

Interactive comment on “Large contribution of organics to condensational growth and formation of cloud condensation nuclei (CCN) in remote marine boundary layer” by Guangjie Zheng et al.

Anonymous Referee #2

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Through size-resolved CCN and HTDMA measurements the authors present evidence for a substantial role of organics in the condensational growth of particles to CCN sizes in the remote marine boundary layer. There is no shortage of aerosol organics in the marine atmosphere but there is a lack of information about their sources and impacts. This paper provides information about the role they may play in CCN formation. The paper should be published after the concerns listed below have been addressed.

Line 34: “It has long been recognized...” adding a few references going further back than 2018 would be appropriate.

Lines 112 – 113: What is the uncertainty associated with the SO₂ and MSA concen-

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trations derived from MERRA-2?

Lines 201 – 202 and Figure S1 caption: These seem contradictory. The main text says “The difference is close to the measurements uncertainty...therefore the major condensing species is classified as (NH₄)₂SO₄. The figure caption says “the major condensing species included both organics and sulfates or dominated by (NH₄)₂SO₄”.

Figure 5 caption: Please describe what the black dashed line in the figure represents.

Figure 5: There is no clear relationship between the degree of difference between kappa_{c,GF} and kappa_{c,CCN} and the NH₄ to SO₄ molar ratio. If I'm interpreting the figure correctly, there are instances (dark blue points) when the NH₄ to SO₄ molar ratio is very low but the difference between the kappa values is small. Based on these data, it's not clear that low amounts of NH₄ relative to SO₄ is most prevalent during intermediate kappa_{c,CCN} events. Maybe it would be clearer if Figure 5 were expanded to include all data, not just intermediate events.

Lines 231 – 232: It is stated that kappa_{c,CCN} is not correlated with the NR-PM₁ organic/sulfate ratio suggesting different sources of the condensed species in pre-CCN and the accumulation mode particle composition. Does this lack of a correlation suggest anything about the importance of the pre-CCN condensed species in terms of CCN activity or concentration since the accumulation mode can dominate the CCN concentration?

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