

Assimilation of drifters' trajectories in velocity fields from coastal radar and model via the Lagrangian assimilation algorithm LAVA.

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LAVA (LAgrangian Variational Analysis) is a variational algorithm that assimilates drifters trajectories in the velocity fields (from radar or models). It corrects the current fields by minimizing the distance between drifter observed positions and numerical trajectories. Therefore it allows to optimize tracer transport prediction.

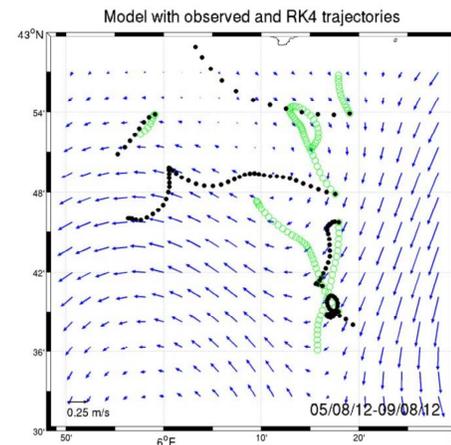


Figure 1

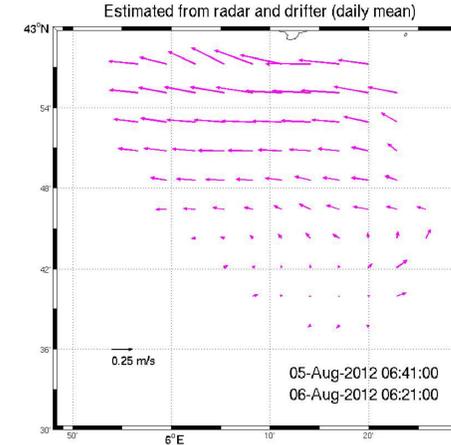
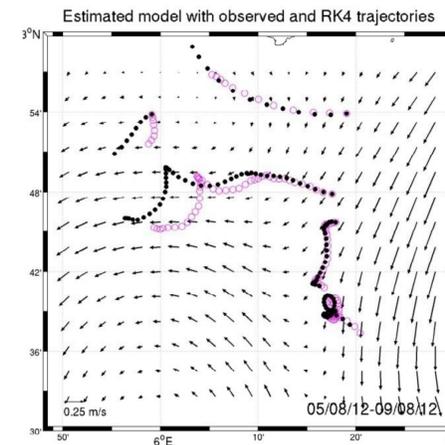
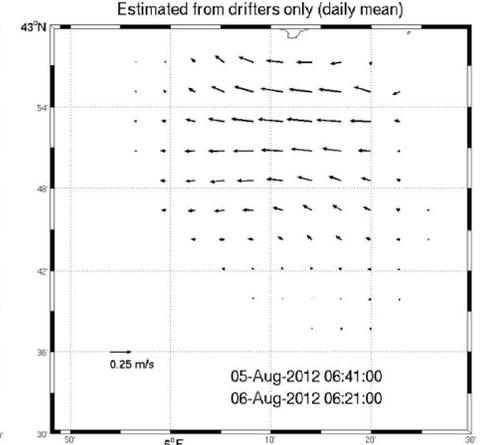


Figure 3



In this study, LAVA is applied to a TOSCA project experiment in the coastal area in front of Toulon (France). Surface currents are available from a WERA radar network (2km spatial resolution, every 20 minutes) and from the GLAZUR model (1/64° spatial resolution, every hour). 7 drifters have been used for the assimilation and the results are validated using other 13 drifters.

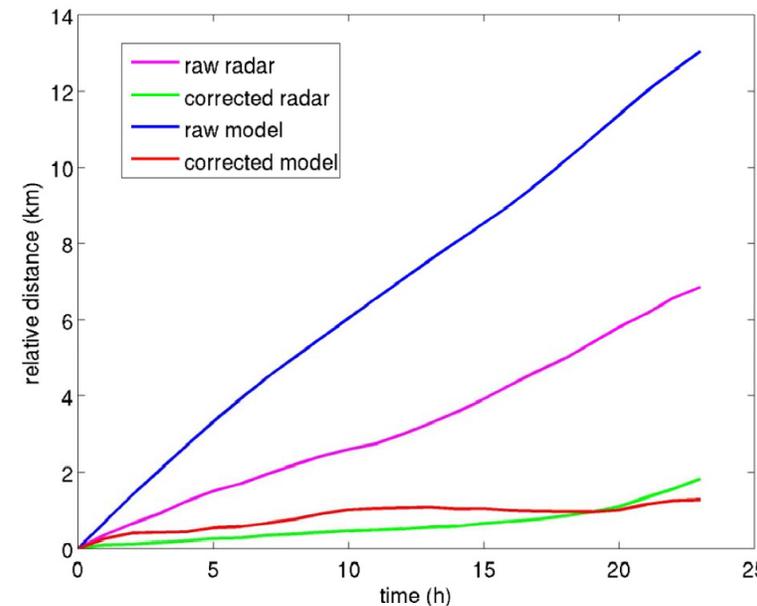


Figure 2

After LAVA correction, the prediction of the model trajectories is significantly improved (Fig.1: drifter trajectories are in black; green and purple represent synthetic model trajectories before and after LAVA).

Radar trajectories compare quite well with drifters, but they are further improved by LAVA (Fig.2).

Using drifters only, the velocity field is satisfactorily reconstructed and similar to the radar one, but limited to the neighbor of the drifter paths (Fig.3).

Three assimilation cases are considered:

- i)* correction of the radar velocity field,
- ii)* correction of the model velocity field,
- iii)* reconstruction of the velocity field from drifter only.

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