



Blending of Radial HF Radar Surface Current and Model Using ETKF Scheme For The Sunda Strait

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Preliminary study of data blending of surface current for Sunda Strait-Indonesia has been done using the analysis scheme of the Ensemble Transform Kalman Filter (ETKF). The method is utilized to combine radial velocity from HF Radar and u and v component of velocity from Global Copernicus - Marine environment monitoring service (CMEMS) model. The initial ensemble is based on the time variability of the CMEMS model result. Data tested are from 2 CODAR Seasonde radar sites in Sunda Strait and 2 dates such as 09 September 2013 and 08 February 2016 at 12.00 UTC. The radial HF Radar data has a hourly temporal resolution, 20-60 km of spatial range, 3 km of range resolution, 5 degree of angular resolution and spatial resolution and 11.5-14 MHz of frequency range. The u and v component of the model velocity represents a daily mean with 1/12 degree spatial resolution. The radial data from one HF radar site is analyzed and the result compared to the equivalent radial velocity from CMEMS for the second HF radar site. Error checking is calculated by root mean squared error (RMSE). Calculation of ensemble analysis and ensemble mean is using Sangoma software package. The tested R which represents observation error covariance matrix, is a diagonal matrix with diagonal elements equal 0.05, 0.5 or 1.0 m²/s². The initial ensemble members comes from a model simulation spanning a month (September 2013 or February 2016), one year (2013) or 4 years (2013-2016). The spatial distribution of the radial current are analyzed and the RMSE values obtained from independent HF radar station are optimized. It was verified that the analysis reproduces well the structure included in the analyzed HF radar data. More importantly, the analysis was also improved relative to the second independent HF radar site. RMSE of the improved analysis is better than first HF Radar site Analysis. The best result of the blending exercise was obtained for observation error variance equal to 0.05 m²/s². This study is still preliminary step, but it gives promising result for bigger size of data, combining other model and further development.

Keyword: HF Radar, Sunda Strait, ETKF, CMEMS