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Feasibility of sedimentation strategies for the Mekong delta to counterbalance relative sea-level rise

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As one of the largest deltas in the world, the Mekong delta is home to over 17 million people and supports internationally important agriculture. Recently deposited sediment compacts and causes subsidence in deltas, so they require regular sediment input to maintain elevation relative to sea level. These processes are complicated by human activities, which prevent sediment deposition indirectly through reducing fluvial sediment supply and directly through the construction of flood defence infrastructure on deltas, impeding floods which deliver sediment to the land. Additionally, anthropogenic activities increase the rate of subsidence through the extraction of groundwater and other land-use practices.

This research shows the potential for fluvial sediment delivery to compensate for sea-level rise and subsidence in the Mekong delta over the 21st century. We use detailed elevation data and subsidence scenarios in combination with regional sea-level rise and fluvial sediment flux projections to quantify the potential for maintaining elevation relative to sea level in the Mekong delta. We present four examples of localised sedimentation scenarios in specific areas, for which we quantified the potential effectiveness of fluvial sediment deposition for offsetting relative sea-level rise. The presented sediment-based adaptation strategies are complicated by existing land use, therefore a change in water and sediment management is required to effectively use natural resources and employ these adaptation methods. The presented approach could be an exemplar to assess sedimentation strategy feasibility in other delta systems worldwide that are under threat from sea-level rise.