



EGUsphere, referee comment RC2
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Comment on egusphere-2022-202

Anonymous Referee #2

Referee comment on "Surface circulation properties in the eastern Mediterranean emphasized using machine learning methods" by Georges Baaklini et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-202-RC2>, 2022

The paper studies the long-term variability of the mesoscale structures in the Eastern Mediterranean Sea (EMS) using geostrophic velocities derived from altimetry. Authors found an intermittent occurrence of the mid-Mediterranean jet and an increase of the mesoscale activity in the Levantine basin.

I think that the topic is of interest and the approach that the authors try to follow is correct but the paper in its present form is still far from being publishable. Sections are mixed and the Ms is difficult to follow needing some editorial work. Figures do not provide the information that the authors want to present being in some cases repetitive or understandable.

Main concerns.

*The work is based on the application of SOM with a huge number of neurons and then grouping them using the HAC. The input layers correspond to the zonal and meridional velocities as well as the OW parameter. Then, at different sub regions statistics for the different parameters are evaluated including seasonal variations of clusters. If the objective of the Ms is to understand the mesoscale dynamics of the EMS the approach

would be first to perform a temporal SOM analysis to the (ug,vg) velocities (or alternatively the MKE) to obtain the zones of co-variability. This would also provide the time series of the velocities in each of the patterns. This has to be done in conjunction with a spatial SOM that will give the main mesoscale structures in the basin. The BMUs of these spatial patterns decomposition will give the seasonality that the authors want to explain. However if the objective is to analyse the eddy activity in the area I suggest to change for the input data the EKE, MEKE and the OW parameter. In the paper no mention is given to which SOM they are applying nor the 5 clusters that they finally ended.

Minor concerns.

* I assume that the data corresponds to daily velocities but this is never stated in the Manuscript. Why using daily data and not weekly or monthly if the objective is to analyse mesoscale structures?.

Figure 1 and 2 can be merged.

Figure 3. What are the units in the colorbar?

Figure 4A. What is the message in this figure?

Figure 5. I suggest defining the areas directly with the SOM (see main concern)

Figures 6-10. I don't understand the message behind these graphics.

Ln 90. Why using OW and velocities as input?

Page 6. Why 1400 neurons?

Lines around 120. What do you mean with "SOM is well organized"?

Line 132, C\$ instead of C5

Line 156 "iso-MDT" . There are no isolines in this plot

Section 3.1. See Main concerns.