Verification of SWAN model Outputs with Buoy data on Wave Height and Period

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Introduction

Forecasting sea conditions and its vital role in shipping, fisheries and professional affairs, is too obvious. Different models, accuracy and precision in this regard can effectively lead to a better understanding. One of the useful models is SWAN. For evaluating the performance of this model in aspect of executive and scientific both, study on verification of its products is required. In this study, the model outputs of wave height and period in the case of Bushehr and Assaluyeh have been verified. With this study it is tried on the accuracy of the model outputs with the corresponding values of Buoy and its performance on predictions 12, 24, 48, 72 and 96 hours studied and assessed.

Materials and methods

In the verification process by using the adaptive table we want to control climatic data with the model output for both wave height and period parameters. For this purpose, threshold values smaller than or equivalent with 2 seconds and smaller than 5 seconds and the values between two mentioned thresholds for wave period also values $h<=25cm$, $25\ cm<h<50cm$, $h>50cm$ for wave height were calculated.

Moreover the skill scores of models for predicting wave height and period were calculated. Mean absolute and relative errors with the SWAN model and Buoy data for 48 hours forecasting were calculated and listed in Table .

As a sample graphs of the measured wave period and measured height wave by Buoy, with the predicted value of them are plotted. Summarized findings results of the analysis are obtained.

By examining the output values from the model and observation data for two regions of Bushehr and Assaluyeh and setting minimum and maximum values for the two parameters, the mention ranges are defined.

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Results and discussion

In Assaluyeh region more than 60 percent of cases, the wave height was between 25 cm<h<50cm and less than 15 percent of wave was height less than 25 cm (h <= 25cm). In this area, more than 71 percent of the wave frequency was between 2s<T <5s and less than 22 percent wave's frequency was 5s>T.

In Bushehr, about 21 percent of cases, the wave height was between 25 cm <h<50cm and less than 13 percent of wave height was less than 25 cm (h <= 25cm). In this area, about 52 percent of the wave frequency was between s5> T> s2 and more than 72 percent frequency waves was T>5 s.

Values obtained from the scores for forecasts 12, 24, 48, 72 and 99 hours shows that the model predictions for the both parameters in 48 hours forecasting in any two regions of Bushehr and Assaluyeh has high accuracy. Proportion Correction (PC) Values shows that more than of 94 percent, predicting the occurrence or non-occurrence waves frequency and more than 86 percent for the wave height performed correctly and in Assaluyeh this value for the wave frequency of more than 64 percent for wave height of more than 88 percent of cases have been predicted correctly.

Overall results of SWAN model verification on wave height and frequency have acceptable accuracy. The mean absolute errors of observation data show that the model accuracy for wave height is greater than its accuracy for the wave frequency.

Keywords: verification, discontinues table, climatic parameters.

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