Anonymous Referee #1

We thank the anonymous referee #1 for its constructive remarks. Specific responses to the reviewer' comments are found below:

The paper represents an interesting attempt to combine the in-situ current measurements obtained by surface drifters and sea level anomaly obtained from satellites. Both methods separately have their shortcomings, and a combined dataset will provide helpful information on the distribution and variability of kinetic energy (in particular eddy kinetic energy) in the Black sea.

My main concern however is a confusion in the use of the concept of geostrophy in relation to the measurements obtained in mesoscale eddies and the method of assessing the wind driven components of currents.

By definition, a geostrophic current is the current in which the pressure gradient force is fully balanced by the Coriolis force. This can only be achieved under certain conditions, e.g. the current is in a steady state and flows along a straight line . Large scale currents such as the Rim current in the Black Sea are a good approximation to geostrophy. However currents associated with mesoscale eddies have a significant ageostrophic component due to the curvature of the flow„ see e.g. G.L.Mellor, 1996.Introduction to Physical Oceanography, ISBN: 1563962101. The departure of real currents from geostrophy needs to be assessed and discussed when comparing calculated currents (based on Sea Level Height and geostrophic equations) with real currents measured by the drifters. The importance of ageostrophic currents in can be seen from exchanges between the shelf and the deep sea in general (see e.g. Huthnance, J. M. (1995), Circulation, exchange and water masses at the ocean margin: the role of physical processes at the shelf edge, Prog Oceanogr, 35(4), 353-431), and in the Black Sea specifically, see e.g Ginzburg, A. I.et al, 2002. Mesoscale eddies and related processes in the northeastern Black Sea, J Marine Syst, 32(1–3), 71-90; Shapiro, G. I., S. V. Stanichny, and R. R. Stanychna, 2010 , Anatomy of shelf–deep sea exchanges by a mesoscale eddy in the North West Black Sea as derived from remotely sensed data, Remote Sens Environ, 114(4), 867-875. Geostrophic currents flow along the contours of constant depths, and hence they are unable to cross the shelf break.

Mesoscale eddies are characterised by a geostrophic and an ageostrophic components. The SLA derived from AVISO is accurate to discriminate the geostrophic component of mesoscale eddies in the Black Sea (http://www.aviso.oceanobs.com/en/news/idm/2008/mar-2008-black-seas-eddies.html**). Therefore, we have investigated only the geostrophic aspects of the mesoscale eddies and we can't discriminate the exchanges between the shelf and the open water. We have clarified this concept in the revised version of the manuscript (section 3.2.2) and we have quantified the difference, in terms of kinetic energy, between drifter total and geostrophic currents (section 2).**

The paper correctly states that drifters are influenced by wind driven currents and a formula is suggested to subtract a wind driven component from the current measured by drifters, see Eq (1). The empirical coefficients for this equation, which relates the wind driven current and the wind speed, have been calculated by the authors in their previous paper on the Mediterranean Sea. The accuracy or applicability of the same empirical coefficients to the Black Sea has not been discussed. The wind driven currents contribute significantly to the circulation in the Black Sea ,in particular in the autumn-winter months. Hence the accuracy of assessing the wind driven component should be carefully estimated and discussed in the paper.

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).

The paper can be published after these concerns have been addressed.