



Denudation rate estimation in Central Italy: space-time variability at catchment and hillslope scales

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Long lasting researches performed in Central Italy evidenced that considerable spatial variability of denudation rates occurs within the Tevere River and Ombrone River basins, with clear socio-economic implications. Particularly, small sub-catchments affected by sharp-edged and/or rounded-edged badlands are likely to afford the major contribution to the overall sediment yield at the basin outlets. In these rapidly evolving catchments the comparison between indirect estimations and field monitoring of erosion rates led to encouraging results for prediction improvement. At the catchment scale, the *denudation rate index* (Tu) equation provided good indirect evaluations in a wide range of morphological contexts, as it was computed as a function of morphometric parameters previously determined and statistically correlated to denudation intensity. Moreover, since 1993 several field stations have been equipped to measure local denudation rates on the most rapidly evolving slopes. Surface and rainfall monitoring allowed to infer a general step-like denudation trend. A rough rainfall threshold was inferred as possible trigger for steep denudation increases within this trend. By performing a monthly field monitoring, we attempted to define better the seasonal variability of erosion power and the alternation between different denudation leading processes as a function of rainfall distribution. In a frame of lively morphodynamics due to surface running waters and gravity, the characterization of rainfall events triggering specific modifications of the hillslope topography, clearly represents a significant improvement for the space-time prediction of strong denudation events. These significant events alone may account for extreme values of catchment sediment yield (i.e. thousands of $t/km^2/a$) predicted for some catchments by the Tu equation.