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This paper is devoted to reconstruction of the Black Sea reference velocity field for 1999-2009 and investigation of some aspects of it's seasonal and interannual dynamics, basing on drifter and altimetry data. Authors use novel method, allowing to make some interesting conclusions. However, article arise some serious questions and contains some uncertainness, that are discussed further.

Authors compute time-averaged geostrophic velocities UDG for 1999-2009 period and concurrent anomalies of altimetry velocities and use a simple regression model in order to find A and B, as UDG = A*USLA + B + error and then defines A, as "local adjustment of amplitude of USLA", where "Deviation of A from unity is mainly due to the oversmoothing of the satellite altimeter data and to the existence of residual winddriven components, non-linear boundary currents and ageostrophic acceleration in the drifter velocities (Niiler et al., 2003; Poulain et al., 2012)." and B, as "MDT expressed in terms of geostrophic velocities in the period 1999–2009".

1) The coefficient B arise some questions:
As authors mentioned in the article SLA data are defined with respect to a 7 yr mean (1993–1999) (Page 1508. Line 23). Actually this means that full dynamic topography (DT) (or geostrophic velocity(UDG)) can be derived as sum DT=SLA+MDT (or UDG=USLA+UMDT), where MDT is mean for the reference period (1993-1999) above the sea surface above geoid (see SSALTO/DUACS User Handbook: (M)SLA and (M)ADT Near-Real Time and Delayed Time Products). In fact this means that in order to compute MDT for reference period one can use difference between full signal (full dynamic topography or geostrophic velocity) and SLA, i.e.
UMDT=UDG(t)-USLA(t); (1)
Here UDG and USLA can be taken for same time t for any period and UMDT is constant in time field for 1993-1999. This is the conception of synthetic method for MDT estimation (see [Hernandez F. et. al., 2001; Rio et. al, 2003, 2007; Kubryakov, Stanichny, 2011;]). As one can use data for any time t, the new and new data can used for more precise definition of MDT for reference period (1993-1999) [Hernandez F. et. al., 2001], so this method have some preferences. For example we can take time t for 1999-2009 period only and time-average the eq.1
UMDT=<UDG(t)>-<USLA(t)>; (2)
here <> is time averaging for 1999-2009 period. In fact, authors uses the same formulae, however with additional coefficients
<UDG(t)> = A*<USLA(t)> + B + error, so B=<UDG(t)>-A*<USLA(t)>, (3)
and than defines B as "B is the offset between USLA and UDG and represents the MDT expressed in terms of geostrophic velocities in the period 1999–2009" (corresponding to time period of available drifter measurements).
Using (2) and (3) we can rewrite
UMDT+<USLA(t)>=B+A*<USLA(t)>; then
B=UMDT+(1-A)*<USLA(t)> (3)
This mean that UMDT, mean for 1993-1999 years, and B, mean for 1999–2009, differs on the constant in time field (1-A)*<USLA(t)>. If A is equal to 1, so there is no additional coefficient to SLA data, corresponding to mean bias due to " to the existence of residual wind-driven components, non-linear boundary currents and ageostrophic acceleration in the drifter velocities" we come to B=UMDT. So B is mean for 1993-1999 years and not for 1999–2009.

The coefficient B is equal to U_{MDT}^{93-99} only if A=1. Otherwise it derives from a combination of U_{MDT}^{93-99} and U_{DG}^{99-09}, as explained hereafter:

$U_{SLA}(t) = U_{DG}(t) + U_{MDT}^{93-99}$ **(1)**

$U_{DG}(t) = AU_{SLA}(t) + B + error(t)$ **(2)**

where U_{DG} is the geostrophic component of drifter velocities. If we estimate the mean in the period 1999-2009:

$$\langle U_{DG} \rangle_{99-09} = A \langle U_{SLA} \rangle_{99-09} + B + \langle error \rangle_{99-09} \quad \textbf{(3)}$$

the mean error is zero. Using (1) and (3) we obtain:

$$\langle U_{DG} \rangle_{99-09} = A \left\{ \langle U_{DG} \rangle_{99-09} - U_{MDT}^{93-99} \right\} + B \quad \textbf{(4)}$$

$$B = (1 - A) \langle U_{DG} \rangle_{99-09} + A U_{MDT}^{93-99} \quad \textbf{(5)}$$

then our sentence "The offset *B* represents the MDT expressed in terms of geostrophic velocities in the period 1999-2009 " is not totally correct! We have substituted this sentence with:" The offset *B* represents the MDT expressed in terms of geostrophic velocities, partly referred to the SLA definition period (1993-1999) and partly referred to the drifter data period (1999-2009)."

So the general statements in Introduction: "combined method, applied to concurrent satellite and drifter observations, gives an estimation of the Mean Dynamic Topography (MDT) of the BS in terms of absolute geostrophic velocity ïn˘A¸eld, over the period 1999–2009."
We have modified this sentence.

and in the Conclusion "The mean geostrophic currents derived from the combined method (Fig. 1c) can be considered more realistic and accurate than the currents estimated from the SMDT of Kubryakov and Stanichny(2011) for diffrent reasons: (1) the combined method is based on concurrent drifter and altimetry data for the period considered, whereas the synthetic method considers in-situ measurement and altimetry data collected in different time periods and the resulting SMDT is referred to the period in which the SLA data are referenced, whatever is the time measurement of the in-situ and altimetry data; " are not true and should be corrected.
We have removed this sentence from the Conclusion (section 4).

