

A hybrid method for wave simulation in selected nearshore areas of the Persian Gulf

Project manager: **Dr. Bahareh Kamranzad**

Contributors: **Ashkan Reisi-Dehkordi, Parastoo Salah**

Abstract

Since ocean waves are mainly wind induced, carrying out coastal engineering projects and investigating environmental issues call for determination of wind-generated wave characteristics, especially in nearshore areas. In this study, a nested grid SWAN model and a hybrid approach combining Artificial Neural Network (ANN) and coarse grid SWAN modeling results are used to hindcast the significant wave height in two nearshore locations in the Persian Gulf. However, the results are only valid in the regions where they are trained and tested. The models were calibrated in order to minimize the scatter index and the performances were compared, and the results show that the scatter index for significant wave height for both nearshore locations is less using the hybrid model rather than the nested one and there is no significant difference for the other error indices using both approaches. Regarding that the nesting approach is costly and consumes much more time in comparison to the hybrid one, and also taking into account that the nested model is unable to correctly calibrate wave height and other wave parameters, simultaneously and additional calibration may be required, the alternative hybrid approach is suggested to be

used in wave simulation in nearshore areas. It is because the proposed hybrid model takes advantage of both SWAN and ANN merits while trying to avoid their limitations.

Keywords:

Wave; numerical modeling; hybrid method; nearshore