# Response to reviewer comments

Dear Reviewer,

Thanks for your careful reading of our manuscript entitled "**Microphysics of liquid water in sub-10 nm ultrafine aerosol particles**". We highly appreciate your time and valuable suggestions. Below you will find our replies to your comments.

Best wishes,

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Thank you for the clarifications of your revised manuscript and the detailed responses. Please address the following additional comments from Referees:
1. Regarding the findings of Zheng et al. 2021 (and similar works), it should be noted that signal intensities from mass spectra are not necessarily the same as molecular abundance since the ionization efficiencies across molecules can vary greatly.

2. Additionally, the results clearly depend on the bulk/surface partitioning behavior of the organics as this appears to determine the agreement in water activity between simulation and experiment - and this partitioning behavior also varies greatly across organic molecules found in atmospheric particles. Therefore, the conclusions might be overstated in present form and described more accurately if written in terms of PML rather than "organic loading" more generally.

**Response to comment 1 and 2: Mass spectra signal intensity and statement of PML or "organic loading".** Thanks for the great comments. We agree with you that mass spectrometry results are not strictly quantitative due to differences in ionization efficiency of different species. We also agree with you that the phrase of "PML" is more appropriate than "organic loading" to avoid overstatement of our conclusions. We have resolved these concerns in our newest manuscript by (i) rephrasing "organic loading" as "PML loading"; (ii) noting that mass spectrometry results are not strictly quantitative; (iii) noting that additional studies are required to evaluate the sensitivity of our predictions to the type of salt or organic solutes. All the changes regarding comment 1 and 2 are marked as yellow shaded areas in the track-change document.

3. The justification for PML as a model compound is based on studies of aerosol with low contributions of salt, and therefore the relevance of mixtures of PML and NaCl to marine aerosol is not clear. Please provide specific citations to why PML is representative of organic aerosol that has been found to be associated with sea salt.

**Response to question 3 (Q3): PML and sea salt aerosols.** Thanks for the comments. As noted on page 4 of our manuscript, we selected NaCl and PML as representative inorganic and organic solutes frequently observed in different types of aerosol particles. We do not claim that PML is abundant in sea spray aerosol particles, and we simulate NaCl- and PML-containing aerosols separately in our study. As part of our edits, we noted the importance of examining aerosols containing other salts or organic solutes (or mixtures of solutes) in future studies.