

Automatic shoreline detection and coastal change detection using multiple satellite data in Bangladesh

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The Bangladesh government has been faced with the risk of coastal erosion as one of the urgent issues in land use planning and coastal management. As a preliminary investigation, an automated algorithm was proposed focusing on shoreline detection using multiple satellite data. The selected study site is located in the estuary of the Meghna River around the Gulf of Bengal in Bangladesh.

We employed Landsat-7, -8 data (90m and 30m spatial resolution, respectively) and ALOS, ALOS-2 (12.5m and 25m spatial resolution, respectively) to detect accurate coastal lines during the similar snapshot period.

As a result of automatic shoreline detection and coastal change detection by the interpretation and classification, the average rate of coastal line change was 0.5km (eroded) per year for the period between 2010 and 2019 in case of Meghna River along Noakhali (Noler Char). In addition, the resultant coastal change line was also verified by ground truth and field survey data using a small unmanned aerial vehicle (sUAV: Quadcopter with a flight control system, ©DJI Technology Co. Ltd., China) for comprehensive validation.

This feasibility study will continually investigate the characteristics of short-term and long-term changes with the relationship between hydrological parameters such as precipitation, river discharge, wave, and tidal effect.

Keywords: Shoreline detection, Coastal change