Water resources and sediment prediction in poorly monitored basins: the Mingardo river basin case study

R. Di Rosario (1), G. Guida (1,2), **A. Longobardi** (1), V. Siervo (2), P. Villani (1,2)

(1) Department of Civil Engineering, University of Salerno, Fisciano (SA), Italy.
alongobardi@unisa.it Fax +39-089964099

Water resources and sediment prediction represent a present key issue in hydrology. From this point of view, hydrological models, generating streamflow components time series which are statistically equivalent to the recorded time series, coupled with soil erosion models, simulating water erosion operated by surface runoff, become useful tools. A great number of coupled hydrological - erosion models can be used to this aim, spanning from traditionally conceptual approaches to fully distributed physically based approaches. But is their application feasible and reliable for very poorly monitored basins? The case study we propose is represented by the Mingardo river basin, a 224 kmq catchment, located in southern Italy, Campania region. Data consist in ten years historical precipitation time series recorded at two gauging stations, monthly streamflow measurements recorded within a two years campaign, land cover and geological maps. Streamflow and sediment production are modelled by the SWAT (Soil and Water Assessment Tool) model, a river basin scale physically based model developed to predict the impact of land management practices on water, sediment and agricultural chemical yields in large complex watersheds with varying soils, land use and management conditions over long periods of time. SWAT is a semi-distributed model using landscape parameters such as topography, land use, soil and geology besides climatic data to simulate streamflow and sediment transport at the catchment or sub-catchment scale. Most of the required data to describe the case study hydrological processes are only available in a coarse spatial resolution and some of these are not even available making the calibration and validation procedures not feasible in this case. To make up for the lack of data we propose an innovative approach, joining all together hydraulic, hydrological geological and geomorphologic features, to capture space-time variability of hydrological processes with a major reduction in predictive uncertainty.