The authors did a great job streamlining the paper and addressing concerns raised by the reviewers. I find it much easier to follow now and I think the paper can be published as it is, if the following very minor concern about the mixing length equations is addressed:

- Equation (12) $MTF \approx -\kappa \frac{\partial T}{\partial y}$

And remove the "which is generally negative or downgradient" (line 347). Diffusivity is per definition positive, a negative value of κ would indicate something going from a diffuse state to a concentrated state, which physically makes no sense. The negative sign "belongs" to the temperature gradient, indicating that the flux is downgradient.

- Equation (13) $\kappa \propto \sqrt{v'^2} \, L_{mix} \propto \sqrt{EKE} \, L_{mix}$

Since $\sqrt{v'^2} \neq \sqrt{EKE}$, but they are proportional with a factor of $\sqrt{2}$.

One major concern raised by reviewer#1 and me was about the underestimation of EKE in the model. I think the Appendix B addresses this problem adequately regarding the analysis of this paper and shows that the results are not overly sensitive to the low EKE. However, for the future it might be reasonable to analyze why the POP2 model (contrary to other ocean models with comparable horizontal resolution) underestimates EKE so substantially and to what extend this influences results from analyzing output of this specific ocean model.