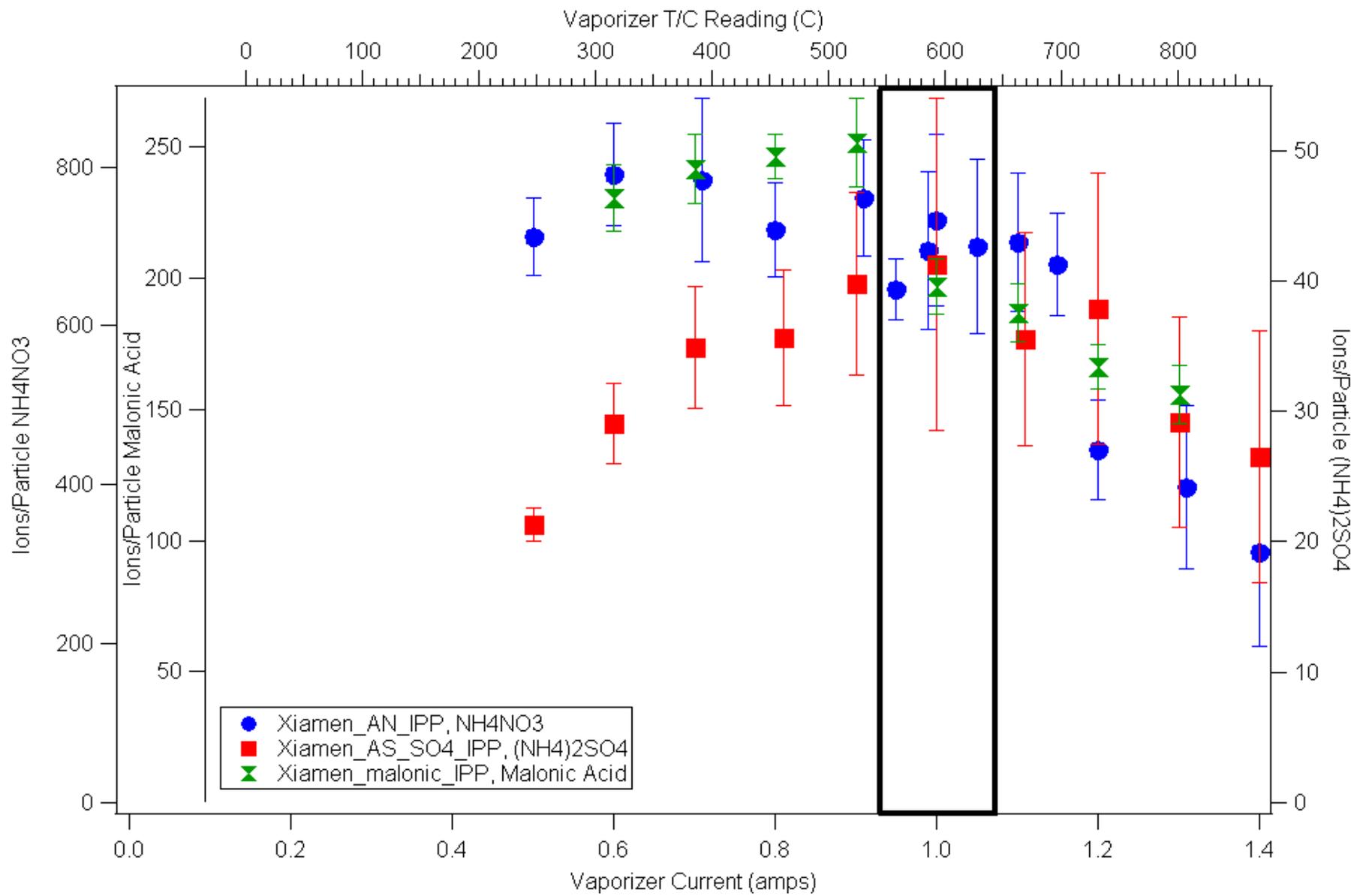


What is My Vaporizer Temperature?

