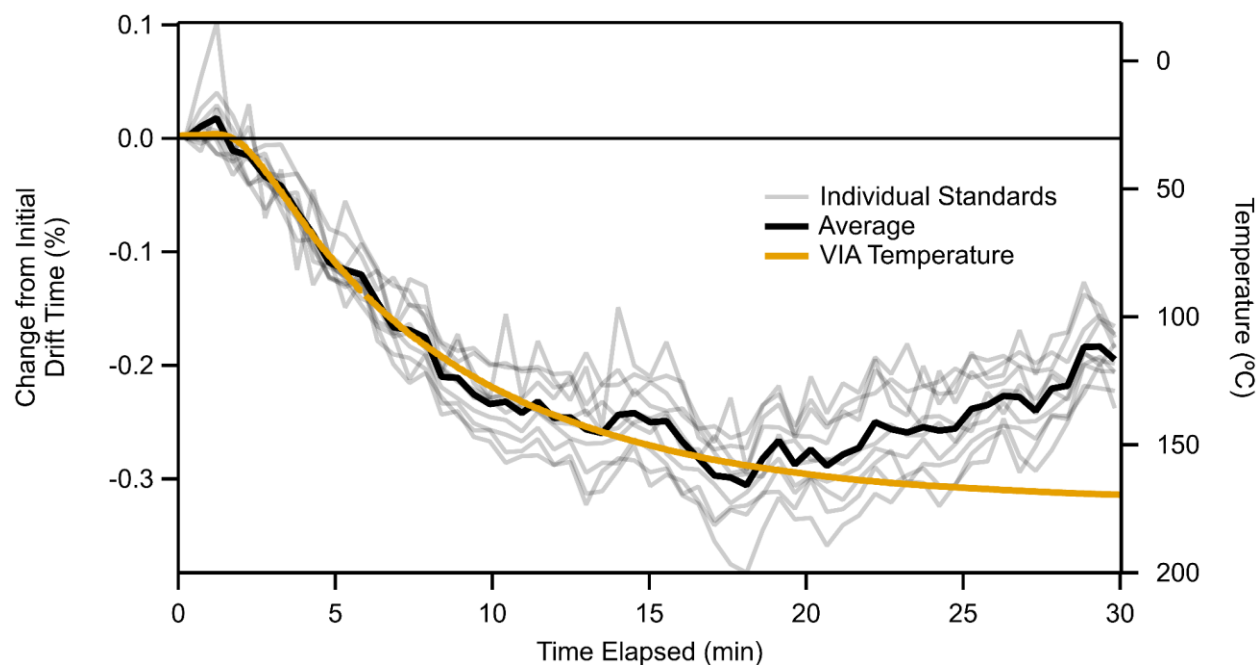
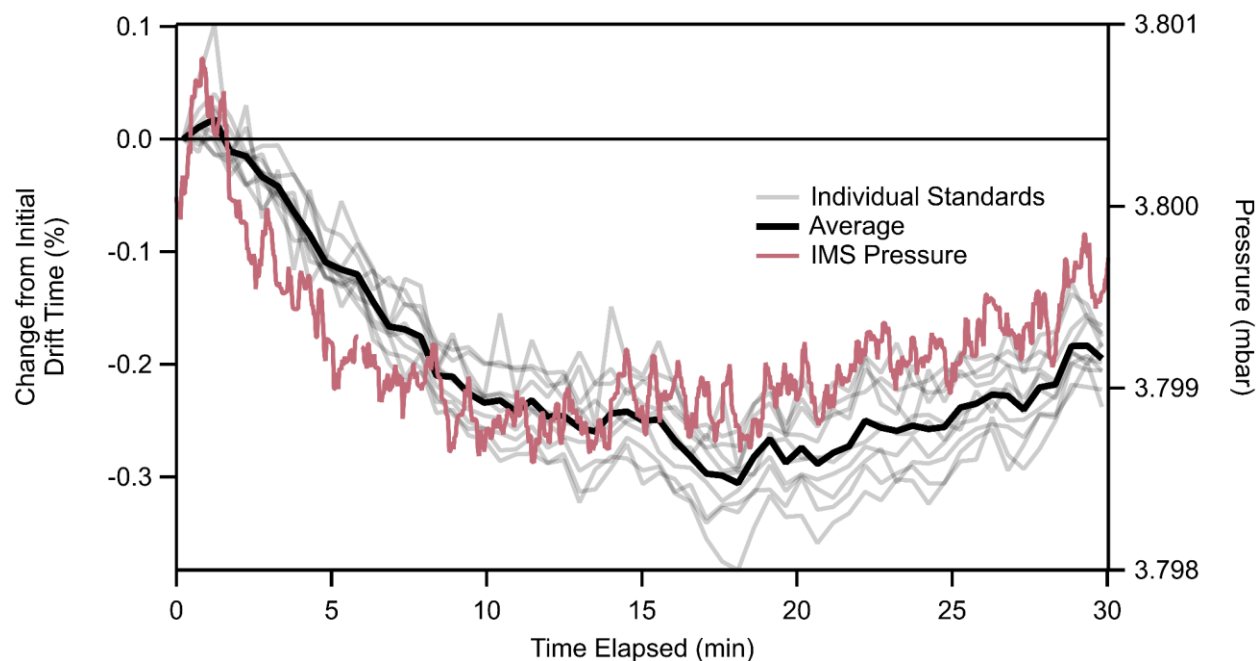


