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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Oligomer and highly oxygenated organic molecule formation from oxidation of oxygenated monoterpenes emitted by California sage plants" *by* Archit Mehra et al.

Anonymous Referee #1

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This manuscript presents measurements of VOC emissions from California sage plants and the chemical composition of subsequently formed SOA. The major finding is that highly oxygenated organic molecules (HOMs) and oligomer contribute to a larger fraction of SOA. This manuscript fits in the scope of the Atmospheric Chemistry and Physics, and the interpretation of the results is sound. While I suggest publication after major revision, I hope that the authors will consider the following comments.

1. What is the VOC concentration in the OFR? Is the high oligomer content caused by high concentrations of VOC and RO2? In other words, is the RO2 fate in the OFR representative of that in the atmosphere? 2. The uncertainty of the contribution of HOMs

and oligomers to SOA should be discussed. Firstly, the SOA product signal is represented by the sum of FIGAERO-CIMS signals. However, this by no means represents the total SOA concentration. Thus, the reported contribution likely represents an upper bound. Secondly, the same instrumental sensitivity is assumed for all ions. I understand the challenges in instrumental calibration, but the associated uncertainty should be considered, even qualitatively, based on previous understanding on the general relationship between compounds chemical properties and sensitivity (Lopez-Hilfiker 2016 AMT). 3. In Figure 5, how is the "% of HR signal" defined? Is this based on number or abundance? Please specify. 4. Is the VOC emission profile in Figure 1 measured by I- CIMS or TD-GC-FID/ToF-MS? I would guess the latter is used, but the description in Line 175-176 ("measured with I- CIMS") is ambiguous.

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