IMPACT OF RESERVOIR SEDIMENTATION ON COASTAL EROSION IN THE CASE OF NESTOS RIVER

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Nestos River flows through two European countries, Bulgaria and Greece, and discharges its water into the Aegean Sea. The basin area of Nestos River, considered in this study, is about 5100 km^2. In the Greek part of Nestos River, two dams, Thisavros Dam and Platanovrysi Dam, were already constructed. The construction of the dams implies the reduction of sediment yield at the outlet of Nestos River basin. In this study, the mean annual sediment yield at the outlet of Nestos River basin was calculated, before and after the dams construction, by means of a simulation model consisting of three submodels: a rainfall-runoff submodel, a soil erosion submodel and a sediment transport submodel for streams. The simulation model was tested in a Bulgarian sub-basin of Nestos River, for which sediment measurements were available. The final quantitative conclusion is that the construction of the dams implies a dramatic decrease (about 80%) of the sediments supplied directly to the basin outlet. The reduction percentage is directly comparable to the increase of the coastal erosion rates, resulting from satellite images of high resolution.

MODELLING SUSPENDED SEDIMENT TRANSPORT USING AN INTEGRATIVE MODEL OF EXPERIMENTAL COEFFICIENTS IN THE ADE

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One of the most important tasks in river engineering is to recognize the process of suspended sediment transport and the environmental parameters affecting this phenomenon. Estimation of suspended sediment loads help the hydraulic structures designers and environmental managers for the appropriate decisions for design and operation of these structures in constructive projects. More accurate estimation of sediment loads leads to better design of hydraulic structures such as dams, intakes, pump stations and etc. and to increase the useful life of them. Numerical models play an important role in modeling and predicting flow conditions, water quality and sediment transport processes and increasingly have become popular. Suspended sediment transport process can be dynamically modeled using Advective Dispersion Equation (ADE). This partial differential equation, which is numerically solved, contains a few experimental coefficients including: dispersion coefficient and the potential sediment transport rate. It is found that applying the appropriate empirical equations for these coefficients can significantly increase the accuracy of model predictions.

In the current study suspended sediment concentrations was modeled for Karkheh River, located in south west of Iran. A reach of 204 km with 227 cross sections was chosen with a survey site being located almost in the middle of this reach. Two different measured periods were applied for model calibration and verification. One dimensional hydrodynamic numerical FASTER model was applied. Since the code of this model is available, the user would be able to add or delete any part of the model. In this research work five and four different empirical equations for dispersion coefficient and the potential rate of suspended sediment respectively were used to predict suspended sediment concentrations. Different combinations of these equations were designed, and the best empirical equations were specified by comparing the predicted suspended sediment concentrations with the corresponding measured values.