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5, S4001–S4002, 2005

Interactive Comment

## Interactive comment on "The heterogeneous chemical kinetics of $N_2O_5$ on $CaCO_3$ and other atmospheric mineral dust surrogates" by F. Karagulian et al.

## Anonymous Referee #2

Received and published: 18 November 2005

This paper reports results of an experimental Knudsen cell study of the interaction of N2O5 with mineral dust surrogates in relation with potential importance of these processes in the chemistry of the atmosphere.

I fully agree with all the comments and questions of Referee #1 and with the conclusion that the paper needs a significant revision before publication.

Additional comments and questions:

P10374, L2-8. What about excess ozone: might it be trapped at 195K together with

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N2O5.

P10381, L1-13. This discussion, particularly the part concerning the kinetics of HNO3 formation (Figure 1), seems to be questionable as it does not consider large and irreversible uptake of HNO3 on mineral surfaces observed previously (e.g. Hanisch, 2001b, gamma between 0.08 and 0.2 for different mineral dust samples).

P10382. The data presented in Figure 4 and their interpretation (L16-21) are in contradiction with the statement on page 10380: "This assumes that at steady-state the total internal area of the powder sample is accessible to N2O5...".

P10384, Table 5. Initial uptake was found to be dependent on the concentration of N2O5. How do you explain it? My filling is that the initial uptake should be independent of N2O5 by definition.

P10389, L6-8. Is it correct to use the total surface area density for Saharan Dust in combination with the value of uptake coefficient derived with geometric surface area?

P10408, Caption to Figure8. Replace NO3 with N2O5, "open circles" and "full triangles" should be probably replaced with "circles" and "triangles", respectively.

Throughout the manuscript. It is difficult to realise what does a "steady-state" uptake mean. My impression from the reported data is that in fact "steady state" was never achieved, uptake coefficient being dependent on time (decreasing) in all the experiments.

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