PHYSICALLY BASED MODELLING OF LANDSLIDE SEDIMENT YIELD AT VALSASSINA, ITALIAN PRE-ALPS

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This work presents an application of the SHETRAN catchment scale, shallow landslide sediment yield modelling system to the 180-km2 Valsassina focus catchment in the Italian pre-Alps of Lecco province. The aim of the application is the development of guidelines for land management to mitigate landslide impacts, for possible land use and climate scenarios.

Available data for Valsassina include a 20-m resolution Digital Elevation Model, a vegetation map, a geology map and meteorological data. A soil property map was compiled through correlation between measured soil properties and the geological map. Available validation data include a 50-year landslide inventory and an inventory of landslides triggered by a major rainfall event in June 1997.

SHETRAN has been validated by considering in sequence the hydrological, sediment transport and landslide responses. Because of the uncertainty that arises in evaluating the parameters of complex, physically based, spatially distributed models, the simulation results have been provided at each stage in the form of uncertainty envelopes based on realistic uncertainty bounds on model parameters.

The validation of SHETRAN demonstrates an ability to bracket the observed spatial distribution of debris flows triggered by rainfall and to simulate a realistic sediment yield range. Subsequent applications are examining the effect of different land use and climate scenarios on shallow landslide incidence and sediment yield.