Reply on RC4
Yingli Zhu and Xinfeng Liang

Author comment on "Characteristics of Robust Mesoscale Eddies in the Gulf of Mexico" by Yingli Zhu and Xinfeng Liang, EGUsphere, https://doi.org/10.5194/egusphere-2022-789-AC5, 2022

Thank you very much for the prompt and helpful comments. We agree that the trajectory, birth, and death of the eddies presented in this study will likely differ from the results based on the Lagrangian approaches. In other words, unlike the Lagrangian coherent eddies, the Eulerian eddies are not likely the same eddies from birth to death but a series of perturbations that are related. Clearly, the meaning of our results depends on the interpretation of those "eddies." In this study, as mentioned above, we interpret the "SSH/Eulerian eddies" as perturbations or "waves", which reflect the generation, propagation, and dissipation of those related signals rather than coherent mass. We would like to state explicitly in the paper the differences between Eulerian eddies and Lagrangian coherent eddies. This can actually serve as a good opportunity to remind the oceanography community of the issues of Eulerian methods, such as what they are good for, and what they are not.

As you kindly pointed out, there is much useful information in this paper. And we aim to present that information in a more accurate way in a revised manuscript. A similar study based on the Lagrangian approaches presented in Andrade-Canto et. al. 2021, Andrade-Canto et. al. 2022a and Andrade-Canto et. al. 2022b is certainly important and could be done. But due to the tremendous effects needed for that, we prefer to conduct that as a follow-up study in the near future. And the comparison between Eulerian and Lagrangian results could be interesting.