Thank you for your response to my comments and questions. I think there is a nice study hiding in the manuscript, but that there is still some work to find it.

The study addresses important questions and suggests an interesting framework for comparing Lagrangian and Eulerian scales, but while I respect the intention by the authors to only include mesoscales, I think this constraint has to be communicated more clearly. I originally assumed that the main story was to assess if Argo floats can be assumed Lagrangian when sampling Chl, but such analysis would need to include all scales that can be observed. I now realize that this assessment is of lower priority and that you mainly focus on understanding how Eulerian and Lagrangian timescales compare over mesoscales. This focus is of course valid, but the abstract, introduction ,and conclusions should be rewritten to deemphasize the question about the utility of Argo floats and if they can be considered Lagrangian. Also, please be careful when providing estimates of timescales of decorrelation since these are calculated for a simplified world without sub-mesoscale processes.

I am still quite concerned about your definition of material derivatives and the consequence it has on your results. Eq 1, as it is stated now, is correct when describing the material derivative of a field which is fixed in space, for example the temperature gradient in a small lake (https://en.wikipedia.org/wiki/Material_derivative) or a stationary velocity field as used by Middleton (1985). I don't think it's correct for Chl in the open ocean which will be advected together with the Lagrangian reference point though. Here, the material derivative in a Lagrangian frame is

$$\frac{DChl}{Dt} = \frac{\delta Chl}{\delta t}$$

And in a Eulerian frame

$$\frac{DChl}{Dt} = \frac{\delta Chl}{\delta t} + \boldsymbol{u}\nabla Chl$$

Please see for example eqs 1 and 2 in Chenillat 2015 (https://www.frontiersin.org/articles/10.3389/fenvs.2015.00043/full) or section 1.2.2 in https://www.usc.es/export9/sites/webinstitucional/en/investigacion/grupos/gfnl/documents/thesis/tesis_Florian.pdf. The paragraph on lines 85-97 is a bit confusing due to this. I read it as starting with talking about Chl, making a statement based on the material derivative of velocity in the middle, switching back to to talk about Chl, and finishing with a relationship based on Lagrangian and Eulerian observations of velocities. I am a bit reluctant to take the rest of the section at face value, especially equations 4 and 5, due to this. It might be that you can expand the findings by Middleton (1985) to a moving tracer, which is different from their assumptions of stationarity, but it would have to be carefully proven.

Finally, I still think that the organization and tone of the MS miss the intended audience. For example, I would have liked a more verbose discussion about the formalism for relating Eulerian and Lagrangian timescales described in Middleton (1985) and why it can be used for contrasting them. I'm also missing a more descriptive explanation of the different metrics that being used. What does for example u'/c^*_{Chl}, α_{Chl}, or q_{Chl} tell us? It can be found by reading the text and references carefully, but a reader might give up before figuring it out. Just a table listing all parameters and a short description for each of them would be very helpful. The description of ACF is very thorough but it's not easy to figure out what is specific with your approach without going through the section in detail. Finally, it would be good to add references to the equations that aren't original to this MS.