The Aerodyne Folks

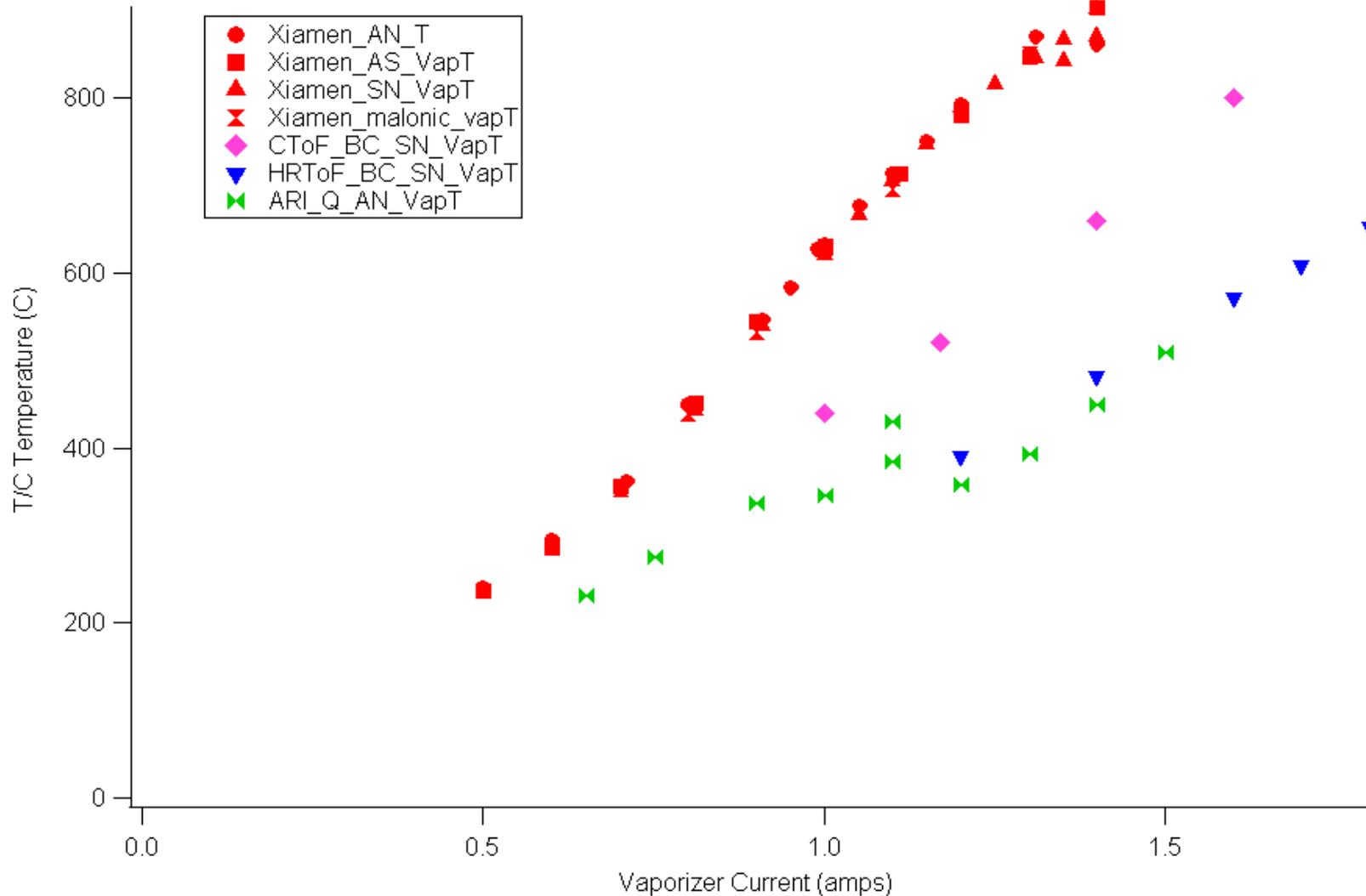
Leah Williams

Oct. 1, 2011

