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Shoreline Dynamics and Various Associated Processes in the Batang Coastal Area, Indonesia

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Coastal area is an area with dynamic environmental condition with both physical and non-physical processes. One of the effects of these processes is shoreline change, which may occur in short-term events due to regular wave action, tides, or winds, as well as in long-term events such as tectonic activities that cause coastal land subsidence or emergence. Shoreline change analysis, especially in Batang, Central Java, Indonesia, is needed as a reference for coastal planning in that area, such as stipulate the coastal protection method, as well as a cornerstone in the policy or development of coastal areas. Shoreline change along Batang coastal area has been analyzed using the End Point Rate (EPR) technique in Digital Shoreline Analysis System (DSAS) in ArcGIS 10. Baseline were created along the shoreline to generate general trend of shoreline. Transects with 500 m spacing were made perpendicular to the baseline towards the sea. About 385 transect with 500 meters spaces was created to measure the shoreline change. Negative and positive value were used to indicate the erosion or accretion regime. Shoreline change have been measured using multi-temporal satellite images from 2009 to 2013. The study found that shoreline in Batang is changed significantly during 2009 - 2013. Around 0,33 km2 of land has lost due to coastal erosion, two times greater than the amount of coastal accretion (0,15 km2). The high erosion area mostly found in west Port of Niaga and in the east of Sambong River estuary. Based on the result obtained with EPR technique, can be concluded that coastal erosion is mostly happened in the Batang coastal than coastal accretion. This statement also supported by research conducted by Agency for the Assessment and Application of Technology (BPPT) in 2013 which states that the phenomenon of coastal erosion in Batang was began in 1994. The highest rate of coastal erosion had occurred between the years 1997 to 2002, including at the Sigandu beach until Ujungnegoro beach.

Keywords: shoreline, alterations, dynamic, DSAS, Batang