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1D Model for Numerical Simulation of Compound Open-Channel Flows with Vegetated Floodplains

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This study presents a one-dimensional routing model for gradually varied flows in compound open-channel flows with vegetated flood plains. The backwater equation for compound open-channel flows derived by Yen (1984) is employed. Yen's model takes into account the flow exchange between main channel and flood plain as well as the shear force between them. Due to vegetation on the floodplain, a friction slope term, which is a function of vegetation density, vegetative drag coefficient, and momentum correction factor, is introduced. A uniform 3D model with second order turbulence closure is used to estimate the relevant parameters for another friction slope term due to the interfacial shear force. The impacts of such parameters are provided and discussed. Using the developed model, the open-channel flows with vegetated floodplains are simulated and the impact of vegetation on the flood plain is investigated.