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Dynamic fuzzy modeling of significant wave height variation

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The purpose of this study is to investigate the relationship between wind speed, previous significant wave height and current significant wave height with the expectation that non-linear relationships including uncertainties can be identified. Compared to traditional approaches, fuzzy logic is more efficient in linking the multiple inputs to a single output in a non-linear domain. This paper presents a dynamic significant wave height prediction procedure based on the Takagi-Sugeno (TS) fuzzy modeling principles. Past measurements of significant wave height values and wind speed variables are used for training the adaptive model and it is then employed to predict the significant wave height amounts for future time intervals. The verification of the proposed model is achieved through the dynamic wave characteristics time series plots, observed versus predicted values scatter diagram and the classical ARMAX models. For the application of the proposed approach the offshore station located in the Pacific Ocean is used.