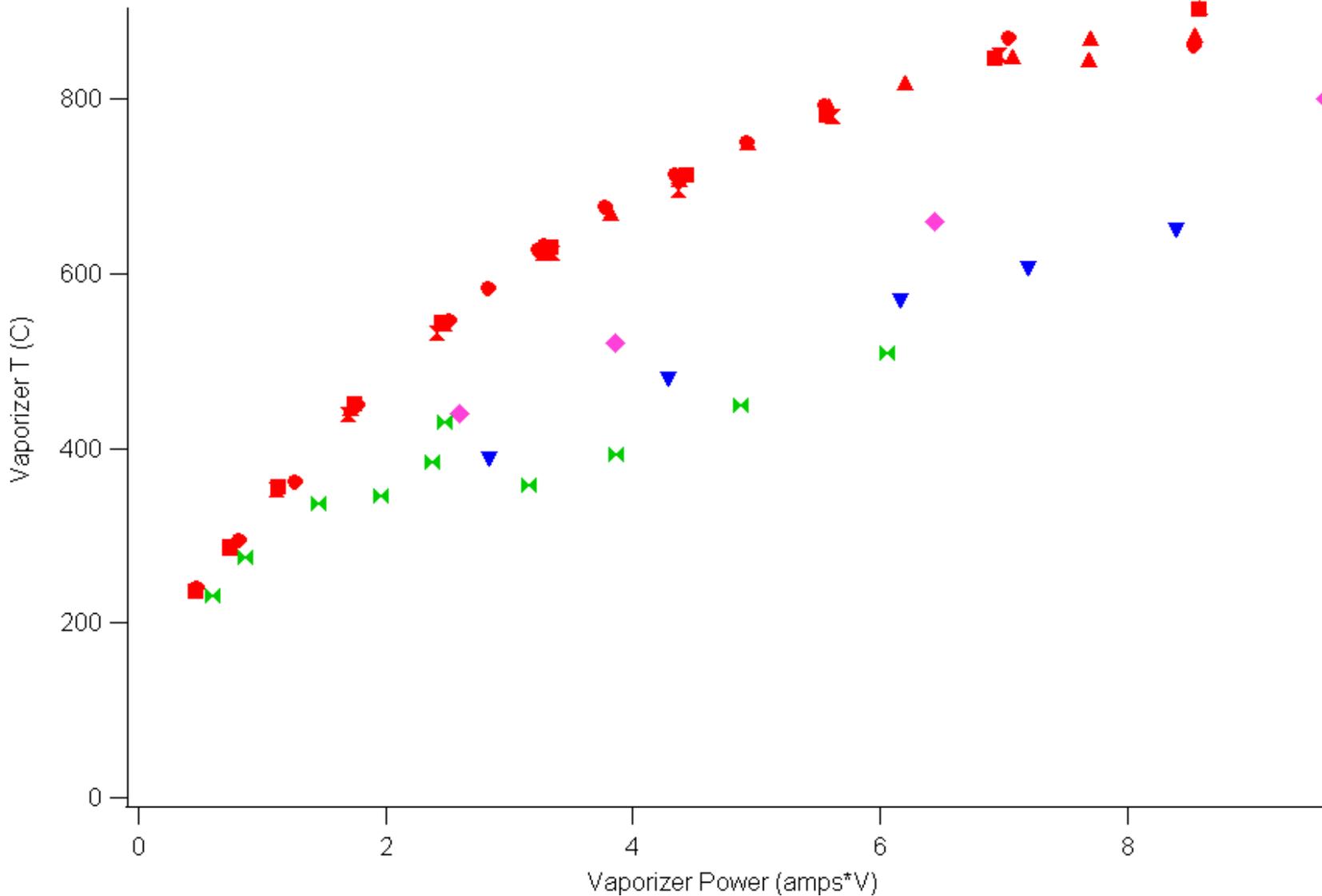


Aiming for 550-650 C. Peak in (NH4)2SO4, peak in organic and before NH4NO3 drops.

