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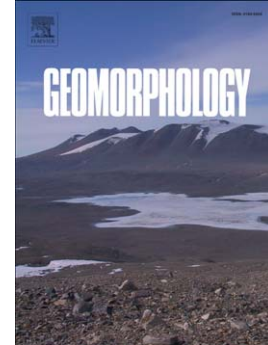
A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature

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A watershed scale spatially-distributed model for streambank erosion rate driven by channel curvature

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Abstract

Streambank erosion is a major source of fluvial sediment, but few large-scale, spatially distributed models exist to quantify streambank erosion rates. We introduce a spatially distributed model for streambank erosion applicable to sinuous, single-thread channels. We argue that such a model can adequately characterize streambank erosion rates, measured at the outsides of bends over a 2 yr time period, throughout a large region. The model is based on the widely-used excess-velocity equation and is comprised of three components: a physics-based hydrodynamic model, a large-scale 1-dimensional model of average monthly discharge, and an empirical bank erodibility parameterization. The hydrodynamic submodel requires inputs of channel centerline, slope, width, depth, friction factor, and a scour factor A ; the large-scale watershed submodel utilizes watershed-averaged monthly outputs of the Noah-2.8 land surface model; bank erodibility is based on tree cover and bank height as proxies for root density. The model was calibrated with erosion rates mea-

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