Review report of "What is adiabatic fraction in cumulus clouds: high-resolution simulations with passive tracer" by Eytan et al. 2021

General comments:

This manuscript compares various method in calculating adiabatic fraction in cumulus clouds, which is an import parameter in quantifying the mixing level. The authors compared three ways in calculating the adiabatic LWC and their impacts on the AF. Besides, the authors examine the assumptions made in previous studies about the calculation of AF. This manuscript is clear about their method but lacks more explanations in the application of this study. I recommend a revision to emphasize the significance of this study more in either introduction or the discussion paragraph. Other specific comments and the minor corrections are below.

Specific comments:

- This study mentioned that it aims at identifying the errors from the assumption in calculation of AF in observations, but the manuscript only shows the results from an idealized model study. Can the author provide more clear linkage that how the results can improve the analysis of observation data?

- The reference AF is based on Equation 6 without considering the supersaturation (Line 166). The Section 3.2 shows that not considering supersaturation leads to errors especially in the lower cloud region of cleaner scenario. I think it better to use the full equation (Equation 5) to calculate the LWC_ref since it has less assumption.

- What are the recommendations for the calculation of AF in the future studies?

- This study has removed large-scale wind. How are the results influenced by a mean wind?

Minor corrections:

- Figure 2: it is better to show the differences by the AF-Tr, which is more straightforward for the readers to tell overestimation or underestimation.

- Figure 6 and Figure 7: it is better to use red-white-blue colors to show the differences (similar color scheme as Figure 3b-3f)

- Line 224: ql should have the l as subscript?