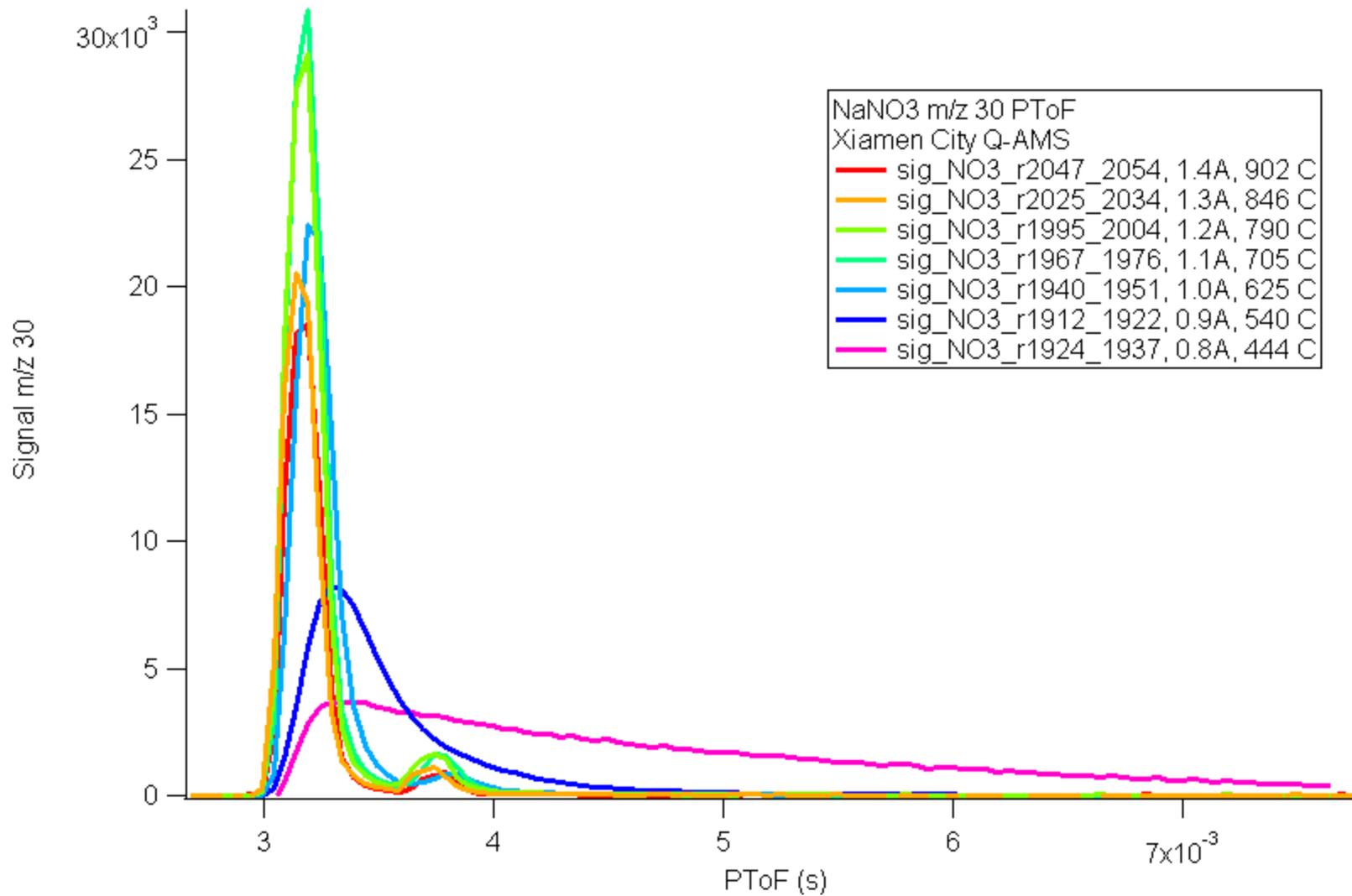
Do NOT trust the thermocouple readout!



