

Interactive comment on “Cirrus clouds in convective outflow during the HIBISCUS campaign” by F. Fierli et al.

F. Fierli et al.

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Major comments:

The suggestions of the reviewers were extremely pertinent. The use of new data was required. Moreover, it was necessary to re-think the modelling part. So the paper has been substantially re-written. To the author's point of view this should lead to a more readable paper and to less generic conclusions. The comparison between Lidar and water vapour data provides significant elements for the analysis; this shows the presence of ice supersaturation up to 140 % in absence of ice clouds and lower values inside the clouds. Observed RHI helps to further interpret lidar data and to formulate an hypothesis on the estimate age of the cloud based on water cloud content and backscatter ratio. The analysis shows that mesoscale models, despite the use of parameterizations, provide a qualitative explanation of the observations. To our opinion,

this analysis provides a robust methodology that could be extended to larger databases and make use of global scale models and analysis.

The major revisions of the paper are:

- MODIS observations were added in Fig.2 and erroneous definition of aerosol optical thickness has been amended
- The water vapour observations from SDLA are thoroughly discussed and compared to lidar data in Figure 4.
- The ECMWF trajectories are no longer included and have been replaced by Bolam trajectories to take into account convective transport.
- Model microphysics is now discussed in model description section.
- Bolam model is compared directly to BRAMS (Marecal et al, ACP, same issue) and to SDLA water vapour in Figure 6 where the BOLAM ice water field is also shown.
- We have skipped the tracer transport analysis since main conclusions are inferred from trajectories: this to simplify the argumentation flow and to avoid the blurring of the results.
- Results discussion and conclusion are completely rewritten.

We also answer to the specific comments not included in the above revisions:

- Sensitivity studies have been carried out to improve significance of model results (refer to the answer to Rev. #4)
- Figure 7 is replaced by vertical profiles of BOLAM RHI and ice water contents with SDLA, BRAMS and Lidar observations. This allows a more direct comparison. Moreover a new figure shows the ice water field from Bolam.
- Grammar has been revised
- We have thoroughly discussed with V. Marecal and G. Durry in order to harmonize the results presented in the special issue.

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