



Deterministic and Ensemble Storm Surge Prediction for Atlantic Canada With Lead Times of Hours to Ten Days

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Regional deterministic and ensemble surge prediction systems (RDSPS and RESPS respectively) are used to forecast sea levels off the east of Canada and northeast US. The surge models for the RDSPS and RESPS have grid spacings of $1/30^\circ$ and $1/12^\circ$ respectively. The models are driven by surface air pressure and 10 m winds generated by operational global deterministic and ensemble prediction systems that are run operationally by the Canadian Meteorological Centre. Surge forecasts are evaluated for the period 1 March, 2013 to 31 March 2014. Based on traditional statistics (e.g., standard deviation of the difference between observations and predictions) both systems are shown to have skill in forecasting surges six days into the future. It is shown however that skill exists beyond six days if allowance is made for errors in the timing of large surges. The usefulness of the RESPS is demonstrated for two positive surges (important for coastal flooding and erosion) and a negative surge (important for safe navigation in shallow water). It is shown that the RESPS can identify events not forecast by the RDSPS, and can also add useful additional information on the timing of the surge, an important consideration in tidally dominated waters. Several new types of display are used to illustrate the sort of information that can be generated by the RESPS to support the issuers of warnings of unusually high and low total water levels.