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River bed morphology evolution following a streamside landslide

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River bed morphology and hydraulic transport processes can suffer modifications at different time and spatial scale because of landslides interaction with river networks during hydrological events, increasing the hydraulic risk for anthropic works and infrastructures. In this work, the Authors describe the investigations carried out on a single thread alluvial reach in the middle valley of the Noce River in Basilicata (Italy), characterized by a narrow and confined bed, which was interested by a progressive morfo-hydrodynamic change caused by a landslide mobilized from the right side slope of the basin in July 2007. Different river morphological scenarios were observed in the first year following the landslide. After a partial and then total blockage of the water course (respectively July 2007 and November 2007), with the formation of a little backwater lake upstream, the following floods avoided the landslide bottom, producing an avulsion with incision of a bend on the left floodplain, thus promoting a process of emptying of the backwater. The new river morphological configuration triggered an alteration of the sediments budget with a progressive erosion of floodplain, bringing to light cyclopean boulders next to the outside bank of the bend. Landslide interference induced some morpho-hydrodinamic changes also in the upstream reach, because of sediments deposition, with the formation of an alternate bars sequence. Instead, in downstream reaches clayey and cohesive material flowed from the hillslope. This material, erodible in a very long time and transportable mainly in suspension, together with the modesty of rainfall following the landslide event, didn't produce significant morphological variations. River bed dynamics and morphological alterations were observed and measured by field observations and topographic surveys and were referred to particular rainfall events occurred during the monitoring period. Information deriving from topographic data was compared with predictions of mathematical models and software simulations of river bed altimetric evolution in different morphologic scenarios.
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