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Interactive comment on "Testing our understanding of Arctic denitrification using MIPAS-E satellite measurements in winter 2002/3" *by* S. Davies et al.

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1. MarkIV comparison.

   We should have stated that the CLaMS model produces renitrificiation which is in much better agreement with the observations than SLIMCAT/DLAPSE and was a typogrphacial error on our part. We agree with the point made by Jens-Uwe Grooß that reproducing the detail of the MarkIV renitrification on December 16 is challenging due to the time and proximity of the edge of the renitrified zone in the model to the balloon launch location. Such a task is more likely to be successfully achieved in a fully Lagrangian model such as CLaMS rather than the

combined Eulerian/Lagrangian model used in this study. It is worth reiterating that the process of denitrification and renitrification occurs in 3-D space and therefore, for any single profile, it is not necessarily the case that the mass increase due to renitrification balances the mass loss by denitrification.

2. Use of model NO_y^*.

   It would be perfectly possible to compare MIPAS-E denitrification derived from HNO_3 - NO_y^* with similarly derived model denitrification rather than HNO_3 - passive NO_y as is done here. To do so would increase the dependence of the outcome on an additional model variable (N_2O). In order to do so, in-vortex model N_2O would require initialisation from MIPAS-derived N_2O in the early winter.

3. Positive MIPAS-E HNO_3 - NO_y^* outside vortex.

   The values shown in Fig. 2 indicate MIPAS-E derived HNO_3 - NO_y^* superimposed on model fields of HNO_3 - passive NO_y. The weak positive values of MIPAS-E ($\sim$1–2 ppbv) HNO_3 - NO_y^* are most likely due to to the limitations in the derivation of NO_y^* in the extra-vortex region although we have not fully investigated the MIPAS-E data in the extra-vortex region.

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