Assimilation of HF radar surface currents to optimize forcing in the northwestern Mediterranean Sea

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HF radar measurements are used to optimize surface wind forcing and baroclinic open boundary condition (OBC) forcing in order to constrain model coastal surface currents. This method is applied to a northwestern Mediterranean (NWM) regional primitive equation model configuration. A new radar data set, provided by two radars deployed in the Toulon area (France), is used. To our knowledge, this is the first time that radar measurements of the NWM Sea are assimilated into a circulation model. Special attention has been paid to the improvement of the model coastal current in terms of speed and position. The data assimilation method uses an ensemble Kalman smoother to optimize forcing in order to improve the model trajectory. Twin experiments are initially performed to evaluate the method skills (not shown here). Real measurements are then fed into the circulation model and significant improvements to the modeled surface currents, when compared to observations, are obtained.