



## **Modelling the response of a meandering river to increased sediment supply**

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Meandering channels provide a conduit through which sediment and water is routed from the uplands to the sea. Alluvial material is periodically stored and transported through the channel network as permitted by the prevailing hydrologic conditions. The lowlands are typically characterised by accumulations of sediment attached to the inner banks of meander bends (point bars). These bedforms have been identified as important for facilitating a link between in-stream sediment supplies and channel dynamism. A 2D curvilinear hydrodynamic model (MIKE 21C) was used to perform experiments in which the sediment supply was increased to investigate how changes in alluvial material fluxes affect the development of point bars and the resultant patterns of bank erosion. A doubling of the sediment load caused a longitudinal increase in the bar in the upstream direction and caused a coeval doubling of the transverse channel slope at the meander apex. The upstream growth of the point bar was accompanied by an increase in length over which lateral migration took place at the outer bank. The magnitude of outer bank erosion was almost 10 times greater for the simulation with the highest sediment supply. These results suggest that enhanced sediment loads (potentially the result of changes in land use or climate) can trigger greater rates of bank erosion and channel change through the sequestration of alluvial material on point bars, which encourage high-velocity fluid deflection towards the outer bank of the meander. This controls riparian habitat development and exchanges of sediment and nutrients across the channel-floodplain interface.