Once again, the phrase on page 1515, Line 8 " whereas the synthetic method considers in-situ measurement and altimetry data collected in different time periods and the resulting SMDT is referred to the period in which the SLA data are referenced, whatever is the time measurement of the in-situ and altimetry data; " is incorrect or hard to understand as synthetic method is based on simultaneous in time in-situ and altimetry measurements.
We have removed this sentence from the Conclusion (section 4).

2) The distribution of coefficient A, presented on the figure 1b, arise some questions.
In the center of the sea the coefficient A have rather high values. In this zone, however, one should assume the best quality of altimetry data, as coast doesn't affect the measurements. What is the explanation? Authors show further that one can compute total geostrophic velocity "for any time period in which USLA is available, independently from the availability of drifter data: <UG>u = A<USLA>u + B" (page 1509, line 24). Does this mean that each altimetry measurement of SLA in this area is underestimated in 1.5-2.5 times? What is the physical explanation? In other central zones A is 0.3-0.5, so here the SLA should be overestimated in 2-3 times? Why we observe such strong differences between two neighbor points? The same questions arise about coastal areas?
In the center of the Black Sea and in some coastal areas we have a limited number of drifter data (less than 20 days) than our model gives inaccurate results. For this reason we have focused our seasonal and interannual analysis only on the regions characterised by high density of drifter data (Anatolia and Crimea coasts, Batumi and Sevastopol areas).

Another arising question: A was defined as mean coefficient for the period 1999-2009. In this case, A can not take into account different changes in altimetry history, occurred in this time period (for example, appearance of new satellites and so on). So the advantage in the sentence "(1) the combined method is based on concurrent drifter and altimetry data for the period considered, whereas the synthetic method considers in-situ measurement and altimetry data collected in different time periods and the resulting SMDT is referred to the period in which the SLA data are referenced, whatever is the time measurement of the in-situ and altimetry data; " is not clear.

We have removed this sentence from the Conclusion (section 4).

3) Wind-driven component removal

Authors uses a simple regression model for removal of wind-driven component. " In this work we have used the results of the regression model applied in the Mediterranean Sea by Poulain et al. (2012): Uwind−driven + error = _ˆ(i_)*W + error, (1) where _ is a real constant and _ is the angle (positive anticlockwise) which represent, respectively, the estimations of intensity and the direction of drifter wind-driven currents with respect to the wind speed;"

Such simple method can lead to rather significant errors.

First, as the drifter drogue depth is centered on _ 15 meters depth, geostrophic component contribute significantly to the total movement. In case, when geostrophic velocity is in phase with wind-driven component such method will automatically exclude needed geostrophic signal. What is the solution of this problem?

As estimated by Poulain et al. (2009), the regression model used in this work between drifter-inferred currents and local wind velocities, are efficient in extracting only the Ekman currents with little contribution from the possible geostrophic wind-coherent currents at long temporal scales (> 10 days).

Second, as the drifter drogue depth is centered on _ 15 meters depth (not on the surface), wind-driven component (in classic assumption [Ekman, 1905]) will highly depend on the value of Ekman depth. It can be approximated by mixed layer depth, that vary significantly with season and area. In this work authors assume it constant - what errors will this issue?

Indeed an Ekman drifter model should include, in addition to the wind speed, the mixed layer depth and also the latitude (see Ralph and Niiler 1999 and Rio and Hernandez, 2004) . Here we have preferred to use the simplest model only dependent upon the wind speed and assuming a constant mixed layer or Ekman depth. We agree that there are uncertainties due to this assumption, but given the limited number of data points and the scarce information about the mixed layer depth (only climatological values could be used) we have chosen to use all the data points available in the simplest regression model.

And other questions: What are values estimated _, _ for the Black Sea? How significant was the coefficients of correlation during regression?

In the revised version of the manuscript we have specifically estimated the empirical coefficients in the Black Sea and we have added and commented the results (see Section 2 and Table 1).

Phrase in conclusion is incorrect: "The mean geostrophic currents derived from the combined method (Fig. 1c) can be considered more realistic and accurate than the currents estimated from the SMDT of Kubryakov and Stanichny (2011) for diffrent reasons ... the SMDT is estimated without removing the wind-induced slips and the wind-driven Ekman currents from the drifter velocities, assuming that the wind–driven component (direct slip and Ekman component) is negligible. " Authors in the Kubryakov and Stanichny (2011) has excluded all the data in the analysis, that corresponds to situations in which wind speed was more than 5m/s, in order to avoid significant influence of wind–driven component on the results. As the excluding of the wind component, especially on 15 meters depth, is not as simple question (see below), this approach can, in fact, lead to better estimates, not affected by wrong parameterization. So this phrase should be corrected.

We have removed this sentence from the Conclusion (section 4).