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Evaluating the Pattern of Monsoon Wind Generated Waves in the Northwest of the Persian Gulf using Coupled Atmospheric and Wave Model

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Abstract

This research has been conducted to simulate the wind and wave pattern due to the winter Shamal Wind, which is a local systematic wind with the duration of 3 to 7 days, normally occurs in cold months of December to March. For simulating this phenomenon, the Coupled Ocean–Atmosphere–Wave–Sediment Transport (COAWST) model has been employed. In this model, the Weather Research and Forecasting (WRF) model was coupled with the Simulating WAves Nearshore (SWAN) model via the Model Coupling Toolkit (MCT). Simulated results of weather showed a cyclonic low pressure system in the middle of Iran's plateau, which is accompanied with a deep upper-level trough and polar front jet system. Simulated results showed an increase of about 1.1 m in significant wave height right after beginning of Winter Shamal Wind. It was also shown that the direction of wave propagation due to this wind was deviated to North and Northwest. Calculating statistical parameters, it was found that wind and wave results derived from COAWST could better represent the actual situation in the area comparing with the simulated results of WRF (for wind), and of SWAN (for wave). It could be concluded that for simulating wind and wave, specifically for stormy condition, COAWST is a reliable model.

Keywords: *Shamal wind Wave, COAWST, SWAN, WRF, Persian Gulf.*