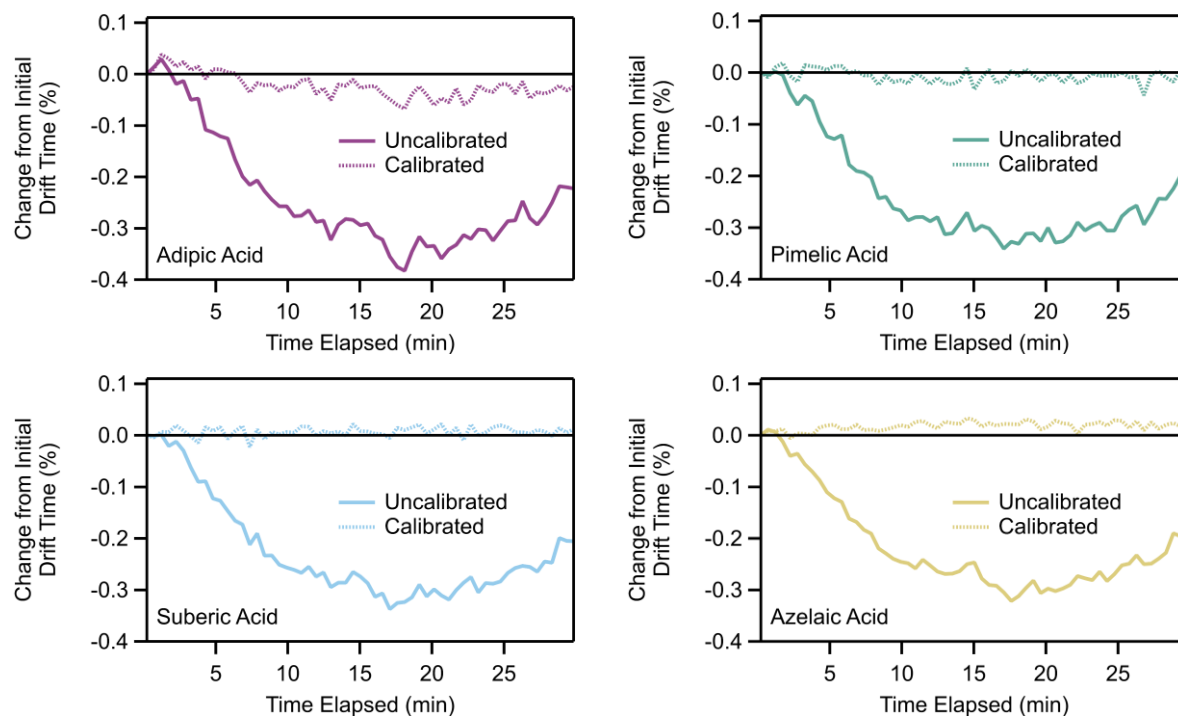
**Figure S3.** IMS drift region pressure pressure plotted as a function of VIA temperature during the temperature ramping experiment. Note the minor decrease in pressure as the temperature increased. The slight pressure increase near the end of the temperature ramp is due to the automatic pressure regulation in the IMS.



