

## Increasing Water Level in the Vietnamese Mekong Delta

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The Mekong Delta is highly susceptible to the impacts of flood, sea level rise, and land subsidence. We considered three factors that could have increased the water level: (1) decrease in flood mitigation functions due to dyke constructions, (2) sea level rise, and (3) land subsidence. We used daily maximum water level, daily minimum water level, and daily water level data. We analyzed data of 21 stations from 1987 to 2006. First, we classified the Delta into two groups; one area is dominated by flows from the upstream, while the other is dominated by the tide. Moreover, we obtained the trend of annual maximum and minimum water levels. Regarding land use, we used the NDVI to estimate the area of dyke construction and the area of the flood plain. It is found that (1) the constructed area of the dyke does not coincide with the area of water level increase, (2) the area with the water level increase correlates with the area with the minimum water level increase. The area with the minimum water level increase is located in the tide dominated zone, indicating that the increase in the maximum water level is caused by the relative increase of sea level.

Furthermore, we examined the trend of sea level rise, and detected a 2.4 mm/year sea level rise. The average of the minimum water level increase was 7.3 mm/year, and therefore, 4.9 mm/year must be the subsidence. In addition, we eliminated the trend of the increasing water level and reconstructed the data without sea level rise and subsidence. We estimated the probabilistic value of water level using the reconstructed data set, and estimated the probability of 100-year water level using the current data set. As a result, the 100-year probabilistic water level in the reconstructed data becomes 21.2-year water level in the current.

Keywords: Mekong delta, Increasing water level, Flood, Sea level rise, Land subsidence, Dyke