

Geosci. Model Dev. Discuss., referee comment RC2
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Comment on gmd-2022-104

Anonymous Referee #2

Referee comment on "Basin-scale gyres and mesoscale eddies in large lakes: a novel procedure for their detection and characterization, assessed in Lake Geneva" by Seyed Mahmood Hamze-Ziabari et al., Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2022-104-RC2>, 2022

The study was carried out via comprehensive methods, including numerical models, remote sensing observations, and field observations. It made important contributions to the studies on (sub)mesoscale hydrodynamic motions and bio-geo-chemical process, and it also provided a successful example for how numerical model can be used to instruct the design of field campaigns.

Except for some minor issues in the text and figure descriptions, more detailed descriptions about the decomposition of OW parameter should be provided in the method and supplied in the results. Also, the effect from Coriolis force and thermal stratification should be further discussed if that is still within the scope of the study. I recommend the manuscript should be accepted subject to minor revisions. Please find my specific comments below:

- Abstract: the abstract contains too much introduction. More focus should be put on the major results you found via applying the numerical model and in field observations.
- Line 88-89: this sentence is not necessary.
- More discussion about the effect from Coriolis force and seasonal stratification on the gyres' size, lifetime, and boundary are required.
- The meteorological data used to drive the numerical model were from the atmospheric model, but the wind information showed in Fig. 5 and used to identify the event was from Buchillon field station. Have you compared the model input with the realistic wind data? How is the spatial variation in the wind field? The statement or comparison figure are required to clarify that.
- Fig. 2: Describe the sources of inset images in the figure.
- Line 230: Is there any specific reason for choosing September? Due to the availability of Satellite data? Or thermal stratification is vanishing in this month?
- Line 248-249: Why? The combine effect of Coriolis force?
- Fig. 3: What do the percentages in the figure represent?
- Fig. 5: Are the values in (a) and (c) integrated over a specific time range? Can you give

more explanation about how you decomposed OW parameter? In (e) and (f), the information is blur here. Why OW parameter is negative when Pown is positive? Does that mean Eown and Pown always have opposite signs?

- Line 404: Is that because the spatial resolution of the field measurement is not fine enough?
- Line 423: Did you record the lifetime of them?
- Fig. 9: description of panel (h)?
- Line 497-499: You have said that in the result part.