

An angular–linear time series model for waveheight prediction

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Received: 4 January 2008 / Revised: 13 August 2008 / Published online: 1 October 2008
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Abstract The modeling of the dynamic relationship between the changes of the wind and the waveheight has been an important topic from various standpoints such as oceanography, technology and navigation safety. Generally, when we apply the standard statistical models for the waveheight prediction, the observation of wind direction has been treated as the ordinary time series data, not reflecting unique properties as directional data. In this article, we develop a time series model with linear and angular–linear variables, by extending the angular–linear regression model considered by Johnson and Wehrly. Our prediction test based on extrapolation suggested the possibility that the angular–linear time series structure gave positive effect on improving the prediction accuracy of the time series model, in which the original wind direction is included as a linear variable.

Keywords Directional time series model · Angular–linear regression · ARIMA model · Prediction · Waveheight · Wind direction