

Interactive comment on “The impact of ice uptake of nitric acid on atmospheric chemistry” by R. von Kuhlmann and M. G. Lawrence

Anonymous Referee #2

Received and published: 14 September 2005

This manuscript presents an important follow-on study that clarifies the importance of nitric acid removal by ice uptake and sedimentation in the upper troposphere. The authors address the uncertainty in physical aspects of the HNO₃ uptake process through sensitivity studies. The results include effects on HNO₃ and ozone distributions, methane lifetimes, and the sensitivity to non-methane hydrocarbons. The manuscript is well-written and well-organized; and has a clear expression of ideas and results. I recommend publication after the authors consider a few comments and suggestions.

P7367 The Popp et al results show an observed relationship between IWC and surface area density in convective ice clouds as in Heymsfield and McFarquhar. They also show % uptake of HNO₃ vs surface area density (Fig 13). It would be interesting to

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compare the model fields to these results. For example, under what conditions

Minor comments:

Abstract: 'neglected' is unclear. Better: 'chemistry compensates for the absence of HNO₃ uptake on ice in the model.' P7367 In 25 Change to: 'This larger range' P7368 In 21 Change to: 'simulations' P7372 In 12 Change to: 'by the model'

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 7361, 2005.

ACPD

5, S2619–S2620, 2005

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