Mangrove Mapping and Change Detection Using Multi-temporal Landsat imagery in Hai Phong city, Vietnam

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Abstract. Mangroves play an important role in protecting dyke systems and defend against the impact of tropical storms. However, these forests are under severe threat due to the rapid growth of population, insufficient governance, poor planning, as well as uncoordinated economic development. Hai Phong city is located on the Northern coast of Vietnam where the mangroves are distributed between zone I and zone II among the four mangrove zones in Vietnam. This city is vulnerable to rising sea levels associated with climate change and tropical cyclones, which are forecasted to become more prevalent and stronger as climate change intensifies. The objectives of this research were to map the locations of mangrove and to analyze their change in Hai Phong, Vietnam from 1989 to 2013 using different sensors of LANDSAT including TM, ETM+ and OLI. Image segmentation was used to improve the accuracy assessment of the post satellite image processing. Moreover, Geographic Information System (GIS) and Remote Sensing data were applied to analyze how the mangroves had changed throughout the period 1989-2013. The findings of this research showed that mangrove loss from 1989 to 2001 and its gained from 2001 to 2013. The overall accuracy of satellite imagery processing for the year 2013 were 83% and the Kappa coefficient were 0.81. This research indicates the potential for the use of multi-temporal LANDSAT data together with image segmentation and a GIS approach for mapping mangrove forest in the coastal zone.

Keywords. Mangrove change, Object-based classification, GIS, Landsat imagery, Satellite remote sensing