# Simplistic evaluation scheme for catchment-scale sediment management

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Sediment budget at catchment scale -sediment production and conveyance throughout the stream network of a basin- is defined mostly by the hydrological and sediment connectivity, and has a direct impact on catchment's ecology and geochemistry. Despite the development of a vast array of mathematical models to simulate sediment transport phenomena at different scales, from reach to catchment, application of those models is often burdensome due to the complexity of initialization. Thus, in this research, we attempt to reduce the complexity and increase the flexibility of modeling procedure, to improve the understanding of the hydro-geomorphic connectivity. We introduce a simplistic scheme for quantifying sediment budget in a catchment. The scheme can be used as a basis for identification of the morphologically critical points in a catchment. To quantify the sediment budget of a basin we implement following steps. Sediment production units are delineated, each of which is formed around an independent single stream, whose starting point is either naturally occurred, a confluence of the upstream units' streams, or an obstacle and the end point is either a confluence or an obstacle. Then, a rectangular grid is set on the whole catchment, whose cells hold multiple values at center, e.g. erodibility probability, distance from the corresponding stream, land use, slope, aspect etc. Subsequently, sediment entrainment threshold, production rate, entrainment delay time and finally, sediment contribution to the corresponding stream is calculated probabilistically at each time step for every single unit. In addition to sediment contribution value, each unit also has terminal state value, which shows either the terminal point is a confluence or an obstacle. The value is used for connecting a unit to the downstream unit. Moreover, in case of an obstacle, the unit also has obstacle passage coefficient value. Using two scenarios for sediment management, we apply the scheme to a part of river Ruhr, Germany.

Keywords: sediment budget, catchment-scale sediment transport modeling, river basin management