

***Interactive comment on* “Transport of short-lived species into the Tropical Tropopause Layer” by M. J. Ashfold et al.**

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Anonymous Referee #2

Referee: This paper is an original study of the transport of short lived species into Tropical Tropopause Layer using back trajectories calculated with NAME, the UK Met Office Dispersion model. The paper is clearly written. The authors characterize the distributions of tracers of exchanges from the BL to the TTL in November 2006-2007 and 2008 to investigate what might occur in a future campaign in Borneo in November 2011, and during 2 previous campaigns (CR-AVE and TC4). I think that this paper is publishable in ACP if the authors clarify/improve/develop the following points:

Response: We thank the reviewer for their comments and address specific issues

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below.

Referee: 1) Page 442 Line 5 “We investigate the conditions which might occur during one such campaign, SHIVA, which takes place in Borneo during November 2011.” and page 445 line 6 “The trajectory calculations and analysis are in part motivated by our involvement in the SHIVA campaign, which will be based in Malaysian Borneo, and takes place in November 2011 (see <http://shiva.iup.uni-heidelberg.de/> for details)” This paper has been submitted in November 2011, we are now in February 2012 and it could be interesting to actualize this point and develop how this work has been useful relatively to SHIVA.

Response: We agree that comparing a similar analysis for November 2011 with the SHIVA data would be a valuable exercise, and plan to do this when possible. The aim of the work presented in this paper was to inform discussion in the build-up to the SHIVA campaign, rather than to provide real-time flight planning. Nevertheless, we hope to use this type of analysis in an operational, short-term forecast system in the future. SHIVA aside, the TTL over South East Asia is clearly an area of general interest, and we have slightly reworked the abstract to reflect this.

Referee: 2) The interannual variability investigated in the section 2.2 is probably strongly linked to the dynamical synoptic situations in place in November 2006, 2007, 2008. These situations could be more detailed as example with satellite images or data (WV Meteosat?)

Response: We agree a further investigation in to the dynamical causes of the modelled interannual variability would be very useful, and would help us to understand how much of the range of year-to-year variability we have sampled by studying only three years. However, we feel that to do so comprehensively is beyond the scope of this paper.

Referee: 3) Page 454 Line 16 “Figures 8 and 9 show that the trajectory calculations, as campaign means, are consistent with the observations” A scatterplot trajectory tracer vs measurements with correlation coefficients for each campaign would strengthen this

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assertion.

Response: We agree with the reviewer, and now include such a figure, for the CHBr₃ observations collected during both CR-AVE and TC4. We feel that this new figure supports our original arguments, and have added a number of related sentences to sections 4 and 5.

Referee: 4) For the figures 1, 4, and 5 : please add the latitude and longitude labels on the axis of the main figure, and the Y labels on the “count” plots. For the figures 2 and 6 : please write X and Y labels on all the subplots

Response: We are happy to make these changes to the plot labels.

Interactive comment on Atmos. Chem. Phys. Discuss., 12, 441, 2012.

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