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A geomorphometric approach for the recognition of fluvial banks in Southern Sardinia (Italy).

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The identification and mapping of fluvial banks is very important for land management, both in terms of protection and risk prevention. In particular, the study presented in this paper addresses the need of the Italian legislation to protect the watercourses as reported in the Article 142, paragraph 1, letter c of the Legislative Decree 42/2004, named Code of Cultural Heritage and Landscape. It incorporates the legislation on protection based on the European Landscape Convention and it specifies that "rivers, streams and water courses,... and their banks or base foundation for a swath of 150 meters each" are subject to protection. Moreover, the impact of flooding on bank erosion can result in damage to the infrastructures but urban planning does not always consider flood plains as areas of maximum protection where building has to be inhibited or restricted. For this reason the study here presented has been proposed in the framework of the Flood Risk Management Plan of Sardinia (Italy) with the aim to contribute to the hydraulic modelling for the identification of floodable areas. The study is based on the use of a DTM from LIDAR data and on the integration in a GIS environment of the data from geological and geomorphological surveys. The morphometric parameters used are those classified as local. They are based on individual pixel values and allow to study the geometrical characteristics of the surfaces and, in particular, the steepness and curvature. The integration of morphologic data with the geological characterization provides information on the interactions between lithological nature, particle size and morphology of the river bed, and therefore its peculiarities in different geological contexts, and water flows, i.e. with climatic phenomena related to precipitation (hydraulic closely approach)
The results obtained with this methodology allow to define the areas where the river exerts its current share of deposition of sediments and erosion along the banks and in the river bed. The landscape value of the watercourse is therefore safeguarded as a whole as it should be and how the Italian legislation requires.