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Regional scale identification of erosion- and deposition-prone reaches

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Floods result from a limited carrying capacity of the stream channel as compared to the discharge peak value. Often, it is noticed that the transit of a flood wave - through sediment erosion and deposition - can locally increase the hazard level by reducing the cross section area. A mathematical model able to identify reaches where river processes are more active is here formalized: the attention is focused on sediment erosion and deposition processes. The model works at the regional scale, i.e. an area with similar morphological and structural characteristics, identifying river segments with tendency to deposition, stability or erosion. The model has been tested with reference to the drainage network of the Valle d'Aosta region, Italy. Validation is provided both at regional and local scales of analysis. In particular, local validation is performed by using an additional model, able to forecast altimetric variations of river bottom during a flood event. Ante and post-event surveys were available for comparison. The overall results are strongly encouraging. The identification of reaches in which the deposition process prevails is a first step for the development of further investigation, at the channel scale, to confirm or reject regional scale results. From this viewpoint, the model is a useful tool to concentrate economic resources in areas prone to the flooding risk.