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Interactive comment on “Geostrophic currents and kinetic energies in the Black Sea estimated from merged drifter and satellite altimetry data” by M. Menna and P. -M. Poulain

Anonymous Referee #2

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The title describes the main focus of the manuscript. It is specific to surface currents since only these can be estimated (assuming geostrophic balance) from the altimetry.

“Focus” above is the correct word. There is some argument for the merits of the approach, but otherwise the approach is very much “we used this method for the Black Sea and here are the results”. The merits are vis a vis using drifters and altimetry separately, or an alternative way to combine them, but there is little assessment of how good absolutely are the results beyond qualitative statements about consistency (or not) of some features with earlier findings. Some quantitative assessment would help, and also some discussion of what factors are likely to make this approach perform well (or not) in other contexts. Many more potential readers will have interests in other

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areas than the Black Sea.

I wonder if this approach makes full use of the drifter data. They seem to be used only in a one-off regression for the whole time period as a “calibration” of the altimetry data which then becomes the main data source. This should be a point for discussion.

The presentation is generally straightforward / logical, and the English generally good although there will be changes when copy-edited.

Detailed comments

Page 1506. The Introduction should begin with some motivation about why Black Sea currents are particularly interesting.

The first paragraph discusses the merits of the approach relative to drifters and altimetry separately. What about comparison with other methods of estimating (Black Sea) currents?

Page 1507 line 23. “spikes” (maybe more than one).

Page 1508 lines 6-7. I do not understand “used with the drifter velocities” if the coefficients “ β and θ are drawn from the results obtained in the Mediterranean Sea from Poulain et al. (2012)” (lines 16-17). Was a regression carried out for the Black Sea data or were the results of Mediterranean Sea regression used?

Page 1509 equation (2). I guess that this regression is for each spatial bin separately but over all the daily data. Please clarify here (rather than later suggestions) and also that the velocities and B (also in line 12) are vectors. Is A just one scalar or could it reflect different scalings for two vector components as hinted in line 8 and later references to $|A|$?

Page 1509 lines 14 to 17. These additional motions only affect $|A|$ if they are somehow correlated with SLA but not with the “correct” magnitude.

Page 1509 line 24. Does this definition of UG imply that the values are derived from

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satellite altimetry only? Please clarify.

Page 1509 line 26. “less” implies a comparison – with what current estimate in this case?

Page 1510 equation (6) needs (. .) around the terms after the factor $\frac{1}{2}$.

Page 1511 line 5. Please define BE, SE at first use (here?) – Batumi Eddy, Sebastopol Eddy?

Page 1512 lines 5-6. If speeds are less than 10 cm/s then the MKE should be less than 50 cm²/s².

Page 1513 line 5 end. Either “can move” or “moves”.

Page 1514 lines 6-7 and 9-11. These periods of more intense activity should be stated all together; they need some rationalising as there seem to be two thresholds for “more intense” and overlapping times when they occur.

Several figures, especially figure 5, would benefit from larger lettering for any printed copy.

Interactive comment on Ocean Sci. Discuss., 10, 1505, 2013.

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