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Toward a general parameterization of N_2O_5 reactivity on aqueous particles: the competing effects of particle liquid water, nitrate and chloride

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Abstract. The heterogeneous reaction of N_2O_5 on mixed organic-inorganic aerosol particles was investigated using an entrained aerosol flow tube coupled to a custom-built chemical ionization mass spectrometer.

Laboratory results on aqueous particles confirm a strong dependence of the reactive uptake coefficient (γ) on particle liquid water, for particle water concentrations below 15 M, and the molar ratio of particle water to nitrate. Measurements of γ (N_2O_5) on mixed chloride-nitrate particles indicate that the presence of trace chloride can negate the suppression of $\gamma(N_2O_5)$ at high nitrate loadings with implications for polluted coastal regions. These results are used to construct a new parameterization for γ (N_2O_5), that when coupled to an aerosol thermodynamics model, can be used within regional and/or global chemical transport models.

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