Interactive comment on “New insights into atmospherically relevant reaction systems using direct analysis in real time-mass spectrometry (DART-MS)” by Yue Zhao et al.

Anonymous Referee #2

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This is a well written manuscript reporting on the application of DART-MS for in-situ analysis aerosolized particles of C3-C7 dicarboxylic acids reacted with gas-phase amines and laboratory SOA generated by ozonolysis of alpha-cedrene – all are model systems relevant to atmospheric aerosols. The results show that DART–MS has a good potential for molecular-level analysis of aerosol mixtures with enhanced sensitivity to shallow surface (∼30 nm) layer of particles. Complemented by more traditional AMS detection of the whole particle volumes, DART-MS can provide unique information on the surface chemistry of particles. The presented results are thoroughly evaluated in a context of available literature reports and are convincing. Overall, this is an accomplished work in all its aspects including scientific impact, original measurements,
methodology development, and presentation quality. I recommend this paper for publication. Below, I list a few minor notes to consider in the revised manuscript.

I think that quantitative estimate of the surface layer (∼30 nm) probed by DART is a very important result that needs to be included in the abstract. Line 24: ‘particles’ after (SOA) can be removed Line 33: ‘However’ is not needed. Eq (1): it needs to be noted that eq 1 assumes the same effective ionization efficiency for gas-phase and particle phase amines that likely won’t be always correct. Line 205, eq 2, and then throughout the text: it is more common to use ‘normalized surface area’ rather than ‘surface area normalized’. Line 293: consider change of ‘explanation is the relative...’ to something like ‘a possible explanation can be suggested based on differences in the relative saturation vapor pressures’