BASEMENT - a freeware simulation tool for hydro- and morphodynamic modelling

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The application of numerical modelling tools to river engineering problems is a well established methodology. In the present contribution, a numerical software for simulation of hydro- and morphodynamics is presented that is available free of charge - also for commercial use. The main motivation for development of the software is to provide an powerful user-friendly tool that facilitates basic applications for practitioners as well as advanced model configuration for research. The underlying one- and two-dimensional models are based on the Saint-Venant equations for hydrodynamics, the Exner-Hirano equations for bed load and an advection-diffusion approach with source terms for suspended sediment transport. Mentionable special features of the software are arbitrary combination of 1-D and 2-D model domains, a PID controller for various monitoring values and use of an unstructured dual-mesh to improve topographic accuracy. Besides the presentation of some appealing examples of use, the possibility of embedding the software into an open-source pre- and post-processing environment is highlighted.