Shoreline Variation with Construction of a Pair of Training Walls, Ponnani Inlet, Kerala, India

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Abstract : An idealized definition of shoreline is that it is the zone of coincidence of three spheres such as atmosphere, lithosphere, and hydrosphere. Despite its apparent simplicity, this definition in practice a challenge to apply. In reality, the shoreline location deviates continually through time, because of various dynamic factors such as wave characteristics, currents, coastal orientation and the bathymetry, which makes the shoreline volatile. This necessitates us to monitor the shoreline in a temporal basis. If shoreline's nature is understood at particular coastal stretch, it need not be the same trend at the other location, though belonging to the same sea front. Shoreline change is hence a local phenomenon and has to be studied with great intensity considering as many factors involved as possible. Erosion and accretion of sediment are such natures of a shoreline, which needs to be quantified by comparing with its predeceasing variations and understood before implementing any coastal projects. In recent years, advent of Global Positioning System (GPS) and Geographic Information System (GIS) acts as an emerging tool to quantify the intra and inter annual sediment rate getting accreted or deposited compared to other conventional methods in regards with time was taken and man power. Remote sensing data, on the other hand, paves way to acquire historical sets of data where field data is unavailable with a higher resolution. Short term and long term period shoreline change can be accurately tracked and monitored using a software residing in GIS - Digital Shoreline Analysis System (DSAS) developed by United States Geological Survey (USGS). In the present study, using DSAS, End Point Rate (EPR) is calculated analyze the intra-annual changes, and Linear Rate Regression (LRR) is adopted to study inter annual changes of shoreline. The shoreline changes are quantified for the scenario during the construction of breakwater in Ponnani river inlet along Kerala coast, India. Ponnani is a major fishing and landing center located 10°47'12.81"N and 75°54'38.62"E in Malappuram district of Kerala, India. The rate of erosion and accretion is explored using satellite and field data. The full paper contains the rate of change of shoreline, and its analysis would provide us understanding the behavior of the inlet at the study area during the construction of the training walls.

Keywords : DSAS, end point rate, field measurements, geo-informatics, shoreline variation
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