

Ocean Sci. Discuss., referee comment RC2 https://doi.org/10.5194/os-2021-9-RC2, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

Comment on os-2021-9

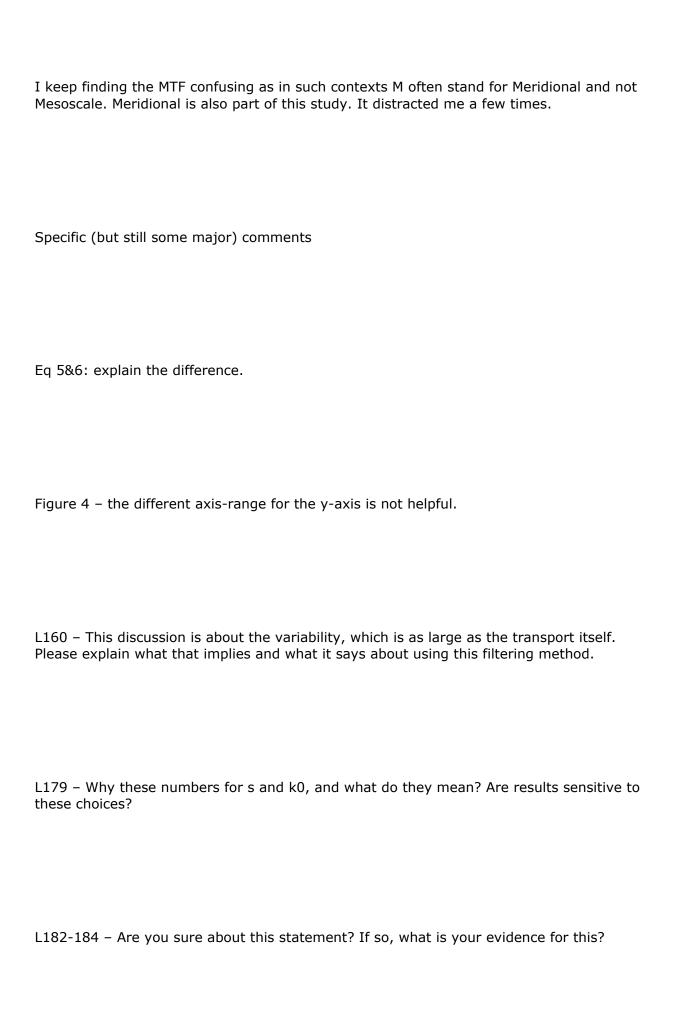
Anonymous Referee #2

Referee comment on "Global contributions of mesoscale dynamics to meridional heat transport" by Andrew Delman and Tong Lee, Ocean Sci. Discuss., https://doi.org/10.5194/os-2021-9-RC2, 2021

This paper decomposes the global heat transport into basins-scale, large-scale and mesoscale transports. Th main thing is to do so using a spatial filter, rather than the more common time-mean approach. The spatial filter results in different values for eddy heat transports than the time-mean method. However, little discussion is provided o why and how this benefits future work and what the differences really mean. Also, it is stated that this work help parameterization, but it is unclear how exactly. Overall, this paper could potentially be published, but it needs a clearer narrative, fewer figures, and improved use of symbols and names. Also, the importance of the results should be better explained and parts that are doubtful should be removed or require further argumentation.

Overall, I would recommend reducing this paper by a couple of figures and with that be more to the point about the most important results here. What is the main story and which figures do you need to prove this?

Rewrite section 2.2 to start with the most common method to define eddies as given in equation 10. From there introduce the spatial filter method. Then explain all the different types of eddies that are used in this paper (including eq 7,8,9) and more importantly, give them clear and distinct names. At this moment mesoscale is used in various different ways and definitions and it becomes very unclear.







| that percentagewise | or wha | it is the | correlation | factor? |
|---------------------|--------|-----------|-------------|---------|
| | | | | |

Section 5.2

I'm not convinced that this section is correct. It is based on a very big IF in L340. Check papers on changing Rossby radius of deformation and temperature on short and large scales. They both vary strongly with y. I'm not convinced this part is very meaningful, without more evidence that this could work.