

Abstract

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Modeling of wave propagation off Damietta - Port Said Coast, Egypt

The coastline from Damietta to Port Said is considered as one of the most important areas for industrial, agricultural, trade and fishing activities. Suez Canal, international Damietta Harbour and the Mediterranean Sea are also important. Recently natural gas exploration increased the socioeconomic importance of the study area. The study area is subjected, after the construction of Aswan high dam (1964), to erosion and accretion processes due to deficiency of sediment input and the action of sea waves. This paper aims to study all the factors (wind regime, surface current and sea level) affecting sea wave propagation, and also to predict important wave parameters using STWAVE model. Breaker area and closure depth were calculated by using published empirical formulae. The numerical spectral wave model, STWAVE, was used to simulate the propagation of sea waves along the study coast during extreme wave events (significant wave height >3.5 m). STWAVE model results were validated using shallow wave observations. STWAVE model results showed convergences of wave energy near Damietta promontory, while divergence area occurs near Port Said and Suez Canal. During extreme wave events, the study area is characterized by spilling breaker type, breaker wave depth is ranging from 1.56 to 2.06 m. The study area coast has a maximum closure depth of 6.37 m. These results are expected to be useful for coastal zone management.