EVALUATING KINEROS2 SIMULATED SEDIMENT YIELDS USING MULTIPLE PARTICLE SIZE DISTRIBUTIONS

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Abstract The model KINEROS2 is used to simulate runoff and sediment from various watershed geometries driven by artificial and natural precipitation events to evaluate the differences between using a single particle size parameter, D50, and a distribution of multiple sediment particle classes. Measurements of total sediment yield during runoff events caused by high intensity thunderstorms in semiarid areas are difficult because of the rare occurrence, limited spatial extent, rapid rise of runoff in channels and the ability to capture flow and sediment samples during such events. Contributing to the difficulty of sediment measurements is the method of transport of eroded particles, suspended in concentration in the flow or moved along bottom surface by flow, both of which are dependent upon the size of particle being transported. The various particle size classes of the source and transported materials are seldom known, and less often considered in modeling. Simulation of several events for which observed rainfall, runoff and sediment yields are available at the USDA-ARS Walnut Gulch Experimental Watershed, Arizona are compared using objective criteria to evaluate model performance. Use of D50 is shown to under-predict total sediment yield relative to a distribution of particle sizes dependent upon the assumed particle size distribution.