

## ***Interactive comment on “Characterisation of the photolytic HONO-source in the atmosphere simulation chamber SAPHIR” by F. Rohrer et al.***

**F. Rohrer et al.**

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Reply to R. Cox (Editor)

We would like to thank the editor for his interest in our paper and his suggestions and comments. The concerns he raised are addressed below.

Precision of the empirical expression:

As stated on page 7893, last paragraph and on page 7894, first paragraph, the photolytic HONO production in SAPHIR changed during August 2002 by a factor of 1.8 caused by unknown reasons. However, before and after this change, the precision of the empirical expression describing the HONO production was very high. Accordingly, we conclude that the chamber related source must be quantified in regular intervals to

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confirm its stability. We will add this conclusion in the revised manuscript.

Hinted general application of the empirical equation:

As stated on page 7892, lines 5-10, the aim of the paper was a parameterisation of the photolytic HONO production without any chemical model, since the exact mechanism of the source could still not be identified. Accordingly, we have not included the S/V ratio in equation (E1). However, we agree with the editor that the process is most probably a heterogeneous one and thus will depend on the S/V ratio. Accordingly, other groups using simulation chambers might use the given equation (E1) of the HONO production in SAPHIR to compare this to the measured HONO production in their chambers taking into account the different S/V ratio. The S/V ratio for SAPHIR of approx. 1 m<sup>-1</sup> is given on page 7885, line 9. We would like to emphasised that equation (E1) must not be used to calculate the HONO source in other simulation chambers. However, we encourage the simulation chamber community to check the validity of this formula for the different chambers. We will add this information in the revised manuscript.

In addition, from the discussion on page 7899, lines 11-18, the editor might have got the impression that the mechanism for the photolytic HONO production in SAPHIR is similar to that in the atmosphere, so that the empirical expression might be used for the calculation of atmospheric HONO formation. However, since we could not identify the exact mechanism, this cannot be concluded. The paragraph should simply highlight that SAPHIR is a suitable tool for atmospheric simulation experiments at ambient conditions, since the HONO concentrations inside the chamber are similar to situations observed in the atmosphere. We will add this information in the revised manuscript.

Dependence on oxidised nitrogen:

As already discussed in the manuscript, the exact mechanism remains an open question. Thus, we cannot answer the editors question, where the nitrogen comes from and we can definitely not give any dependency on any precursor, i.e. any oxidised nitrogen compounds. However, as already calculated on page 7897, lines 18-21, only a very

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small fraction of a precursor must be present in the Teflon foil to explain the observed HONO formation. In order to give a more general estimate, we will modify this calculation in the revised manuscript, by giving a nitrogen content of approx.  $10^{-8}$  in the Teflon foil to explain the observed formation during a typical experiment.

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 7881, 2004.

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