

RESEARCH ARTICLE

Simulation of the atmospheric parameters during passage of a tropical storm over the South China Sea: a comparison with MetOcean buoy and ERA-Interim data

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Abstract

The accuracy of Weather Research and Forecasting (WRF) model derived meteorological fields during the passage of a tropical storm, Pabuk, over the southern South China Sea is investigated. The European Centre for Medium-Range Weather Forecasts' ERA-Interim data were also used for comparison. Data from a MetOcean buoy which captured tropical storm Pabuk were used to evaluate the accuracy of the WRF model. The period of study was from January 1, 2019 to January 5, 2019. Simulated parameters (surface temperature, wind speed and pressure) showed agreement with the buoy data before and after passage of the tropical storm. In contrast, model output shows differences from observations during the passage of the storm near 0600 UTC on January 3, 2019. Overall, surface pressure was simulated with a maximum correlation of 0.93 while the wind speed showed a minimum correlation of 0.76. The surface temperature was simulated with a correlation of 0.78. Weaker correlations arise due to differences in simulated and observed parameters during the storm. During the storm, model estimates overestimated the buoy wind speed and pressure data. The results show the inaccuracy of the simulation due to the vigorous conditions prevailing during the storm. The location of the centre of the storm differing between the model and the ERA-Interim data could also contribute to the discrepancy of the WRF data. The MetOcean buoy provided a rare opportunity for validation of the WRF model during the storm over the understudied shallow tropical South China Sea.

KEYWORDS

buoy, mesoscale modelling, simulation, tropical storm

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