



EGUsphere, referee comment RC1  
<https://doi.org/10.5194/egusphere-2022-1073-RC1>, 2022  
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## **Comment on egusphere-2022-1073**

Anonymous Referee #1

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Referee comment on "Global submesoscale diagnosis using along-track satellite altimetry" by Oscar Vergara et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-1073-RC1>, 2022

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This paper provides global maps of mesoscale and small scale SSH wavenumber slopes and transit scale separating the circulation properties between balanced and unbalanced motions (Lt) based on the along track altimetric data from J3 and S3A. These global maps are very informative to our research community, especially the map of Lt is estimated for the first time using satellite observation. And this paper encourages much the upcoming SWOT mission, which is expected to provide high-quality data to make the global maps. I recommend the publication after minor revision.

### Minor comments

The global pattern of Lt (Fig. 6) is similar to that in Fig4 of Qiu et al. (2018) using a high-resolution simulation. However, most values of Lt appear to be relatively larger than those in Qiu et al. (2018). In addition, the Lt in this study is also relatively larger than that of the ADCP observations in the Western Pacific in Qiu et al. (2017). Could you provide the reason or discussion about this issue?

L66: Please add a reference (Lawrence and Callies 2022).

Lawrence, A., & Callies, J. (2022). Seasonality and Spatial Dependence of Mesoscale and Submesoscale Ocean Currents from Along-Track Satellite Altimetry, *Journal of Physical Oceanography*, 52(9), 2069-2089.

L120-121: Could you explain a little bit more about the distribution of noise level? Are the noise levels high in the regions around the Gulf Stream, Kuroshio Extension, and ACC?  
L123-124: Does the noise level increase simply increase from the equator to the poles?

L261: "Mesoscale spectral slope" should be "3.1.1 Mesoscale spectral slope".

L309: "Small-scale spectral slope" should be "3.1.1 Small-scale spectral slope".

Caption of Fig.4: Please clarify the shadings in Fig. 4c.

Caption of Fig.5: Is the figure the same as Fig.4, but S3A? And dashed gray lines in (c) correspond to Jason-3 zonal averages from Figure 4c.

L325 "as well as an increase in the uncertainty": Does it mean that the blank zone corresponding to not describing the small-scale slope increases toward the poles?

L344: The tropical instability waves distribute between 10S and 10N.