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The contribution of fluvial and mass wasting processes to sedimentary budget in mountain catchments of the southern Apennines, Italy

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Erosion quantification is an important topic for both scientific and social community, although the large number of prediction models developed in the last decades showed controversial results and limited reliability (Boardman, 2006 and references therein). On the other hand, direct measurements of sediment flux are extremely rare and limited to a few years. This is true also for southern Apennines where, in this work, the sediment yield has been estimated in a wide sector of the axial zone, by using simple empirical relationships, such as the statistical correlation between some geomorphic parameters of the drainage network and the measured suspended sediment yield at the outlet of several drainage basins of Italy (Ciccacci et al., 1980). The test area includes several mountain catchments of the central-western sector of the Basilicata region, characterized by strong differences in litho-structural, morphological and tectonic features. In this area, classical and GIS-aided quantitative geomorphic analysis allowed to estimate several geomorphic indexes and topographic attributes, which are used to estimate fluvial turbid transport data (Tu, mean annual suspension sediment yield), an expression of the erosion degree within the drainage basin. In particular, in this study Tu calculation was modified considering also some morphological and climate parameters, with the aim to relate this index to the real physiography of the studied area and to recent (i.e. the last ten years) pluviometric trend. Then, Tu index is converted into a mean denudation rate, giving a mean bulk density to the rocks outcropping into drainage basins. Denudation rates obtained through Tu method have been compared with those estimated by published study of long-term erosion rates and with data of historical sediment accumulation in the artificial reservoir of the Camastra dam.
In order to assess also the contribution of mass movement processes to the sedimentary yield, a landslide inventory map has been realized in each studied catchment through systematic aerial photo-interpretation and field survey. Moreover, a comparison between landslide volumes and total sedimentary budget has been carried out in some selected area.
The collected dataset represents a basic tool to investigate the morpho-dynamics of the studied catchments and to evaluate sedimentary budget related to both fluvial and hillslope processes. This approach could also be useful to solve practical problems such as burial velocity of an artificial reservoir.

References

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