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Vast erosion, vast colluviation, - but the way of sediment flux accounts for a success story of sustainable land use? Lessons learned from a 7500 years sediment budget in an agricultural loess catchment, Germany.

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A rolling small-scale loess catchment (10 sqkm) in the central German Wetterau Basin serves to exemplify spatial and temporal characteristics of quantified sediment fluxes for the 7500 years period of agriculture. Field-based evidence and datings provide direct measures of soil erosion, within-system redeposition and system output. Database applications and GIS-based data processing deliver information about (1) the spatially distributed sediment budget, (2) a functional differentiation between budget elements, (3) long-term temporal properties of sediment flux on slopes and from slopes to the 2nd order stream, and (4) the time-dependent change in rates of catchment delivery. The budget values and datings illustrate the virtual velocity of sediments along the sediment cascade in this agricultural watershed. At the temporal scale the differences in on-slope and valley floor transport rates are most remarkable. A denoted significant change in rates of catchment delivery during cultivation history requires explanations other than a simple expansion of arable areas or changing climatic drivers. Regarding functional soilscape properties in terms of soil fertility and large-scale floodplain metamorphosis allowing pastural and grassland land use on valley floors, it can be deduced that long-term land use effectively has resulted in a sustained large-scale amelioration of cultivated areas. However, this provoking conclusion only accounts for a certain type of central European landscapes and certain boundary conditions of sediment flux. Unfortunately, presently ongoing agrarian change most probably is going to alter the formerly advantageous effects of man-induced sediment fluxes.