The authors express their deep gratitude to Referee #2 for his valuable comments are remarks

Comments on "Theoretical investigation of mixing in warm clouds – Part 3: Inhomogeneous mixing"

© This paper, in my opinion, is the most insightful of the three parts. Analytical results are obtained for droplet response for an idealized one-dimensional mixing and growth model. The appearance of the second non-dimensional parameter R, in addition to the already known non-dimensional parameter Da. As illustrated in Figure 16, this opens up a whole new range of possible conditions for homogeneous versus inhomogeneous mixing. It may help explain why in some cases observations have seemed to favor one type of mixing limit even when it was not thought to be dominant. I consider the paper an important theoretical advance in this now old problem of homogeneous vs inhomogeneous mixing.

® Thank you.

General criticisms:

© 1. As stated already in the reviews of parts 1 and 2, the relationship between this paper and the previous two papers is weak. Especially this paper is more stand alone. The idealized case considered here is distinct, and in fact also different compared with the real atmosphere, albeit still instructive of what may be happening in the fully 3D environment with dynamical feedbacks, etc. To me, the simplicity is a strength because it allows the underlying physics to become clearer, but the assumptions and caveats still need to be stated along with those of the other two parts.

® The list of main assumptions and simplifications is included to Section 2.

© 2. The results in this paper are very difficult to interpret in places. For example, there is no clear physical interpretation of the new dimensionless parameter R. In fact, it does not even have a name (in Table 1 it is simply referred to as "non-dimensional parameter). Please come up with a descriptive name and provide some

interpretation. Can you explain what range of R is realistically achievable in the atmosphere, and how it might vary with typical cloud conditions?

® Done. This parameter is now referred to as potential evaporation parameter (PEP). Explanations concerning this parameter are presented in Section 3 and in Conclusion.

"The first parameter R, referred in this paper as potential evaporation parameter (PEP) is proportional to the ratio between the saturation deficit in the initially droplet-free volume and the initial liquid water content in the cloudy volume. At $R < -1$, the final state is characterized by complete droplet evaporation and a spatially homogeneous saturation deficit, which indicates dissipation of the cloudy volume. At $R > -1$, the final state is characterized by existence of droplets and zero saturation deficit (RH=100%). In this case, the cloud volume expands after mixing with the entrained air."

© 3. This is not so much a criticism as a recommendation: can you, based on the findings of parts 2 and 3, suggest several specific measurements that could allow the type of mixing in a cloud to be identified with less ambiguity than is currently possible? Put another way, how can the central findings be experimentally verified? This kind of discussion will be very helpful in connecting the theoretical results to the experimental and observational parts of the field.

® Corresponding discussion is added into the conclusion section.

Specific comments

© 1. Figure 1 seems redundant with the previous sections, and is so simple that it can probably be deleted and instead described in words.

® fig 1 illustrate the design of the problem.

© 2. Check the sign of the second term in Equations 13, 14, 17, 18. It think they should be the opposite.

® Thank you. Corrected.

© 3. Same comment for q and LWC as in Parts 1 and 2.

® Done

© 4. Same comment for S as in Part 2.

® Done

© 5. Page 30343, line 10: “very” should be “vary”.

® The sentence is corrected

© 6. Page 30347, line 26-28: “at high R”, should be “at lower R” or “at higher |R|”? Also check other places in the text. For example: Page 30350, line 18: should be “lower |R|”? Page 30351, line 15: should be “small |R|”?

® We checked the values. We added the comment that since R<0, larger R is that closer to zero.

© 7. Add labels a) and b) in Figure 17.

® done