

## ***Interactive comment on “Gas-to-particle partitioning of major biogenic oxidation products from monoterpenes and real plant emissions” by Georgios I. Gkatzelis et al.***

### **Anonymous Referee #2**

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Gkatzelis and coworkers report measurements of gas-to-particle partitioning of products from biogenic oxidation using three recently developed aerosol inlets and parallel gas-phase measurement. They developed an approach for identifying fragments in data due to thermal dissociation and ionic dissociation. The authors did a decent job in discussing  $C^*$  intercomparison of 3 aerosol sampling systems and comparison of measured volatility to theoretical calculations. This PTR-based technique can be implemented to promote research in this area. The paper is generally well written. It has a heavy focus on techniques and how they affect the results. I understand that more details are in the cited Gkatzelis (2017) and some are discussed later in the Results section. However, I feel the authors should provide a little more information when rele-

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vant and/or refer to the specific section that you discussed in more detail (see specific comments).

Specific comments:

Line 82: Should be “known”.

Line 86: Where does the 10-40% come from? Please cite relevant references.

Line 173: Why ACM and TD have different final temperature? How does this affect the compounds they measured?

Line 176-183: The PTRs were operated under different conditions. When you calculate  $C^*$  using G/P ratio measured by different PTRs (e.g., TD for particle, a standalone PTR for gas), how did you treat the different sensitivities? In addition, a very simple schematic in SI, or table, showing all the instruments connected to the chamber might be helpful to readers, since the authors refer to the different operating conditions, inlets etc. frequently in discussion. Some time series examples of each technique in SI, along with Figure S1, will also be useful.

Line 187: It sounds like the PTFE filter is always before the ACM-PTR-MS then how can the ACM collect particles?

Line 252: Please be explicit what typical vaporization enthalpies are.

Line 253: A change of 15 C will result in  $C^*$  change larger than 10  $\mu\text{g}/\text{m}^3$ . For example, a compound with a  $C^*=100 \mu\text{g}/\text{m}^3$  at 290 K will have a  $C^*=700 \mu\text{g}/\text{m}^3$  at 303 K. It is worth to consider and discuss this in the following comparison.

Line 286: Can the authors estimate the uncertainty caused by operating gas and particle phase measurements under different ionic dissociation?

Line 317: Did the authors do similar test for organic nitrate products (-HNO<sub>3</sub>)?

Line 342: Should be “percentage”.

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Line 354: Should be “previous”.

Figure 2: The error bar for the green dots need a darker color since it's hard to see. The ACM C\*s don't have any error bar. Why, too small? In addition, since only averages were presented, it'd be worth to mention in section 2.4 that you calculated C\* from equation 2 using how many samples for each technique for each experiment. As temperature varied though an experiment, how was C\* affected?

Figure S6: Temp = 280K, why inconsistent with 298K used for experimental measurement mentioned at line 256? The name for each theoretical calculation is not consistent with that in the text, e.g., nano vs. NN.

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