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Sediment transport time series in Tiber river

C. Iadanza (1), F. Napolitano (2)

(1) Now at Italian National Agency for Environment and Territory Protection APAT, (2) Department of Hydraulic, Transportations and Roads, University of Rome “La Sapienza”, Rome, Italy, (francesco.napolitano@uniroma1.it / Fax +39 06-44585065)

In last decades many hydraulic works, e.g. some hydropower reservoirs and land use modification, were made in Tiber river basin. In this river the wash load plays an important role in sediment transport, the knowledge of this hydrological variable is very important in the evaluation of both medium-long term dynamic of shore line and reservoir landfill. The daily sediment transport time series at Ripetta Gauge, located in downtown of Rome, is available only for some years, whereas the daily discharge is available without holes in the series. In order to evaluate the yearly sediment rate of the river a simple stochastic model, based on the evaluation of sediment rating curves, is proposed. The sediment rating curve, i.e. the average relation between discharge and suspended sediment concentration for a certain location, can be considered a “black box” type model; the curve has been fitted using power function, where the coefficients, estimated by regression analysis, have no physical meaning theoretically. Nevertheless some physical interpretation, linked to erosion severity and erosive power of river, is often ascribed to them from an empirical point of view. Using fitted sediment rating curves a simple stochastic procedure is developed for the sediment transport daily values simulation. The procedure was calibrated using observed data and used with the aim to reconstruct sediment concentration values from daily discharge values. The application of the model clarified the real role of various hydraulic works in sediment transport regime of Tiber river.