ABSTRACT

Coastal areas are dynamic environments vulnerable to changes caused by natural processes and human activities. One of the major phenomena in coastal regions is sedimentation, the deposition of materials such as sand and silt, which can lead to silting, altered coastal morphology, and disruption of marine activities. This study was conducted at Cemara Beach, Gandapura Subdistrict, Bireuen Regency, an actively utilized coastal zone for tourism and fishing, yet previously unstudied in terms of sedimentation characteristics. The aim of this study is to analyze the sedimentation rate, sediment characteristics, and oceanographic parameters influencing sedimentation processes. A survey method was employed, using purposive sampling at four observation stations. Data collected included primary data such as sedimentation rates, current velocity, and sediment fractions, as well as secondary data from the Nautide app and literature sources. Results showed that sedimentation rates ranged from 1,559.32 to 2,239.89 mg/cm²/day, with the highest rate observed at Station 4. Sediment characteristics were dominated by very fine sand fractions (up to 53.50%), particularly in areas with lower current velocity and greater depth. Average current velocities ranged from 0.10 to 0.12 m/s, with the highest tide reaching 155 cm. These findings confirm that oceanographic dynamics such as currents, tides, and water depth significantly influence sediment deposition processes. This research contributes valuable insights into sedimentation patterns in Cemara Beach and highlights the importance of integrating oceanographic factors into sustainable coastal management strategies.

Keywords: coast, current, sedimentation, sediment characteristics, tidal