



The resilience and sustainability of the Mekong delta to changes in water and sediment fluxes

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The Vietnamese Mekong delta, home to eighteen million people, floods annually during the Monsoon, sustaining a suite of ecosystem services. This includes rice production that underpins food security for the rapidly growing population in the wider region. The future of the area is uncertain. The delta is sinking due to relative sea level rise and is rapidly losing land. This process is further exacerbated by a number of human activities occurring within the delta and its upstream catchment. Examples include sand mining and dam building that reduce the amount of sediment reaching the delta and being deposited on its plains during the annual floods. This sediment is of great value as it drives delta building and is the only process that offsets sea-level rise. Additionally, the sediment is rich in the nutrients required for the agricultural productivity of the region. The sinking of the delta is also driving an exacerbation of flood risk in the area, placing nearby cities, key infrastructure and a large part of the local population at risk. This paper presents an investigation of the flow and sediment routing through the Mekong delta across the annual monsoon flood. We develop a new generic understanding of the impact of relative sea level rise and human activities on sediment routing processes through distributary channels and key bifurcation sites of the delta. This understanding is based on a range of state-of-the-art field datasets, including flow fields, sediment fluxes, water quality and detailed bathymetry, collected during two field campaigns in May and November 2018. The implications of the findings for the long-term sustainability and the evolution of flood hazard and risk across the delta plain will be discussed.