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TITLE: A Digital Shoreline Analysis System (DSAS) applied on mangrove shoreline changes along the Giao Thuy coastal area (Nam Dinh, Vietnam) during 2005-2014

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ABSTRACT:

The paper deals with a combination of the Digital Shoreline Analysis System (DSAS) and remote sensing, studying historical mangrove shoreline changes and mangrove zoning in the GiaoThuy coastal area of the Nam Dinh province, Vietnam. The results show an over-all mangrove area increase of 2,487 hectares during the years 2005-2014. This dynamics results from both degradation and increase of the mangroves. The calculated degradation rate is 1.41 m yr-1, and the growth rate is 1.26 m yr-1 on average. 4 different mangrove zones were delineated based on the End Point Rate (EPR) values of DSAS transects. The differential evolution of the mangroves in these zones is driven by socio-economic and environmental factors. The results contribute to practices of mangrove planning and management in a coastal area. Furthermore, historical mangrove shoreline change provides indicators to monitor coastal environmental changes for global warming, climate change, storm effects, sea level change, pollution, and sedimentation rates.References Alongi, D.M., 2008. Mangrove forests: Resilience, protection from tsunamis, and responses to global climate change. Estuarine, Coastal and Shelf Science, 76(1), 1-13. Cohen, M.C.L., Lara R.J., 2003. Temporal changes of mangrove vegetation boundaries in Amazonia: Application of GIS and remote sensing techniques. Wetland Ecology Management 11, 223-231. Ellison, J., 2000. How South Pacific mangroves may respond to predicted climate change and sea level rise. In: Gillespie A. and Burns W. (Eds.). Climate change in the South Pacific: Impacts and responses in Australia, New Zealand, and small islands states. Dordrecht, Netherlands: Kluwer Academic Publishers (Chapter 15), 289-301. Hegde, A.V., Akshaya B.J., 2015. Shoreline transformation study of Karnataka Coast: Geospatial Approach. Aquatic Procedia 4, 151-156. Lewis, R.R., 2005. Ecological engineering for successful management and restoration of mangrove forests. Ecological Engineering, 24(4SI), 403-418. Moussaid, J., Fora A.A., Zourarah B., Maanan M., Maanan M., 2015. Using automatic computation to analyze the rate of shoreline change on the Kenitra coast, Morocco.Ocean Engineering, 102(1), 71-77. Nguyen Hai Hoa, McAlpine C., Pullar D., Leisz S.J., Galina G., 2015. Drivers of coastal shoreline change: case study of Hon Dat coast, Kien Giang, Vietnam. Environmental Management, 55(5), 1093-1108. Oyedotun, T.D.T., 2014. Shoreline Geometry: DSAS as a tool for historical trend analysis. Geomorphological Techniques, Chapter 3(2.2), British Society for Geomorphology, 1-12. Pham Quang Son , Nguyen Duc Anh, 2016. Evolution of the coastal zone in Hai Hau district (Nam Dinh province) and nearest region over the last 100 years based on analysis topographic maps and multi-temporal remote sensing data. Vietnam Journal of Earth Sciences, 38(1), 118-130 (in Vietnamese). Rebelo, L.M., Finlayson C.M., Nagabhatla N., 2009. Remote sensing and GIS for wetland inventory, mapping and change analysis. Environmental Management, 90, 2144-2153. Sathirathai, S., Barbier E.B., 2001. Valuing mangrove conservation in southern Thailand. Contemporary Economic Policy, 19(2), 109-122. Sheik, M., Chandrasekar, 2011. A shoreline change analysis along the coast between Kanyakumari and Tuticorin, India, using digital shoreline analysis system. Geo-spatial Information Science, 14(4), 282. Thieler, E.R., Himmelstoss E.A., Zichichi J.L., Ergul A., 2009. Digital Shoreline Analysis System (DSAS) version 4.0 - An ArcGIS extension for calculating shoreline change.U.S. Geological Survey Open-File Report 2008-1278. Dang Van To, Phan Thi Phuong Thao, 2008. A shoreline analysis using DSAS in Nam Dinh coastal area. GeoInformatics, 4(1), 37-42. Tran Thi V., Xuan A Tien Thi., Phan Nguyen Hong, Dahdouh-Guebas F., Koedam N. , 2014. Application of remote sensing and GIS for detection of long-term mangrove shoreline changes in Mui Ca Mau, Vietnam. Biogeosciences ,11, 3781-3795. Vu Van Loi, 2016. Sedimentary facies and engineering geological characteristics of Holocene deposits in the coastal area of Tien Lang district, Hai Phong city. Vietnam Journal of Earth Sciences, 38(1), 108-117.

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