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Incorporation of GIS Based Program into Hydraulic Model for Water Level Modeling on River Basin

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ABSTRACT

Water resources management usually requires that hydraulic, ecological, and hydrological models be linked. The Hy- drologic Engineering Center River Analysis System (HEC-RAS) hydraulic model and the Hydrologic Engineering Center Geospatial River Analysis System (HEC-GEORAS), imitates flow and water profiles in the Neka river basin ' s downstream flood plain. Hydrograph phases studied during the flood seasons of 1986-1999 and from 2002-2004 were used to calibrate and verify the hydraulic model respectively. Simulations of peak flood stages and hydrographs ' evaluations are congruent with studies and observations, with the former showing mean square errors between 4.8 - 10 cm. HECRAS calculations and forecast flood water levels. Nash-Sutcliffe effectiveness (CR3) is more than 0.92 along with elevated levels of water which were created with some effectiveness (CR5) of 0.94 for the validation period. The coupled two models show good performance in the water level modeling.

KEYWORDS

HEC-RAS; HEC-GEORAS; Nash-Sutcliffe; Neka River; Water Level Modeling

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References

[1] M. Morita, "Modeling of Conjunctive Two-Dimensional Surface-Three-Dimensional Subsurface Flows," Journal of Hydraulic Engineering, Vol. 128, No. 2, 2002, p. 184. doi:10.1061/(ASCE)0733-9429(2002)128:2(184)

[2] J. E. Brandmeyer and H. A. Karimi, "Coupling Methodologies for Environmental Models," Environmental Modelling and Software, Vol. 15, No. 5, 2000, pp. 479-488. doi:10.1016/S1364-8152(00)00027-X

[3] Y. Lian, I. C. Chan, J. Singh, M. Demissie, V. Knapp and H. Xie, "Coupling of Hydrologic and Hydraulic Models for the Illinois River Basin," Journal of Hydrology, Vol. 344, No. 3-4, 2007, pp. 210-222. doi:10.1016/j.jhydrol.2007.08.004

[4] A. Pistocchi and P. Mazzoli, "Use of HEC-RAS and HEC-HMS Models with ArcView for Hydrologic Risk Management," iEMSs2002 Congress Proceedings, Lugano, 2002.

[5] R. G. Kamp and H. H. G. Savenije, "Hydrological Model Coupling with ANNs," Hydrology and Earth System Sciences, Vol. 11, No. 6, 2007, pp. 1869-1881. doi:10.5194/hess-11-1869-2007

[6] V. Anselmo, G. Galeati, S. Palmieri, U. Rossi and E. Todini, "Flood Risk Assessment Using an Integrated Hydrological and Hydraulic Modelling Approach: A Case Study," Journal of hydrology, Vol. 175, No. 1-4, 1996. pp. 533-554. doi:10.1016/S0022-1694(96)80023-0

[7] DHI, "A Modelling System for Rivers and Channels," Reference Manual, in DHI Software 2003, DHI Water & Environment, H?rsholm, 2003.

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[8] V. T. Chow, D. R. Maidment andL. W. Mays, “Applied Hydrology,” McGraw-Hill, New York, 1988, p. 570.

[9] P. B. Bedient and W. C. Huber, “Hydrology and Floodplain Analysis,” Addison-Wesley, Reading, 1988, p. 650.

[10] N. M. Hunter, P. D. Bates, M. S. Horritt and M. D. Wilson, “Simple Spatially-Distributed Models for Predicting Flood Inundation: A Review,” Geomorphology, Vol. 90, No. 3-4, 2007, pp. 208-225. doi:10.1016/j.geomorph.2006.10.021

[11] U. S. A. C. o. E. USACE, HEC-RAS, River Analysis System User ' S Manual, Hydrological Engineering Centre, Davis, 2008.

[12] S. Mosquera-Machado and S. Ahmad, “Flood hazard assessment of Atrato River in Colombia,”