GIS environment.

The geomorphic network analysis, obtained by the combination between detailed field surveys and an high resolution topographic representation of landscape, can be considered as an useful tool for the knowledge of morphodynamic relationships in a moun-

tain basin.