

Hydro- and sediment dynamics in the estuary zone of the Mekong Delta: case study Dinh An estuary.

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The Mekong River is the tenth largest river in the world, covers an area of 795,000 km², 4400km in length, the main river flows over the six countries including: China, Myanmar, Thailand, Laos, Cambodia and Vietnam. Its water discharge is 470 km³year⁻¹ and the sediment discharge is estimated about 160 million ton year⁻¹. The sediment transported by the Mekong River is the key factor in the formation and development of the delta. It is a vital factor for the stability of the coastline and river banks. Furthermore it compensates land subsidence by floodplain deposition, and is the major natural nutrient source for agriculture and aquaculture. However, only a few studies were conducted to characterize and quantify sediment properties and process in the Delta. Also the morphodynamic processes were hardly studied systematically. Hence, this study targets to fill some important and open knowledge gaps with extensive field works that provide important information about the sediment properties and hydrodynamic processes in different seasons

Firstly three field survey campaigns are carried out along a 30 km section of the Bassac River from the beginning of Cu Lao Dung Island to Dinh An estuary in 2015 and 2016. During the field campaign, the movement of the salt wedge and the turbidity were monitored by vertical profiles along the river, as well as discharge measurements by ADCP were carried out at three cross sections continuously for 72 hours. The extension of the salt wedge in the river was determined, along with mixing processes. The movement and dynamics observed under different flow conditions indicate that sediment was pumped during low flow upwards the river, while during high flow net transport towards the sea dominated. Also a distinct difference in the sediment properties in the different seasons was observed, with a general tendency towards a higher proportion of coarser particles in the high flow season.

These quantitative results give insights into the important sediment dynamics in the estuary and the vital sediment transport towards the coast of the Mekong delta, which is the basis for morphological stability of the coast. The results of the field campaigns will be used for the development of a detailed 3D sediment transport model (Delft 3D) for the quantification of the morphodynamic processes at Dinh An estuary.