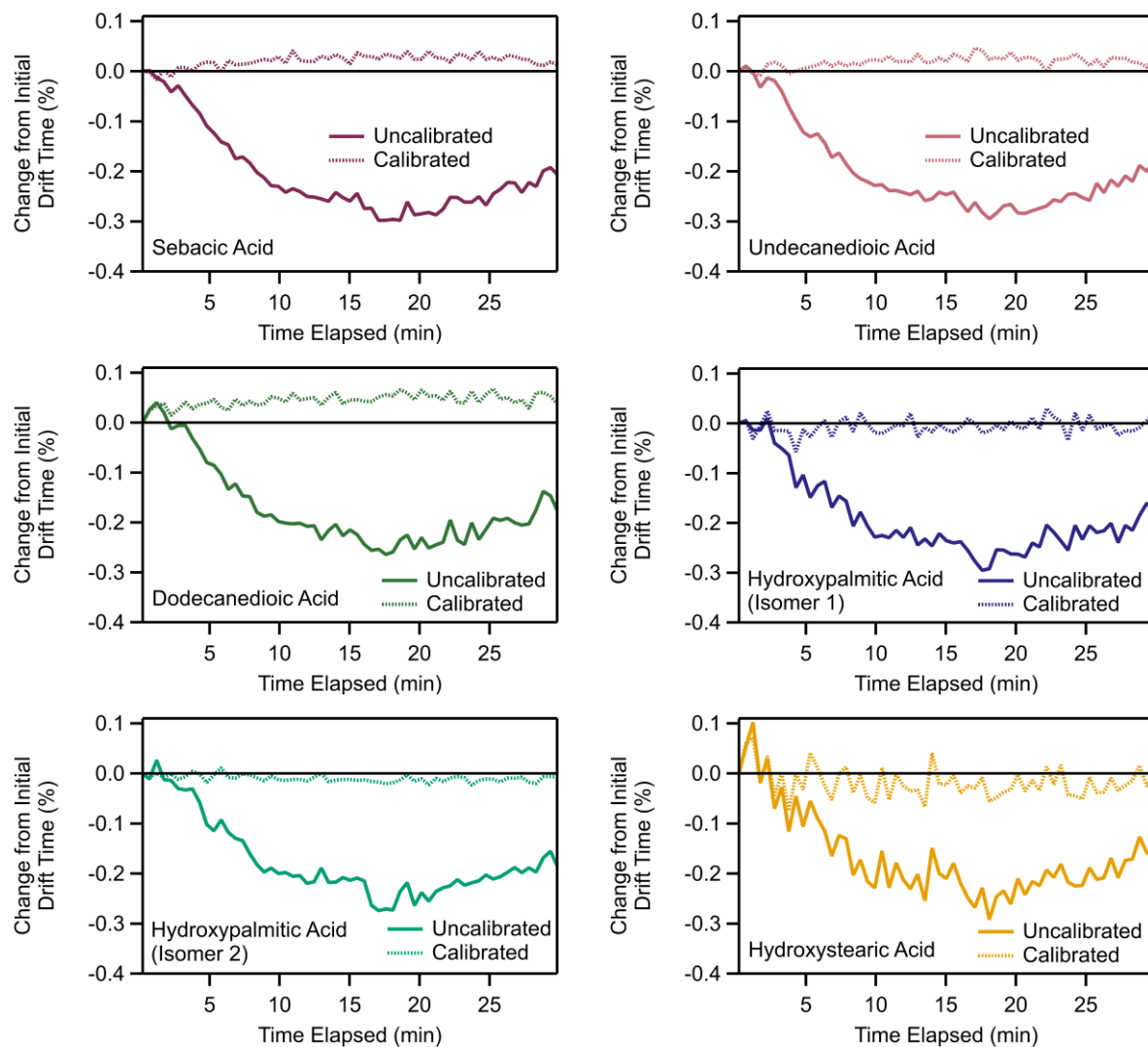
**Figure S4.** Relative changes in carboxylic acid standard drift times and VIA temperature before drift time calibration.



