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Atmospheric Chemistry and Physics Discussions

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 #1

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Zheng et al present a long time series of CCN measurements in the remote marine boundary layer. Measurements of this kind are rare, especially during nucleation events. The authors systematically characterize a series of nucleation events to calculate the hygroscopicity parameter for the condensing material. Surprisingly, they find that it is much lower than that for sulfate as would be predicted. These measurements provide some of the first direct evidence that condensation of organic material in the marine boundary layer contributes to particle growth with important implications for CCN. The paper is well written and should be published in ACP. I have only a few comments:

1) Are there any direct gas-phase measurements that can be used to support the airmass characterization efforts? Even CO would be helpful!

2) It would be helpful if the authors could include some context for what the kappa value is for different potential condensing species (e.g., BVOC oxidation products, MSA, carbonyl compounds which may dominate the photo-chemical VOC pathway).

3) Is the MSA-SO2 yield really constant in MERRA-2 or does it still depend on temperature as that dictates the branching between H-abstraction and OH addition in DMS+OH? This is what yields distinct MSA/SO2 ratios. Is it possible to simply use the concentration of SO2 as an indicator?

4) Is it possible to extract from the growth rates any information on the concentration of condensing species? This would help in the comparison with the magnitude of BVOC ocean emissions (e.g., is 10ppt steady-state monoterpene sufficient to sustain this type of growth?)

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