

HTT006-06

Room:201A

Time:May 25 17:45-18:00

Analyses of erosion and sedimentation around the mouth of Ganges in Bangladesh

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Recent changes in coastal line and river banks at around the mouth of Ganges are analyzed by using satellite remote sensing with shorter time periods. Synthetic Aperture Radar (SAR) on board JERS-1 satellite, Geocover TM Mosaic data by NASA and Terra/ASTERs are used to map the changes in coastal line and river course. SAR images has predominance of night and day observation and multiweather observation. It increases the observation frequency, and also increase the chance of coastal line and river course observation. Geocover TM image is geometrically corrected mosaiced LANDSAT TM imageries in circa. 1990 and circa. 2000 provided by NASA. These images can be used for base image to rectify SAR images, and also time change detection between 1990 and 2000 is possible. Terra/ASTER image is the latest image in this study that observes the mouth of Ganges area. From the analysis of Geocover TM images, large topographic changes at river course of Ganges and at coastal line and island around the mouth are recognized. In the river bank, erosion was dominated in 1990s, and sandbar has developing. However, ASTER image show the alteration between erosion and sedimentation at some place in river courses. On the other hand, coast line of land and island around river mouth has consistent trend of erosion or sedimentation at the same place. Northern end of Hatia Island experienced about 79 km² of coastal erosion, and erosion rate has been changing during the observation period. Comparison between erosion rate and monthly precipitation at Dhaka reveals clear correlation. Precipitation in Dhaka may be the index of regional precipitation and discharge amount of Ganges, and large flow quantity may leads to large erosion at Hatia Island. At the left bank of Ganges, sedimentation was dominated during the observation period. Especially, during 1989 and 2005 shows about 10 km of regression, however, the rate was different at the place to place.

Keywords: Bangladesh, Ganges delta, remote sensing, changes in topography, synthetic aperture radar