

Interactive comment on “HOM cluster decomposition in APi-TOF mass spectrometers” by Tommaso Zanca et al.

Anonymous Referee #2

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In the present manuscript, numerical simulations of the decomposition of clusters in an APi-TOF mass spectrometer are performed, which are a representative type of a highly oxygenated organic molecule (HOM) with the molecular formula $C_{10}H_{16}O_8$. This elemental composition corresponds to one of the most frequent mass peaks observed in experiments on ozone-initiated autoxidation of biogenic hydrocarbons. The results of the authors show that a decomposition of the considered clusters in the measuring instrument is highly unlikely, as long as their binding energy is large enough to enable their formation in the atmosphere in the first place. In general, HOMs have been at the center of atmospheric nucleation research for several years, especially since their molecular size and thus their vapor pressure make them one of the few organic compounds that can play a role in the early stages of particle formation. Their mea-

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surement is mainly performed with the Api-ToF MS also used in the manuscript, the reliability of the results produced by these measurements is therefore highly relevant and a publication in AMT is appropriate. The model used is highly specialized and cannot be easily reproduced in detail by experimentally educated scientists, but the results appear solid and well-founded. The model is described in sufficient depth and applied to the conditions of the mass spectrometer used. An error analysis is also part of the presented results. Finally, the results are related to atmospheric nucleation by simulating the conditions under which nucleation rates and concentrations correspond to those in the atmosphere and the CLOUD chamber. The manuscript is well written and generally clearly presented. Previous work is adequately cited. Therefore, I suggest to publish the manuscript in Atmospheric Measurement Techniques after considering the following minor comments and suggestions.

Figure 12 is a central figure in the manuscript: It would be desirable if this figure was discussed more intensively and in more detail in the text. Other illustrations, such as Fig. 8, are less meaningful to be shown graphically and could be deleted without loss of quality.

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