Abstract

Wave height prediction is important for sea navigation activities, operational activities in the offshore platform, and coastal areas such as in port. The traditional approach in wave height prediction systems is to utilize the numerical tool for simulating wave energy propagation by solving the energy balance equation. The method requires a very high computation resource. For calculating wave height prediction from wind field data in this study, we use a machine learning methodology, namely the Long Short-Term Memory (LSTM) method, which requires fewer computer resources. To create a dataset for the algorithm's training and testing, we simulate continuous wave simulation from wind field data by using SWAN model, which is based on a phase averaged wave model. As wind field input for the model, we use the ECMWF ERA-5 wind data collection as the model's wind field input. We chose a research area in Jakarta Bay, Indonesia, as a case study. In addition, we investigate the impact of various wind data inputs on the results of wave height prediction in Jakarta Bay. With several wind inputs, the LSTM model predictions wave data with good results.

Keywords: wave prediction, SWAN, long short-term memory, deep learning