

1. The introduction section lacks of novelty. The references are old, except for the articles published by the group. No mention of studies in other part of the globe, despite the possibility to enrich the discussion, such as Shen et al. 2024 (<https://doi.org/10.1016/j.scitotenv.2024.171775>)

Response- We thank the reviewer for this valuable feedback. We have revised the introduction section to provide a stronger global context and have cited more recent relevant studies from regions worldwide.

2. The collector used is a passive sampler, while most of the collectors used on other sites are active (Schmucke, puy de Dôme, ...). Do the authors have an idea of the comparability of the samplers in term of cut-off diameter of cloud droplets and concentrations of ions in the samples?

Response- The Mohnen Passive cloud collector uses Teflon strings with diameters of 0.035-0.04 mm, giving a 50% cut-off diameter of 2-5 μm of cloud droplets for typical summit wind speeds 2-10 m/s. In an intercomparison of 120 paired cloud water samples, the ion concentration ratios of H^+ , NH_4^+ , NO_3^- , and SO_4^{2-} between the Mohnen Passive and Daube-Caltech Active collectors fell between 0.9-1.1 for 90% of the samples, showing excellent agreement (Mohnen & Kadlecck, 1989).

3. How is pH measured? Could the author report the error on pH measurement in Fig. 7? I think everything is reported in Lawrence's paper, but it would be better to have access to the details directly in the text.

Response- The details have been added to the supplement text. pH was measured using a Mettler Toledo InLab Routine Pro electrode in 2018-2019, an Orion 8102BNUWP probe in 2020-2022, and a Thermo Scientific Orion Star A215 pH/conductivity meter in 2023-2024, all with 5% precision and 98-102% accuracy, which is now briefly mentioned in the caption of Fig. 7.

4. The comparison of the sample treatment methodologies is very interesting but I wonder how oxalate is depleted in cloud synthetic solution filtered with 0.2 μm mesh. The authors explain that acetate and formate are prone to reach the equilibrium with the gas phase and explain their lower concentration, but oxalate is not volatile and I don't see any explanation in the text.

Response- We thank the reviewer for raising this point. We agree that oxalate depletion cannot be explained by volatility. The loss is likely due to biological processing. The filtration process took longer than usual, increasing the sample temperature and exposure to the room, and also the microbial presence was later confirmed in the 0.2 micron filter used in the spray test by 16S DNA sequencing. The extended contact time may have led to potential microbial degradation of oxalate during filtration.

5. "However, the aged filtered sample exhibited 45% higher acetate concentration than the aged unfiltered sample. This difference was not due to loss of acetate in the unfiltered sample, since the aged unfiltered sample had 11% higher acetate concentrations than the fresh unfiltered sample." If I understand well, the fresh sample has concentration x , the aged unfiltered had concentration $x+11\%$ and the aged filtered sample $(x+11\%)+45\%$. This means that the concentration of acetate is increasing. I think that the explanation of a possible microbial contamination with *Acetobacter* strains is insufficient: this puzzling result needs to be checked in light of the concentration of acetate. For concentration of the order of 1-2 micromolar and considering the potential coelution

with lactic and glycolic acid, this difference could be not significant. I would suggest giving the actual concentration and not just the normalized value.

Response- Acetate increased from 0.101 mg/L to 0.162 mg/L upon aging in filtered sample (Table S4). We agree with the reviewer that this puzzling result could reflect analytical artifacts rather than true acetate concentration, given such low absolute concentration and potential coelution of acetate with other organic acids. We thank the reviewer for highlighting this possibility. Unfortunately, we are unable to verify the chromatograms of this particular test because the measurement was conducted 7 years ago at AWI and the data were lost from a database corruption issue after a sudden power outage. This is unfortunate, but this issue does not affect our cloud water dataset.

6. Line 268: growing season à late spring, early summer, canopy bloom...

Response- Formate, acetate, and oxalate concentrations exhibited the highest concentrations in the growing season (June and July) compared to August and September, here growing season corresponds to early summer, when canopy growth and leaf expansion are most active.

7. Lines 279-280: reduced photochemical activity or reduced emission of precursors from vegetation?

Response- We revised the sentence with the reviewer's suggestion to specify "reduced emission of precursors from the surrounding vegetation".