

USING CCHE2D MODEL FOR PREDICTION OF RIVER NILE HORIZONTAL VELOCITY DISTRIBUTION AND BED MORPHOLOGY

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Abstract

This paper addresses the usability of mathematical models for simulation of sediment pattern in the River Nile. Therefore, CCHE2D as a two-dimensional model was used for mathematical simulation in this work. Velocity is one of the major parameters affecting sediment process in open channels and reservoirs. Since it is very difficult to simulate analytically the sediment process in channels and reservoirs, simulation models are mostly used. The results from models simulating sediment process depends greatly on the accuracy of the simulation of the hydrodynamic components. This paper focuses on calibrating CCHE-2D simulation model in order to be able to predict 2-D transverse velocity distribution and bed morphology along the River Nile. Measured field velocity data from Nile Research Institute were used in the calibration of the model. The calibrated and verified simulation model (CCHE 2D) was used to predict the velocity distribution at four sections along the Nile at certain locations. The sections are located within a length of 1.53 km. A drinking water pump station is located at the middle of the reach. The selected reach covers locations from km 7.78 to km 9.31 downstream El-Roda gauging stations (to the km 936.31 from Aswan dam). Statistical measures indicated that the model results are accurate enough for practical purposes and hence the model could be used to predict the morphological changes in the River Nile.