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Atmospheric Chemistry and Physics Discussions



# *Interactive comment on* "Freezing thresholds and cirrus cloud formation mechanisms inferred from in situ measurements of relative humidity" *by* W. Haag et al.

**Anonymous Referee #1**

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Reviewer 2 provided helpful and thorough comments to this manuscript. I do want to provide further comments about one issue in particular. The trajectory model assumes the total parcel mixing ratio is conserved throughout its history. This point seems unrealistic. I've looked at size distributions measured in-situ through the depth of subvisual tropical tropause cirrus. From those and reasonable estimates of particle density, I have calculated median mass flux-weighted particle fallspeeds for the distributions. (This flux is the total mass flux for each particle population divided by the ice water content). Near the tops of the layers, the median values are of order 5 cm/, whereas near the bottom they are 10 to 25 cm/s. The larger particles are likely to fall into dry air where they could be lost to the parcel. Over time, the parcel could dry out. Can you assess in some way the impact of this possible mechanism on your asssumption



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of constant total water mixing ratio?

A related point of question has to do with the ECMWF wind fields. Cirrus usually form in small-scale dynamic features such as gravity waves, small convective elements, K-H waves. The ECMWF wind fields will not capture these features in most cases. How sensitive are your results to small-scale convective elements?

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Interactive comment on Atmos. Chem. Phys. Discuss., 3, 3267, 2003.