

## **Modeling sediment yield deposition using SWAT model and analysis of factors determining sediment yield: A Case Study of Ankara River basin, Turkey**

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**Abstract.** The research reported here enhances understanding of correlations between potential control variables and the resulting sediment yield to reservoirs. Better understanding of which factors determine sediment yield rate to reservoirs can facilitate estimation of the probable lifespan of a reservoir and appropriate mitigation measures to limit reservoir sedimentation. The Soil and Water Assessment Tool (SWAT) was applied to the Ankara Cayi Catchment, which includes 4932 km<sup>2</sup> in Turkey. SWAT was calibrated for monthly data at an upstream sediment gauging site draining approximately 322 km<sup>2</sup>. Data from 1989-1996 were used for calibration and from 1982-1984 for validation because of non-available observed data at the main outlet. The Morris Sensitivity Analysis was performed on 18 input parameters that govern surface and subsurface responses. The most sensitive model parameters affecting stream flow are SFTMP (Snowfall Temperature) and Alpha\_BF (Base-flow Regression Coefficient); sediment yield are SQL\_Z (soil depth) and CH\_N1 (Manning Coefficient). In the study, NS (Nash-Sutcliffe Coefficient) and RE (Relative Error) were used for assessing compatibility of the model. SWAT outputs indicate that the model performs satisfactorily on stream flow (NSE=0.79) and suspended sediment (NSE=0.81). Based on the multiple regression analysis, stream flow (R=0.92), drainage area (0.97), and mean channel width (0.92) are the three most dominant controlling variables on sediment yield. Testing the SWAT model applicability in the watershed and identifying the impact of controlling variables on sediment yield lays the groundwork for further research in the region.