

Bank erosion owing to tidal currents and its impact on village distribution in the Sittaung River estuary, Myanmar

*Naoko Nagumo¹, Daisuke Harada¹, Tanjir Saif Ahmed^{1,2}, Shinji Egashira¹

1. International Centre for Water Hazard and Risk Management, Public Works Research Institute, 2. National Graduate Institute for Policy Studies

The Sittaung River is one of the large rivers in Myanmar, draining an area of about 36,000 km². It forms a tide-dominated estuary in its mouth, where dynamic river bank erosion and consequent bank-line changes occur under the influence of river flow and tidal currents enhanced by tidal bores. As the river line retreats inland, serious problems, such as the disappearance of settlements and farmland, have resulted; therefore, we have started research in collaboration with Directorate of Water Resources and Improvement of River Systems (DWIR) to understand the mechanism of the active river bank erosion and plan appropriate prevention measures. Our analyses have so far revealed that the main stream has been shifting its course at least since the 1920s, exhibiting a periodicity, which seems to be induced by meander deformation and channel bifurcation resulting from bank collapses and supplies of very fine sediment in the river reach and estuary areas. The interrelating phenomena among bank erosion, sediment transport, channel-bar formation and deformation, and associated cyclic mainstream shifts have threatened the livelihoods of local people along the bank line. However, our analyses on the historical distribution of local villages also found that the outer edge of the past bank lines indicates a boundary of the safety zone from active bank erosion. We employed a depth-averaged 2-D numerical model to evaluate the sediment transport and associated bed evolution by tidal currents, and the computed results well reproduced the channel bifurcation and channel closing that are responsible for channel bar development.

Keywords: bank erosion, tidal currents, fine sediments, channel shifts, estuary