

## ***Interactive comment on “Uptake of HNO<sub>3</sub> to deliquescent sea-salt particles” by C. Guimbaud et al.***

**C. Guimbaud et al.**

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Answer to Anonymous referee 1

Answer n°1 : Maximum N<sub>2</sub>O<sub>5</sub> production

The maximum rate (molecule s<sup>-1</sup>) for the N<sub>2</sub>O<sub>5</sub> production (from reactions 1 and 2) is at least 3000 times slower than the minimum rate of HNO<sub>3</sub> production (from reaction 3), implying that uptake of N<sub>2</sub>O<sub>5</sub> on particles cannot falsify the uptake of HNO<sub>3</sub>. This value is calculated according to (i) the IUPAC recommended rate constants for reactions 1 and 3; (ii) the maximum O<sub>3</sub> concentration produced by the Xe excimer UV lamp (100 ppbv) and (iii) the minimum OH concentration produced by this UV lamp

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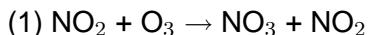
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(1ppbv) for the lowest  $\text{HNO}_3$  concentration used under our experimental conditions (2ppbv).

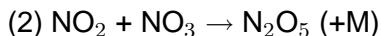
References:



$k(1\text{bar}, 298\text{K}) = 3.5 \times 10^{-17} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$

[http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx28\\_NO2\\_O3.pdf](http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx28_NO2_O3.pdf)

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$k(\infty, 298\text{K}) \simeq 2 \times 10^{-12} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$

[http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx31\\_NO2\\_NO3.pdf](http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx31_NO2_NO3.pdf)



$k(1\text{bar}, 298\text{K}) = 1.1 \times 10^{-11} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$

[http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx13\\_HO\\_NO2.pdf](http://www.iupac-kinetic.ch.cam.ac.uk/datasheets/gas/NOx13_HO_NO2.pdf)

Answer n°2 : Comparison with pure NaCl aerosol

The purpose of Fig. 2, representing the growth factor study of our marine sea-salt aerosol, is not to determine with accuracy the Deliquescence Relative Humidity (DRH) and the Efflorescence Relative Humidity (ERH) values for our sea-salt but just to confirm that particles remain deliquescent (supersaturated) under our experimental conditions. Also, the DRH and ERH values observed are approximate and they cannot be accurately and easily compared with pure NaCl aerosols because they are extremely

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dependent on the nature and on the amount of the impurities present in sea-salt. Thus, we only describe the growth factor characteristics of our marine sea-salt aerosol to assess the extent of supersaturation.

However, we will add a paragraph in section 2.2. to briefly compare the growth factor of our marine aerosol with the one observed for a pure NaCl aerosol by Tang et al., (1977) and Gysel et al. (2001).

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 2, 739, 2002.

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