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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.

M. Hanke et al.

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Response to comment 1: Before responding one should take into account the results presented in Putaud et al., this issue, van Dingenen et al. (2002) and Bonasoni et al. (2002). During the dust episode, the coarse aerosol volume ($>$ 1 micrometer) is strongly increasing with no significant change in the sub-micron aerosol volume ($<$ 1 micrometer). The number concentration of fine particles with diameters below 400 nm was even slightly decreasing. The size-segregated aerosol mass closure and chemical composition measurements of Putaud et al. yielded that, during the Saharan dust outbreak, coarse dust and fine anthropogenic particles were externally mixed, and that no significant oxidation of SO2 on mineral dust particles occurred in the Saharan

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dust plume. In contrast, nitrate was shifted towards the aerosol super-micron fraction in the presence of desert dust. No Ca2+, however, was observed in the sub-micron aerosol collected with the SJAC. The latter finding allows speculating that the small particles do not result from dust and that they might serve as a tracer for polluted air as stated above. This is supported by the positive correlation between the small particles with a diameter below 559 nm and the trace gases HNO3, SO2 and O3. Therefore the separation between small and big particles was used to distinguish between the air masses of Saharan origin and air masses from anthropogenic origin. As already stated in the paper, a full chemical characterization of the air mass during this dust event was not possible due to the lack of data concerning NO, NO2, NOy, CO, and HCHO, which were not measured anymore after June 30 and which would have allowed an insight into transport processes and hence the mixing of polluted air masses with the dust plume. The separation into these two classes (smaller particles with a diameter below 559 nm and bigger particles with a diameter larger than 721 nm) was chosen based on Seinfeld and Pandis (1997), where a typical desert aerosol surface distribution starts at diameters around 0.7 - 1 micrometer.

Bonasoni, P., Calzolari, F., Cristofanelli, P., Bonafè, U., Evangelisti, F., Van Dingenen, R., Balkanski, Y., Ozone and aerosol correlation during dust transport episodes at Mount Cimone during MINATROC project, A changing atmosphere, Proceedings. of the 8th Symposium on the physico-chemical behaviour of atmospheric pollutants, Torino, 2002.

Putaud, J.-P., Van Dingenen, R. DellŠAcqua, A., Matta, E., Decesari, S., Facchini, M. C., and Fuzzi, S., SizeŰsegregated aerosol mass closure and chemical composition in Monte Cimone (I) during Minatroc, this issue.

Seinfeld, J. H., and Pandis, S. N., Atmospheric chemistry and physics, John Wiley and Sons, New York, 1997.

Van Dingenen, R., Putaud, J.-P., Roselli, D., DellŠAcqua, A, Perrone, M. G., Bonasoni,

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P., Facchini, M. C., Aerosol Properties at Monte Cimone (Italy) During and Outside a Saharan Dust Transport Event, A changing atmosphere, Proceedings. of the 8th Symposium on the physico-chemical behaviour of atmospheric pollutants, Torino, 2002.

Response to comment 2: Comparing the data of Fischer et al., this issue, with our measurements shows, that on June 13 Ű14 and June 26 relatively clean air masses coming from areas of low emissions were probed on Monte Cimone. Further data analysis is being carried out.

Response to comment 3: Due to the short duration of the dust event we did not dare to interrupt the measurements with diagnostic measurements not to lose important atmospheric information. We calibrated the instrument one day before the onset of the dust intrusion and then on 6th July again. Within the limits of uncertainties we did not see a significant difference between the calibration factors before and after the event. This is also confirmed by the measurements of this year at Izana, Tenerife, where calibration measurements were carried out before, during and after a dust event, and no significant differences were observed between the calibration factors. Based on this one conclusion could be that due to the short residence time in the sampling line possible processes changing the calibration factor are likely to be negligible.

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