

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



Volumes and Issues Contents of Issue 3

Atmos. Chem. Phys., 6, 601-611, 2006  
www.atmos-chem-phys.net/6/601/2006/  
© Author(s) 2006. This work is licensed  
under a Creative Commons License.

## The observation of nitric acid-containing particles in the tropical lower stratosphere

P. J. Popp<sup>1,2</sup>, T. P. Marcy<sup>1,2</sup>, E. J. Jensen<sup>3</sup>, B. Kärcher<sup>4</sup>, D. W. Fahey<sup>1</sup>, R. S. Gao<sup>1</sup>, T. L. Thompson<sup>1</sup>, K. H. Rosenlof<sup>1</sup>, E. C. Richard<sup>1,2,\*</sup>, R. L. Herman<sup>5</sup>, E. M. Weinstock<sup>6</sup>, J. B. Smith<sup>6</sup>, R. D. May<sup>7</sup>, H. Vömel<sup>8</sup>, J. C. Wilson<sup>9</sup>, A. J. Heymsfield<sup>10</sup>, M. J. Mahoney<sup>5</sup>, and A. M. Thompson<sup>11</sup>

<sup>1</sup>Chemical Sciences Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, CO 80305, USA

<sup>2</sup>Cooperative Institute for Research in Environmental Sciences, University of Colorado, Boulder, CO 80309, USA

<sup>3</sup>NASA Ames Research Center, Moffett Field, CA 94035, USA

<sup>4</sup>Institut für Physik der Atmosphäre, Deutsches Zentrum für Luft- und Raumfahrt, Oberpfaffenhofen, Germany

<sup>5</sup>Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109, USA

<sup>6</sup>Atmospheric Research Project, Harvard University, Cambridge, MA 02138, USA

<sup>7</sup>MayComm Instruments, San Dimas, CA 91773, USA

<sup>8</sup>Global Monitoring Division, Earth System Research Laboratory, National Oceanic and Atmospheric Administration, Boulder, CO 80305, USA

<sup>9</sup>Department of Engineering, University of Denver, Denver, CO 80208, USA

<sup>10</sup>Mesoscale and Microscale Meteorology Division, National Center for Atmospheric Research, Boulder, CO 80301, USA

<sup>11</sup>Department of Meteorology, Pennsylvania State University, University Park, PA 16802, USA

\* now at: Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder, CO 80303, USA

**Abstract.** Airborne in situ measurements over the eastern Pacific Ocean in January 2004 have revealed a new category of nitric acid (HNO<sub>3</sub>)-containing particles in the tropical lower stratosphere. These particles are most likely composed of nitric acid trihydrate (NAT). They were intermittently observed in a narrow layer above the tropopause (18±0.1 km) and over a broad geographic extent (>1100 km). In contrast to the background liquid sulfate aerosol, these particles are solid, much larger (1.7-4.7 μm vs. 0.1 μm in diameter), and significantly less abundant (<10<sup>-4</sup> cm<sup>-3</sup> vs. 10 cm<sup>-3</sup>). Microphysical trajectory models suggest that the NAT particles grow over a 6-14 day period in supersaturated air that remains close to the tropical tropopause and might be a common feature in the tropics. The small number density of these particles implies a highly selective or slow nucleation process. Understanding the formation of solid NAT particles in the tropics could improve our understanding of stratospheric nucleation processes and, therefore, dehydration and denitrification.

Final Revised Paper (PDF, 463 KB) Discussion Paper (ACPD)

Citation: Popp, P. J., Marcy, T. P., Jensen, E. J., Kärcher, B., Fahey, D. W., Gao, R. S., Thompson, T. L., Rosenlof, K. H., Richard, E. C., Herman, R. L., Weinstock, E. M., Smith, J. B., May, R. D., Vömel, H., Wilson, J. C.,

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, 23 Dec 2008: Measurement of glyoxal using an incoherent broadband cavity enhanced absorption spectrometer

02 | ACPD, 23 Dec 2008: Single particle characterization using a light scattering module coupled to a time-of-flight aerosol mass spectrometer

03 | ACP, 23 Dec 2008: Corrigendum to "Modeling the effect of plume-rise on the transport of carbon monoxide over Africa with NCAR CAM" published in

Heymsfield, A. J., Mahoney, M. J., and Thompson, A. M.: The observation of nitric acid-containing particles in the tropical lower stratosphere, *Atmos. Chem. Phys.*, 6, 601-611, 2006. [Bibtex](#) [EndNote](#) [Reference Manager](#)