

Interactive comment on “Atmospheric Chemistry, Sources, and Sinks of Carbon Suboxide, C₃O₂” by Stephan Keßel et al.

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General Comments: The authors may also wish to mention their determination of the Henry's law constant for C₃O₂ in the abstract (not in the introduction section). The applicability of the dynamic method (Roberts et al., Kames and Schurath), normally employed for stable organic compounds, should be discussed in greater detail. The presented data (Table 2) show a distinct dependence of pH which points to a fast hydrolysis of C₃O₂. Could the Henry's law constant be dependent on pH or should this dependence be assigned to its hydrolysis? From the inset of Figure 12 it is evident that the depletion phase starts with a fast decrease and turns later to a slower one. This could be interpreted by two different rate constants which are conceivable since the hydrolysis of C₃O₂ requires two water molecules to produce malonic acid. C₃O₂ + 2 H₂O → HOOC-CH₂-COOH (Eq. 1) The rate constants in Table 2 are calculated

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from the initial depletion phase, neglecting the final, smoother descent. This deviation is confirmed by the inset of Figure 12 as well. So the stated measurement errors are not conclusive. Information on the number of runs should be given if a statistical error is meant (see also Figure 12). Are the results obtained from the saturation phase consistent with the depletion phase? It would be helpful to add a new Figure containing the calculation of the rate constants according to Roberts et al. and Kames and Schurath. The source strength of C₃O₂ should be assessed from two sides: Its formation from natural soils and waters can be neglected due to its fast hydrolysis in these compartments (Huber et al.). A formation in the atmosphere from volatile organic compounds (e.g. phenolic moieties) in the gas phase or on particles is conceivable.

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