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A Bayesian method for data assimilation in probabilistic wave forecasting

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Abstract: New innovations are emerging which offer opportunities to reduce the uncertainty of forecasts of wave conditions. These include probabilistic modelling results, such as those based on an ensemble of multiple predictions which can provide a measure of the uncertainty, and new sources of observational data such as GNSS reflectometry and FerryBoxes, which can be combined with an increased availability of more traditional static sensors. This paper outlines an application of the Bayesian statistical methodology which combines these innovations. The method modifies the probabilities of ensemble wave forecasts based on recent past performance of individual members against a set of observations from various data source types. Each data source is harvested and mapped against a set of spatio-temporal feature types and then used to post-process ensemble model output. A prototype user interface is given with a set of experimental results testing the methodology for a use case covering the English Channel.

Keywords: Bayesian, Ensemble, Feature Types, Forecast, Observations, Waves