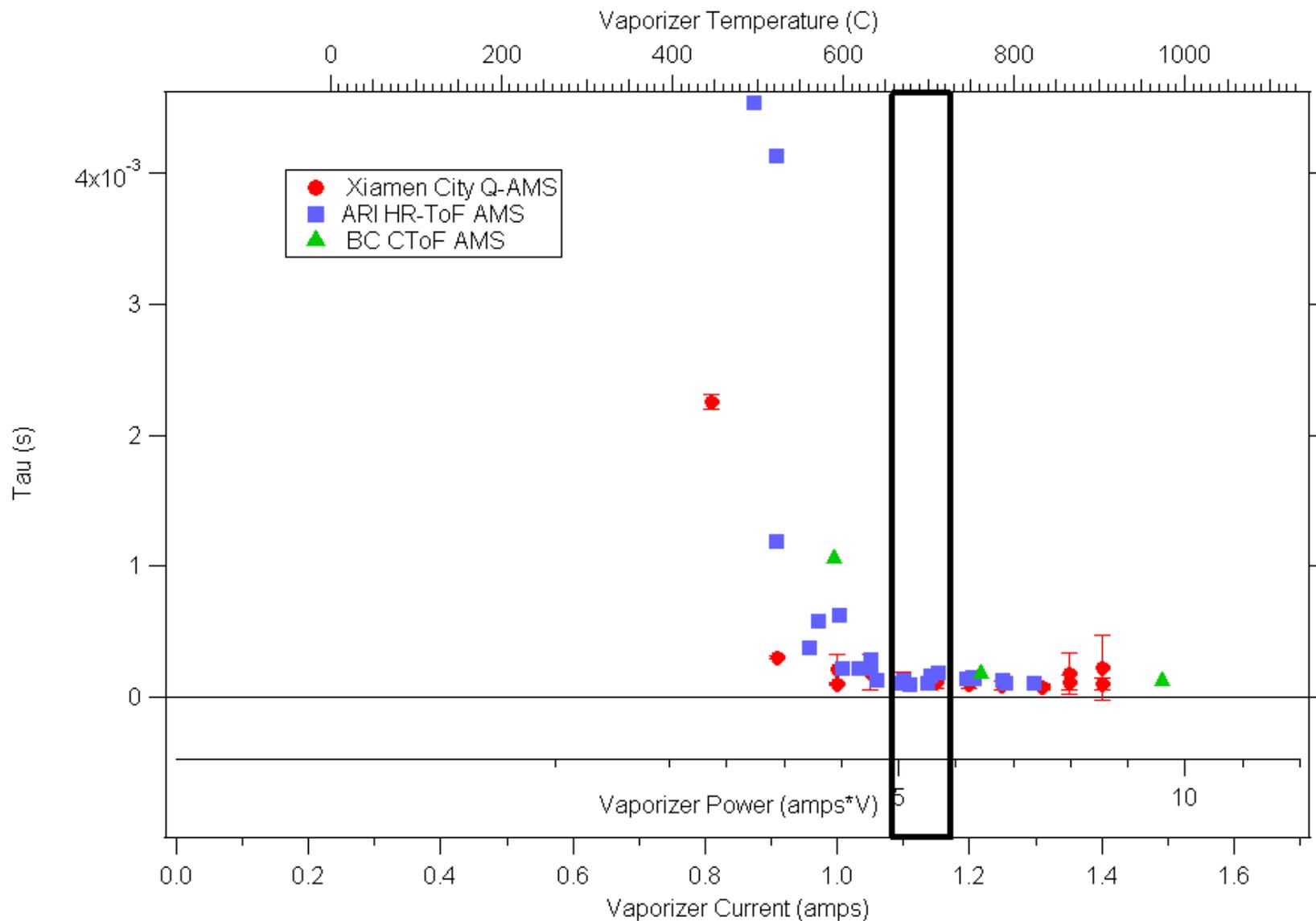
T/C reading depends on where and how the T/C is attached to the vaporizer. Can be off by hundreds of degrees. Green points – T for a given amp changed after ramping amps up and down. Bad connection between T/C and vaporizer.



Agreement between instruments better for T/C reading vs vaporizer power (amps*V), but still variation.



PToF traces for NaNO₃ (m/z 30) give good temperature indication.



