



Multidecadal Fluvial Sediment Fluxes to Deltas under Environmental Change Scenarios

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Sediment delivery is vital to sustain delta environments on which over half a billion people live worldwide. Due to factors such as subsidence and sea level rise, deltas sink relative to sea level if sediment is not delivered to and retained on their surfaces. Deltas which sink relative to sea level experience flooding, land degradation and loss, which endangers anthropogenic activities and populations. The future of fluvial sediment fluxes, a key mechanism for sediment delivery to deltas, is uncertain due to complex environmental changes which are predicted to occur over the coming decades.

This research investigates fluvial sediment fluxes under environmental changes in order to assess the sustainability of delta environments under potential future scenarios up to 2100. Global datasets of climate change, reservoir construction, and population and GDP as proxies for anthropogenic influence through land use changes are used to drive the catchment numerical model WBMsed, which is being used to investigate the effects of these environmental changes on fluvial sediment delivery. This process produces fluvial sediment fluxes under multiple future scenarios which will be used to assess the future sustainability of a selection of 8 vulnerable deltas, although the approach can be applied to deltas worldwide.

By modelling potential future scenarios of fluvial sediment flux, this research contributes to the prognosis for delta environments. The future scenarios will inform management at multiple temporal scales, and indicate the potential consequences for deltas of various anthropogenic activities. This research will both forewarn managers of potentially unsustainable deltas and indicate those anthropogenic activities which encourage or hinder the creation of sustainable delta environments.