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I. 57: the paper by Petters and Kreidenweis, 2007, describes a parameterization of CCN hygroscopicity. It does not seem to be a correct reference in the context of the role of CCN concentrations on shallow boundary layer clouds.

Response: Removed Petters and Kreidenweis and added Painemal et al. 2017.

I. 83: replace 'aerosol chemistry' by 'chemical composition of aerosol' or 'chemical processes'

Response: Done

I. 101: what do you mean by 'sulfur-based concentrations of aerosol'? Do you mean 'highest sulfate masses' or 'highest particle number concentrations of sulfur-containing particles' or something entirely different?

Response: This is the language used in Twohy et al., (2021) that defines sulfur-based in their supplemental text as measurements from the STEM-EDS instrument during Socrates as "Round shape, primarily S, O, may be volatile under the electron beam. (Sulfuric acid, ammonium sulfate/bisulfate or MSA)". I changed the language to be more specific of what I think Twohy et al. is referring to – basically non sea salt sulfates.

I. 121: (1) what exact relationship was used? What was different to the one by Stephens (1978) cited here? (2) Please write the equation in a separate line and add an equation number.

Response. The stated equation is the relationship used. I re-wrote to be more precise and added an equation number as you requested.

I. 123 – 5: This sentence seems awkward. It might be clearer "... with a correlation coefficient of -0.60 in the monthly means (Figure 1)."

Response: Yes, the sentence was awkward. Changed as suggested.

I. 175: 'deposition' is not a chemical pathway. Maybe better: 'Other pathways are possible such as condensation of sulfates onto primary sea salt particles...'

Response: Changed as suggested.

I. 177: It is not clear what you mean by 'removal of sulfur compounds' – even after

oxidation, they remain sulfur compounds. Or do you mean 'uptake and aqueous oxidation of sulfur-containing gases'.i.e. removal from the gas phase?

Response: My chemistry credentials are not strong, obviously. I changed the language to represent what Woodhouse et al is implying. As I understand it, they argue that gas phase sulfur compounds are removed from the gas phase through aqueous phase oxidation in cloud drops.

Figure 1 is the key figure of the manuscript. Please make sure that at least this figure is accessible for readers with color vision deficiencies (cf Figures & Tables at <https://www.atmospheric-chemistry-and-physics.net/submission.html#manuscriptcomposition>) . For example, choose a different color scheme or split the figure into two panels using the same x-axis or make the lines better distinguishable, independent of their color by using different line types/strengths or symbols.

Response: Figure 1 is now in two panels, and we use red and black with different line styles and symbols.

Throughout the manuscript: Please write 'd' as index in Nd according to your definition in l. 63.

Response: Found three instances and fixed those.