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Full Paper

HYDRODYNAMIC ASSESSMENT ALONG THE COAST OF TANJUNG SEDELI, MALAYSIA

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Graphical abstract

Coastal waters of Tanjung Sedeli, view from Jason Bay

Abstract

Tidal influence plays a significant role in coastal hydrodynamics as the impact may lead to coastal erosion. Tanjung Sedeli located on the southern coast of Malaysia is exposed to low tidal issues which disrupts the navigation of local fisherman due to the shallow river mouth in the area. This study presents the hydrodynamic processes along the shoreline of Tanjung Sedeli. BLUEKENUE was used as the pre-processor to create a bathymetry file and perform mesh generation to set up the initial model boundary which functions as input files for numerical study. TELEMAC2D further processes the hydrodynamic data (tides and currents), calibrated, and validated with the measured field data collected between 24th September to 6th October 2020 covering both spring and neap tide conditions. The nature of tides in the area was mainly mixed tides, predominantly semidiurnal tides. Modelled hydrodynamic values show good conformity with field measurements with an error of 1.4% for water level values, 10.6% and 20° for current speed and direction respectively. Water flows north into the estuary during spring tide with maximum velocity is 0.736m/s surrounding the river mouth and Pulau Tagal. Low velocity values were recorded at the left bank of the river (0.028 m/s) and Pulau Tagal (0.085 m/s) during spring tide. This study provides information on current hydrodynamic condition of the study area.

Keywords: river mouth, ADCP, Numerical model, coastal waters, TELEMAC2D

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1.0 INTRODUCTION

Coastal zones involve a dynamic ecosystem where marine and atmospheric processes produce rocky coasts, beaches, dunes, tidal inlets, and shape deltas [1]. Coastal environments provide infrastructure and ecosystems that are the key to modern human life, but in recent years have been densely populated and are among the most urbanized area in the world [2]. In coastal zones, currents are driven mainly by tides, winds, and waves. The state of the art in hydrodynamic studies of tidally dominated environments now makes it possible to accurately estimate water movements at time scales ranging from a few minutes to several weeks or months. Coastal processes on the east coast of Peninsular Malaysia are highly influenced by monsoonal seasons, mainly the northeast monsoon occurring from October to March and the southwest monsoon from May to September. The natural phenomenon of current speeds, tides, waves, winds, and rainfall frequency during these seasons eventually impacts