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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Cloud water composition during HCCT-2010: Scavenging efficiencies, solute concentrations, and droplet size dependence of inorganic ions and dissolved organic carbon" *by* D. van Pinxteren et al.

Anonymous Referee #1

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The 2010 cloud experiment at Mt. Schmucke (Germany) was performed with much effort and heavily instrumented with regard to cloudwater collection. This manuscripts describes a part of the data set (8 events, inorganic ions and DOC) and highlights three topics: The correlation between cloud concentrations and the liquid water content, the scavenging of substances by the cloud, and the cloud-droplet-size dependent concentrations of substances. Some parameters were measured with high time resolution, as two AMS systems were employed in the field. The results are manifold and described in great detail in this manuscript. The evaluation and interpretation of data

was performed carefully yet clearly, results are embedded into the respective literature results. Overall, this is an interesting and precious data set. Although not breathtaking, this manuscript should be published in ACP. Some comments are intended to help the authors clarify some issues before final publication in ACP:

page 24320, line 26: Schneider (2015) is not a valid reference. Overall in section "2.2 Interstitial and residual particle sampling", there is no information about how efficient the separation between cloud droplets and interstitial aerosol is.

page 24321, line 5: Poulain et al. (2015) is not a valid reference. The information of the monitor "for continuous (1 h time resolution) determination of water-soluble inorganic trace gases and particulate ions" is too sparse.

page 24322, lines 13-19: What about the stability of H2O2 and S(IV) during cloud water collection? These species may react with each other faster than within one hour, which is the time resolution of the cloudwater collection.

page 24323, line 19: Why three sites, didn't you talk about two sites only so far?

page 24327, line 6: van Pinxteren et al. (2015) is not a valid reference. As "Concentrations of a large number of organic acids were measured from the bulk cloud water samples", they need to be reported here. The ion balance (Fig. 2) should be complemented by the measured organic acid anions.

Figure 3: Do symbols indicate the maximum concentration (CWL) datapoints?

page 24328, lines 19-23: This sentence is awkward and not clear. It may be deleted or, if considered important, be expanded in order to better explain the involved processes and conditions.

page 24329, lines 4-6: The sentence "Also in our dataset, LWC does therefore rather control the range of observable TICs than the actual TIC itself, . . ." is not very clear.

page 24334, lines 25-29: The authors speculate about the potential role of organic

acids in DOC behavior. They probably do know the answer, but do not present it to the readers of this manuscript. This is awkward.

sections 3.4.1 and 3.4.2: Please provide some information about the water volumes collected on the individual stages of the collectors. Wouldn't it make sense (despite all overlap between stages) to present LWC and CWL data as functions of droplet size?

Tab 4 heading: Replace "> 0.2“ by "< 0.2“

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 24311, 2015.