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Reservoir sedimentation trends in Ohio, USA: sediment delivery and response to land-use change

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Abstract In Ohio, USA, a sufficiently large number of reservoir sediment surveys is available to characterize spatial and temporal patterns in sediment fluxes in a disturbed landscape. In this study we analyse 156 sediment surveys from 68 reservoirs, representing sedimentation rates in the latter 20th century. The study area includes two major physiographic regions: a glaciated lowrelief till plain dominated by agricultural land use, and a mostly unglaciated dissected plateau with greater relief dominated by forest land use. Despite about 80% agricultural land use in the till plain, specific sedimentation rates are lower than in the plateau region. The agricultural region shows a significant negative relation between specific sediment yield and drainage area, while the upland does not. This is interpreted as indicating significant alluvial deposition associated with accelerated erosion in the agricultural region. The absence of such a relationship in the plateau area implies more efficient sediment delivery there. Comparison of sedimentation rates from the early part of the record (pre-1960) with those of the latter part shows that sedimentation rates are declining in the agricultural region, but not in the upland area, consistent with a reduction of agricultural erosion in the latter half of the 20th century. There is also a weak trend toward flattening in the specific sediment yield–drainage area relation. If confirmed this would imply that the channels in some areas are beginning to shift from net sediment sinks to a neutral condition, roughly a century after the time of maximum upland erosion.
Key words reservoir sedimentation; sediment delivery