Atmos. Chem. Phys. Discuss., 2, S930–S932, 2002
www.atmos-chem-phys.org/acpd/2/S930/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric measurements of gas-phase HNO3 and SO2 using chemical ionization mass spectrometry during the MINATROC field campaign 2000 on Monte Cimone" *by* M. Hanke et al.

G. Huey

greg.huey@eas.gatech.edu

Received and published: 26 January 2003

Sorry my review ended up here. I was at the deadline and didn't know you had to register before you could post a review.

This manuscript presents an impressive series of continuous measurements of HNO3 and SO2 during the MINATROC campaign. The description of the measurement techniques is detailed and demonstrates a sound approach that inspires a high level of confidence in the data. In addition, the incorporation of the background measurements and in situ calibrations is an important addition to the MPI CIMS method. The paper

also presents a convincing argument that air masses impacted by African dust storms are depleted in HNO3 due to uptake on dust. The observed anticorrelation between the HNO3 mixing ratio and large particle surface area is striking. I certainly support publication of this document but I do have a few points the authors might wish to address.

1) The frequency at which this site is impacted by air of African origin is relatively small ~ 10%. The only time period with African dust is July 3-4 and there are only a few short periods of African w/o dust. This doesnŠt give as large of a data set as one would like to make a strong conclusion. Low values of HNO3 are certainly observed during July 3-4 and I agree uptake onto large particles is the most likely answer. However, are there any other explanations such as cloud processing, a long transit time in the marine boundary layer and scavenging on sea salt aerosol, origination in a region with relatively low NOx emissions?

2) The comparison of the NOy and the HNO3 measurements is certainly troubling and unfortunately calls into question one or both of the measurements. I find it very hard to believe that HNO3 comprises much more than 50% of NOy on average at this location with the rest PAN and NOx. I also doubt that the CIMS technique is sensitive to particulate nitrate but it is likely for an NOy instrument given the high temperature of this instrument. I think a likely explanation is that the NOy inlet may not efficiently pass nitric acid. This possibility could be examined by looking at the HNO3 /NOy ratio during periods that HNO3 is expected to be low such as during the dust storm. Does this ratio significantly decrease during this period? Does the NOy decrease during this period relative to the case of African air w/o dust? In short I think the comparison of the two measurements could be extended and estimate of CIMS sensitivity of NH4NO3 could be shortened.

3) Figure 6. is very hard to read in the printed version. I highly recommend increasing the size of this figure if possible. It would also be useful to include aerosol surface area density in the time series.

ACPD

2, S930–S932, 2002

Interactive comment on Atmos. Chem. Phys. Discuss., 2, 2209, 2002.