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www.atmos-meas-tech-discuss.net/7/C1619/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Effect of ions on the measurement of sulphuric acid in the CLOUD experiment at CERN" *by* L. Rondo et al.

Anonymous Referee #1

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Overall, this is a very well written paper. It presents new insights into the CERN CLOUD chamber nucleation measurements revealing a positive ion adduct interference when measuring H2SO4 with CIMS in the presence of organics (pinanediol, PD). As a consequence of these observations the authors developed an ion precipitator device and present relevant measurements confirming its efficiency at removing ions from the chamber and thereby suppressing the CIMS interference.

Comments: 1. Although some measurements have been conducted in ambient air it seems quite preliminary to exclude ion effects in general. For example, early work by Eisele and coworkers has shown significant ion generation in the vicinity of power lines. Therefore, the authors should formulate their conclusions more cautiously in this respect. 2. Did the authors vary the CDC voltage to break up the ligand (HSO4-)

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clusters? 3. Why is [DMA] part of the parameter equation, as it does not cluster with HSO4- ? 4. Explain k in Table 1 and include a reference. The following are minor comments: p. 6598, line 25: Could the sweep (cleaning) 60 kV field in the chamber affect the (non-ionic) nucleation process, e.g., in case of oxidized polar molecules? With OH + SO2 and OH + PD reactions occurring concurrently, how might this affect H2SO4/HSO4- production? p. 6599, line 24: Quote the detection limit together with the relevant signal integration time (30 sec?). p. 6600, line 20: Describe how diffusion-controlled losses were estimated and include uncertainty. p. 6600, line 25: "provided SO2 " = provided from the Cloud chamber? p. 6602, line 22: Can you really assume that the "dark" production of H2SO4 and the additional ion-induced production are completely separate processes, i.e., not mutually influenced? Criegees are breakdown products. Could their concentration be enhanced by ions? p. 6604, line 2: What "other inorganic" compounds? Impurities? p. 6604, line 16: Quantify this statement. Transmission efficiency > 44% ? Has this been parameterized?

Please also note the supplement to this comment:
http://www.atmos-meas-tech-discuss.net/7/C1619/2014/amtd-7-C1619-2014-supplement.pdf

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 6595, 2014.