**Figure S5. Relative changes in carboxylic acid standard drift times and IMS drift region pressure before drift time calibration.**



**Figure S6. Relative drift time changes of carboxylic acid standards before and after drift time calibration.**



**Figure S6 continued. Relative drift time changes of carboxylic acid standards with and without drift time calibration.**

### S3. Reagent Ion Comparison

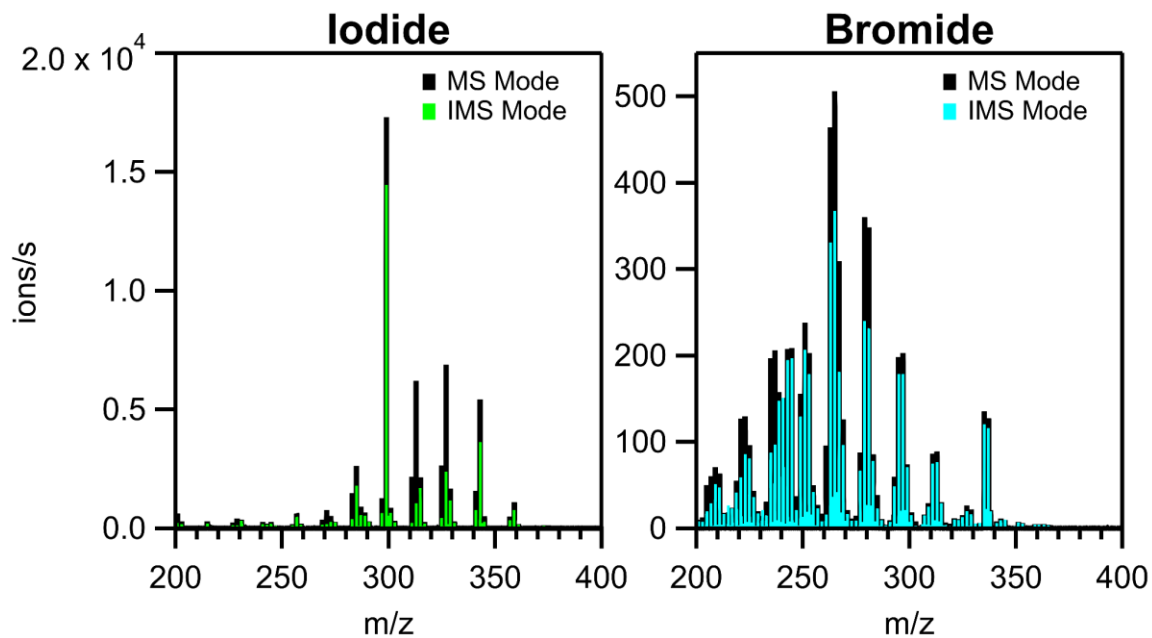


Figure S7. VIA-CI-IMS-TOF spectra collected in MS and IMS modes using  $\text{I}^-$  (left) and  $\text{Br}^-$  (right) reagent ions. Spectra were averaged over  $\sim 1$  min near the end of the experiment. Note the larger number of peaks detected with  $\text{Br}^-$  and the larger signal losses in the  $\text{I}^-$  spectrum for some peaks.