



Bedrock channel reaches morphology: examples from the Northern Marche Region (Italy)

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The Northern Marche rivers, on account of a significant variability of their catchment geology, geodynamics and geomorphology, can be regarded as excellent natural laboratories for the study of the morphology, dynamics and evolution of bedrock channel reaches. Hence a geomorphologic study has been carried on in order to map and describe -from qualitative and quantitative point of view- some bedrock channel types of this area, to detect morphological controls at different scales (from the local scale up to the catchment one), and to assess human perturbations on the drainage systems. The study is based on detailed field surveying concerning channel shape and dynamics, floodplain configurations, slope geomorphologic processes, bedrock structure and composition. In addition, a good aero photograph documentation dating back to the 1955 allowed a reliable reconstruction of the main evolution trends of bedrock channel reaches in the latest past.

In the reported rivers the bedrock channel reaches vary in length from a few tens to hundreds of meters, and alternate with alluvial and mixed bedrock-alluvial channel reaches. In many cases specific numerical relations among geometric parameters of bedrock channels have been discovered and some similarities in both morphology and dynamics of rock-cut channels with alluvial channel reaches have been pointed out. Specifically, with regard of their morphologic arrangement, geometric parameters, and flow dynamics several bedrock channels are quite similar to step pool channels found along gravelly channel reaches. Nonetheless, along a given segment of the hydrographical network where an individual alluvial-channel pattern (e.g. a wandering) is found both upstream and downstream a rock-cut channel reach, the occurrence of this latter (e.g. planar bedrock-floored channel) simply breaks the along-stream continuity of the alluvial-bed morphology.