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Some aspects of longitudinal dispersion coefficient assessment for small modified streams

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The article is focused on analysis of physical - hydraulic and geomorphological aspects of the point source pollution propagation in small modified streams and determination of proper computational equations for longitudinal dispersion coefficient assessment. The dispersion transport characteristics of pollution propagation were determined by computational fluid dynamics tools and classical analytical tools of hydromechanics. To calibrate and verify models and calculated characteristics the time-of-travel experiments and discharge measurements were conducted for different boundary conditions. Comparative study of calculation approaches of hydraulic input data for dispersion coefficient calculation for small modified streams based on different level of schematization (1D and 2D hydrodynamic models and analytical method-Manning equation) showed minimal differences in results. Dispersion coefficients for different boundary conditions reached values from 0.21 to 1.49 $m^2.s^{-1}$. On base of results analysis, work expenditure and precision point of view we prefer 1D hydrodynamic models. The analysis of computations results has showed that the best fitting equation is Fischer eq. that provides accurate and consistent results in comparison with other equations (e.g. Elder, Krenkel, Thackson, McQuivey-Keefer and Parker).

Biography

Peter Halaj is an assoc. professor at Slovak University of Agriculture in Nitra, Department of Landscape Engineering. He has published more than 50 articles in scientific journals, proceedings and books. His fields of specialization are river restoration, flood control and water management in rural areas.

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