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# *Interactive comment on* “Phase state of ambient aerosol linked with water uptake and chemical aging in the Southeastern US” *by* Aki Pajunoja et al.

**Anonymous Referee #2**

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The paper by Pajunoja et al. investigates the phase state of ambient particles in the Southeastern US using an aerosol bounce instrument. The work shows that ambient particles in this region are mostly in the liquid state. In addition further analysis shows that the phase state is related to the hygroscopicity of the particles. The paper is very well written, the analysis is excellent, and the results are important for modelling aerosol formation and growth in the atmosphere. I highly recommend this paper for publication after the authors have had a chance to address the following comments.

Abstract, line 26-28. What sampling techniques are you referring to here? I don’t think this was discussed anywhere in the main document. More specifics somewhere in the document would be useful to the reader.

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Discussion paper

Page 2, line 31-32. The authors state: “Saukko et al. 2012, showed that the increasing O:C of SOA particles decreases the particle liquefying RH”. After reading this sentence I went back and looked at the abstract for Saukko et al. 2012. In the abstract Saukko et al. state “in the majority of cases the bounce behavior of the various SOA systems did not show correlation with the particle O:C.” These two statements sound contradictory. Please clarify.

Please define the terms in equation 5. Also, why is equation 5 needed? Can’t the OH exposure be calculated directly from the real-time decay of CO?

Figure 4c. I wonder if the occurrence of liquid-liquid phase separation (LLPS) in the particles is influencing the particle bounce. LLPS in particles containing organic and inorganic material is expected to occur at O:C values less than approximately 0.7 (very roughly). In Figure 4c, when the O:C is less than 0.7 significant bounce is observed even at high RH, which is when LLPS is expected. On the other hand, when the O:C is roughly 0.7 and greater, the bounce is significantly reduced, which is when LLPS is not expected.

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