



Classification of fluvial morphologies and instabilities in an experimental river basin

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Rivers assume a different morphology as a function of the evolution processes that took place in the past and, through those processes, they search for the slope allowing for the downstream transport of all the solid material coming from upstream. Indeed, systematic changes in terms of water-stream depth, bed slope and sediment size occur during the natural phases of erosion-deposition. That affects the capability of the flow to convey sediment in the downstream sections. Moreover, one must account for anthropic interventions causing upstream and downstream propagation of the instability. Then, the rivers morphological characterization allows for classifying the different branches and for predicting their evolutions as a response to the natural or anthropic inputs. In the last 50 years, the patterns produced by stream waters in the water basins have attracted the attention of geomorphologists, hydrologists, physicists and mathematicians, that have conceived several and sometimes contrasting rationalizations of river networks evolving dynamics.

In this context, the research activity regarding to the experimental basin of the Basento river (Southern Italy) consists in the characterization of some pilot river branches through the integrated application of remote sensing (aerial surveys, ortho-photo maps) and continuous in situ measurements (stream water measurements, solid transport measurements, granulometric measurements) and the application of hydrodynamic models (1D and 2D) in order to evaluate the effects produced by the transit of one or more floods on the river hydro-morphological features.

The aim of the work is to define a classification of fluvial morphologies and instabilities and, subsequently, to make ready suitable guidelines for the intervention criteria of fluvial engineering. On such purpose, it is fundamental to classify in details the morphologies as function of the natural phenomena taking place along the bed and

the slopes, to identify the criteria for the evaluation of the peri-fluvial areas particularly exposed to flood risk, to define the guidelines for interventions of the fluvial settlement, differentiated as a function of the morphologies indicated in the delineated classification, and to validate measurement equipments and methods at the different scales of observation.