



Soil erosion modeling on different time scales in the upper Huaihe river basin, China

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With intensified human activities, soil erosion is increasingly becoming one of the most important of today's environmental problems. Therefore, it is vital to predict/model soil erosion processes on different time scales. With the upper Huaihe river basin being selected as a case study site, soil erosion processes were modeled on daily and half-/hourly based on a water-sediment model, which was developed by coupling the Xin'anjiang rainfall-runoff model widely applied in semi-/humid regions of China with a soil erosion model, the efficiency of the water-sediment model on different time scales was examined by use of 2000-2010 time series of hydrological and sediment data, and the time scale effects on model parameters and modeling of storm-based hydrographs and sedigraphs were explored. The results revealed: the Xinanjiang model and water-sediment model performed well in daily/hourly/half-hourly flow and soil erosion process modeling in the upper Huaihe river basin with the mean NSE values being 0.8, 0.88, 0.91 and 0.63, 0.73, 0.79 respectively; the performance of the Xin'anjiang model and the water-sediment model varied with time scales, generally, the shorter the time scale, the higher the modeling accuracy; time scale effects should be taken into account in the determination of model parameters KE, SM, CS, CI, CG, CGM and BV, and storm-based hydrograph and sedigraph modeling. The paper provides an effective approach for predicting/modeling soil erosion processes on different time scales and an indispensable non-engineering measure for soil erosion control in the Huaihe river basin and elsewhere in humid and semi-humid regions of China.