

Home

Online Library ACP

- Recent Final Revised Papers
- Volumes and Issues**
- Special Issues
- Library Search
- Title and Author Search

Online Library ACPD

Alerts & RSS Feeds

General Information

Submission

Review

Production

Subscription

Comment on a Paper

Impact
Factor
4.865

ISI
indexed



[Volumes and Issues](#) [Contents of Issue 8](#)

Atmos. Chem. Phys., 5, 2189-2201, 2005
www.atmos-chem-phys.net/5/2189/2005/

© Author(s) 2005. This work is licensed
under a Creative Commons License.

Characterisation of the photolytic HONO-source in the atmosphere simulation chamber SAPHIR

F. Rohrer¹, B. Bohn¹, T. Brauers¹, D. Brüning¹, F.-J. Johnen¹,
A. Wahner¹, and J. Kleffmann²

¹Institut für Chemie und Dynamik der Geosphäre II: Troposphäre,
Forschungszentrum Jülich, Jülich, Germany

²Physikalische Chemie/FB C, Bergische Universität Wuppertal, Wuppertal,
Germany

Abstract. HONO formation has been proposed as an important OH radical source in simulation chambers for more than two decades. Besides the heterogeneous HONO formation by the dark reaction of NO₂ and adsorbed water, a photolytic source has been proposed to explain the elevated reactivity in simulation chamber experiments. However, the mechanism of the photolytic process is not well understood so far. As expected, production of HONO and NO_x was also observed inside the new atmospheric simulation chamber SAPHIR under solar irradiation. This photolytic HONO and NO_x formation was studied with a sensitive HONO instrument under reproducible controlled conditions at atmospheric concentrations of other trace gases. It is shown that the photolytic HONO source in the SAPHIR chamber is not caused by NO₂ reactions and that it is the only direct NO_y source under illuminated conditions. In addition, the photolysis of nitrate which was recently postulated for the observed photolytic HONO formation on snow, ground, and glass surfaces, can be excluded in the chamber. A photolytic HONO source at the surface of the chamber is proposed which is strongly dependent on humidity, on light intensity, and on temperature. An empirical function describes these dependencies and reproduces the observed HONO formation rates to within 10%. It is shown that the photolysis of HONO represents the dominant radical source in the SAPHIR chamber for typical tropospheric O₃/H₂O concentrations. For these conditions, the HONO concentrations inside SAPHIR are similar to recent observations in ambient air.

[Final Revised Paper](#) (PDF, 983 KB) [Discussion Paper](#) (ACPD)

Citation: Rohrer, F., Bohn, B., Brauers, T., Brüning, D., Johnen, F.-J., Wahner, A., and Kleffmann, J.: Characterisation of the photolytic HONO-source in the atmosphere simulation chamber SAPHIR, Atmos. Chem. Phys., 5, 2189-2201, 2005. [Bibtex](#) [EndNote](#) [Reference Manager](#)

Search ACP

Library Search

Author Search

News

- Sister Journals AMT & GMD
- Financial Support for Authors
- Journal Impact Factor
- Public Relations & Background Information

Recent Papers

01 | ACP, 16 Feb 2009:
Total and partial cloud amount detection during summer 2005 at Westerland (Sylt, Germany)

02 | ACP, 16 Feb 2009:
Attribution of projected changes in summertime US ozone and PM_{2.5} concentrations to global changes

03 | ACP, 16 Feb 2009:
Simulation of dust aerosol and its regional feedbacks over East Asia using a regional climate model