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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Reactive uptake of N_2O_5 to internally mixed inorganic and organic particles: the role of organic carbon oxidation state and inferred organic phase separations" *by* C. J. Gaston et al.

Anonymous Referee #1

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This is an interesting manuscript which systematisizes the effects of different organic (mixture)(s) on the uptake of N2O5 on atmospheric particles, relative to an inorganic reference state. The manuscript takes into account organic fraction, organic composition (O/C) and particles morphology (phase separation). Application of an analytical solution of the reacto-diffuse equation considering coatings (Antilla model) with modifications / constraints derived from measurments and adjusting the free parameters gives insights into sensitivity and critical paarmeters.The authors derrive from the lab results and model a range of possible effects of organic aerosol components for a range

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of atmospheric conditions and atmospheric organic particle properties. This is showing despite the wide variety of conditions and properties of moxed organic/inorganic particles that reduction of N2O5 uptake is significant and should be considered. The manuscript is well writen, clear, and good to read and can be published as it is.

However, the author may consider a few points:

I would move Figure 1S from the supplement to the manuscript. I like to see the experimental setup when dercibed in the text.

Is it possible to plot the Seatlle field data into Figure 8, using the composition and conditions of the individual data points? Would the position and the spread of the Seattle data points tell something about the likely morphology/composition of the particles, which could be verified by other accompanying measurements This sentence is difficult to understand

p. 32057, line 19-21: This sentence is difficult to understand. Could you try to reformulate or extent a little what you refer to.

p. 32069, line 10ff and Figure 6: Any specific suggestions which could explain the lower N2O5 uptake for the two data points. I guess that experimental artefacts can be ruled out ? (e.g. were they taken in the same period or were other measurements in between? Were they taken with the same setup ? You mentioned the exchange of similar equipment.)

Typos:

p. 32064, line 5: ". . .a similar finding to Antilla et al. (2006)". Turn words to ". . .a finding similar to Antilla et al. (2006)" ??!

Figure 1: legend inside Figure misplaced

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