

Interactive comment on “A gridded surface current product for the Gulf of Mexico from consolidated drifter measurements” by Jonathan M. Lilly and Paula Pérez-Brunius

Anonymous Referee #2

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The authors carefully regrouped and processed an impressive amount of drifter data to generate two products. The first is the average state of the GoM with two different resolutions (one-quarter and one-twelfth degree) and the second product contains all drifters publicly available interpolated to hourly resolution. These products are a significant contribution to the oceanographic community studying the Gulf of Mexico (GoM), in particular for studies of the mean circulation and the interannual and seasonal variability. This manuscript is well written, the method is well explained, and the results and the method were validated using different drifter products, altimetry, and models. Thus, I recommend the publication of this manuscript after minor revisions.

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Fig. 2 and Fig. 3a,b show a very interesting east/west connectivity in the GoM. This path extending from the LC to the Mexican coast and bounded by a westward and eastward flow in the middle of the GoM is the averaged path of the westward propagation of the Loop Current Eddies (LCE). Although this LCE path exists, I doubt it would appear in a simple average of model data, and it does not appear in the altimetry average (Fig. 2a) – even though the LCEs are resolved by altimetry. The accentuated ‘LCE path’ in the drifter average product is possibly due to the sampling characteristic of the drifters - which are entrained into fast currents - or due to an oversampling of the LCEs. On the other hand, the accentuated circulation allows better visualization and study of the ocean structures that would be smoothed with other tools (altimetry, model, float, etc). It would be interesting to add a couple of sentences discussing these divergences between drifter vs model and altimetry products.

I. 104. Mention that the satellite-based product only accounts for the geostrophic component of the flow.

I. 118. The lack of structures in the CMEMS compared to the NSVC product is possibly due to spatial smoothing but also because CMEMS only resolves the geostrophic velocities.

I. 160. A recirculation/closed circulation exists in the bulge of the LC, so what you are seeing in Fig. 3b is not an artifact. However, as you mentioned, the averaging method might have accentuated this recirculation.

Fig. 2d. The cyclonic feature on the northeast flank of the LC represents the strong and frequent LCFEs found in this area.

I. 556 Describe briefly the main artifacts associated with averaging drifter trajectories with altimetry data and models vs the ‘truth’. Does the ‘LCE path’ appear in the model and altimetry ‘drifter’ average?

Add a sentence in section 5.4 saying that the error associated with the different size

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and depth of the drogues and drogued vs undrogued drifters is not estimated.

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