Sediment delivery assessment for a trans-boundary Mediterranean catchment: The example of Nestos River basin

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Nestos River basin flows between Bulgaria and Greece and discharges into the North Aegean Sea and is one of the largest Mediterranean catchments. The total area of its catchment is around 6200 km2 of which the 3800 km2 belongs to Bulgaria and the mean annual precipitation is about 680 mm. Three major hydroelectric projects in cascade had been built and are in operation in the Greek part of the catchment. The aim of the research presented here is to assess the expected sediment delivery of the catchment upstream of the first hydroelectric reservoir (the Thessauros Reservoir). This has been carried out by implementing for the whole catchment the Universal Soil Loss Equation (USLE) in a GIS environment for determining the mean annual soil erosion in conjunction with a suspended measurement program (114 measurements in total) taken between 1965 and 1983 at the site of the reservoir for the associated mean annual sediment discharge and also mean daily discharges are measured constantly. The sediment discharge rating curve in a power form has been constructed using 6 alternative techniques, namely (a) the linear regression of the log-transformed variables (river and sediment discharge), (b) the same as previously but with the Ferguson correction, (c) different ratings for the dry-wet season of the year, (d) ratings for the rising - falling limb of the runoff hydrograph, (e) the non-linear regression, and (f) the broken line interpolation that uses different exponents for two discharge classes. It is shown that the mean annual sediment yield, except from the linear regression of the log-transformed variables, is almost equal for the rest of the different rating curves and varies from 178.5 t/km2 to 203.4 t/km2, where the highest value results from the bro-

ken line interpolation method. Accordingly the sediment delivery ratios vary slightly from 17% to 19% of the gross erosion.