



Significant declines in fluvial sediment delivery to the world's deltas projected over the 21st century under environmental change scenarios

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Deltas are home to over half a billion people worldwide, and are vulnerable due to being low-lying coastal climate change hot spots. Deltas lose elevation relative to sea level due to subsidence and eustatic sea level rise, both of which are increased by anthropogenic activities, and aggradation is the only process by which deltas can maintain elevation relative to sea level. The prediction of rates of delta aggradation is therefore critical to assessments of delta sustainability by contributing to the understanding of the extent to which sedimentation can potentially offset sea level rise. The ability to make predictions of aggradation potential is limited by a lack of insight into future trends of fluvial sediment fluxes delivered to deltas by their catchments. To address this gap we investigate fluvial sediment fluxes under future environmental change for 47 of the world's major river deltas. We employed the numerical model WBMsed to project future variations in mean annual fluvial sediment delivery under a range of environmental change scenarios that include changes in climate, socioeconomics (as an indicator of land use and engineering), and reservoir construction. The results indicate a decrease in fluvial sediment delivery in total to the 47 deltas by 34-41% by the end of the 21st century depending on the specific scenario. Most of the 47 deltas also show a decrease in fluvial sediment fluxes with the reductions driven primarily by reservoir construction globally, however land use and other engineering change can be equally influential for those delta catchments which experience significant socioeconomic change over the 21st century.