



## **Geomorphologic analysis of river reaches and segments within the *Mutino* catchment (Northern Marche Apennines, central Italy)**

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This work focuses on the relations existing at different scales among river channel morphology, channel instability and bedrock incision in a headwater catchment. To this end a detailed geomorphologic analysis of the *Mutino* catchment, within the headwater portion of the *Foglia* river basin in the Northern Marche Apennines, has been carried on along both the river bed and the floodplain. During the survey, in order to describe the channel types and the bed configuration at different scales (river reach and segment, bed length/width ratio respectively 10-15 and 80-100), a specific form has been adopted. The compiled forms took into account both qualitative and quantitative physics variables concerning: river bed (i.e. bedform, granulometry, geometry, bank composition, etc.), floodplain (land use, vegetation types, etc.), slopes dynamics, and bedrock composition. The detailed geomorphologic field analysis, coupled with the aerial photos interpretation, allowed to distinguish and describe six different bedforms: step-pool, plane-bed, pool-riffle, wandering, bedrock and mixed. In order to store and manage the geomorphologic dataset, a GIS based database has been implemented and a high-resolution DTM has been built up starting from detailed digital topographic maps. The use of the GIS allowed to recognize some important relations among channel types, bed granulometry, banks morphologies and materials. The relations among vegetation types and bed configuration have been recognized and described as well. The main results of this work evidence that the characteristics of the different bed configurations, as well as the relations existing among bed-banks-floodplain dynamics at different scales, only in part reflect those provided by previous Authors for similar catchments. In conclusion, the proposed research remarks new

constrains concerning the geomorphologic impacts on the hydrology at the reach and segment scale, as well as the influence of bed configuration (e.g. step-pool-riffle sequence) on the bankfull geometry.