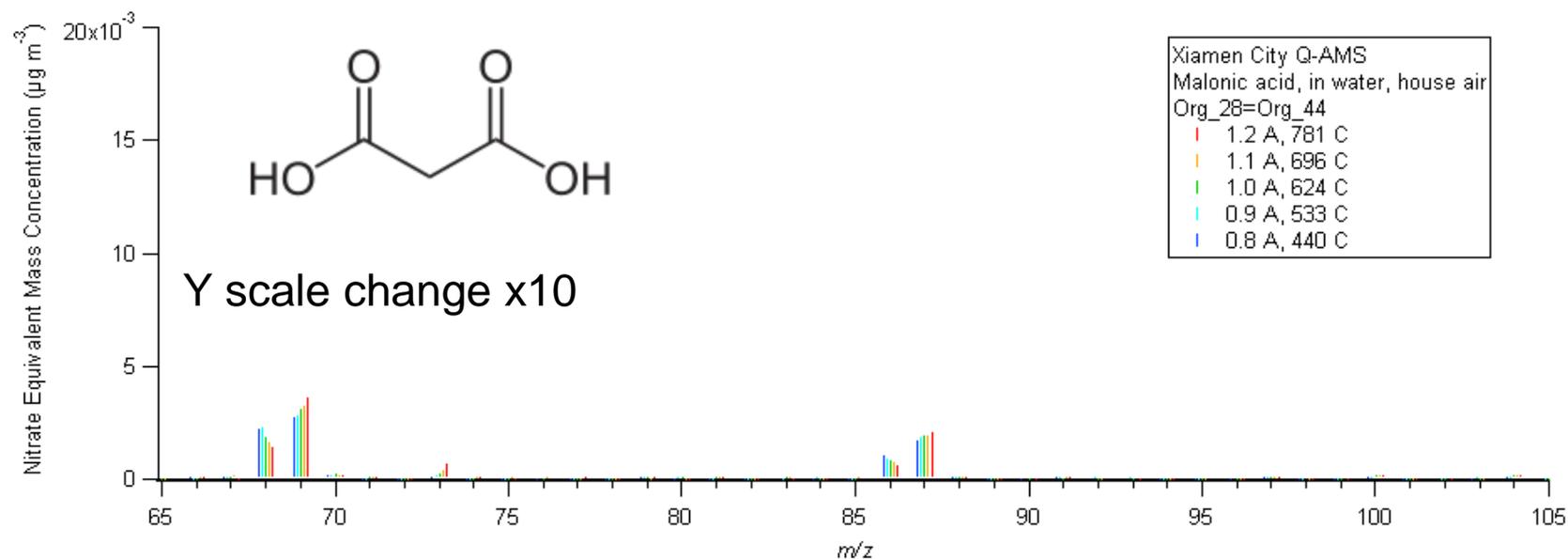
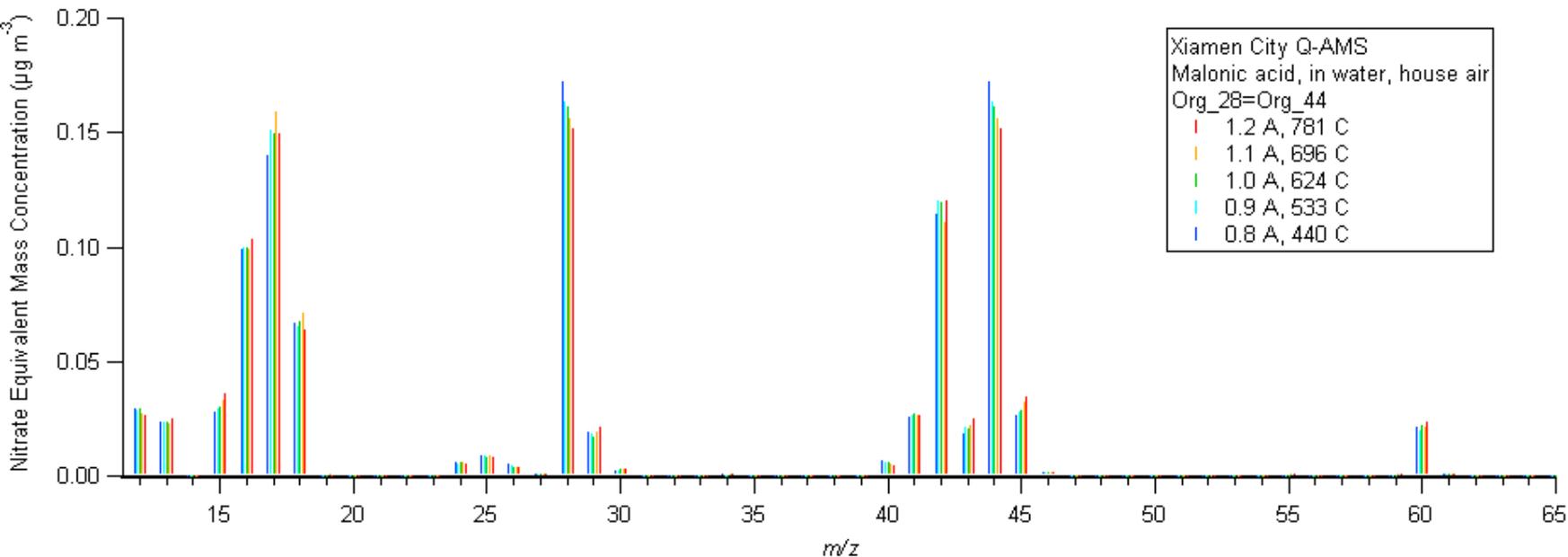
Fit falling edge of PToF with single exponential. Plot tau vs amps. PToF are narrow by 1.1 A, or 700 to 750 C. Vaporizer is glowing dull orange from back (front is cooler than back).

Bottom Line

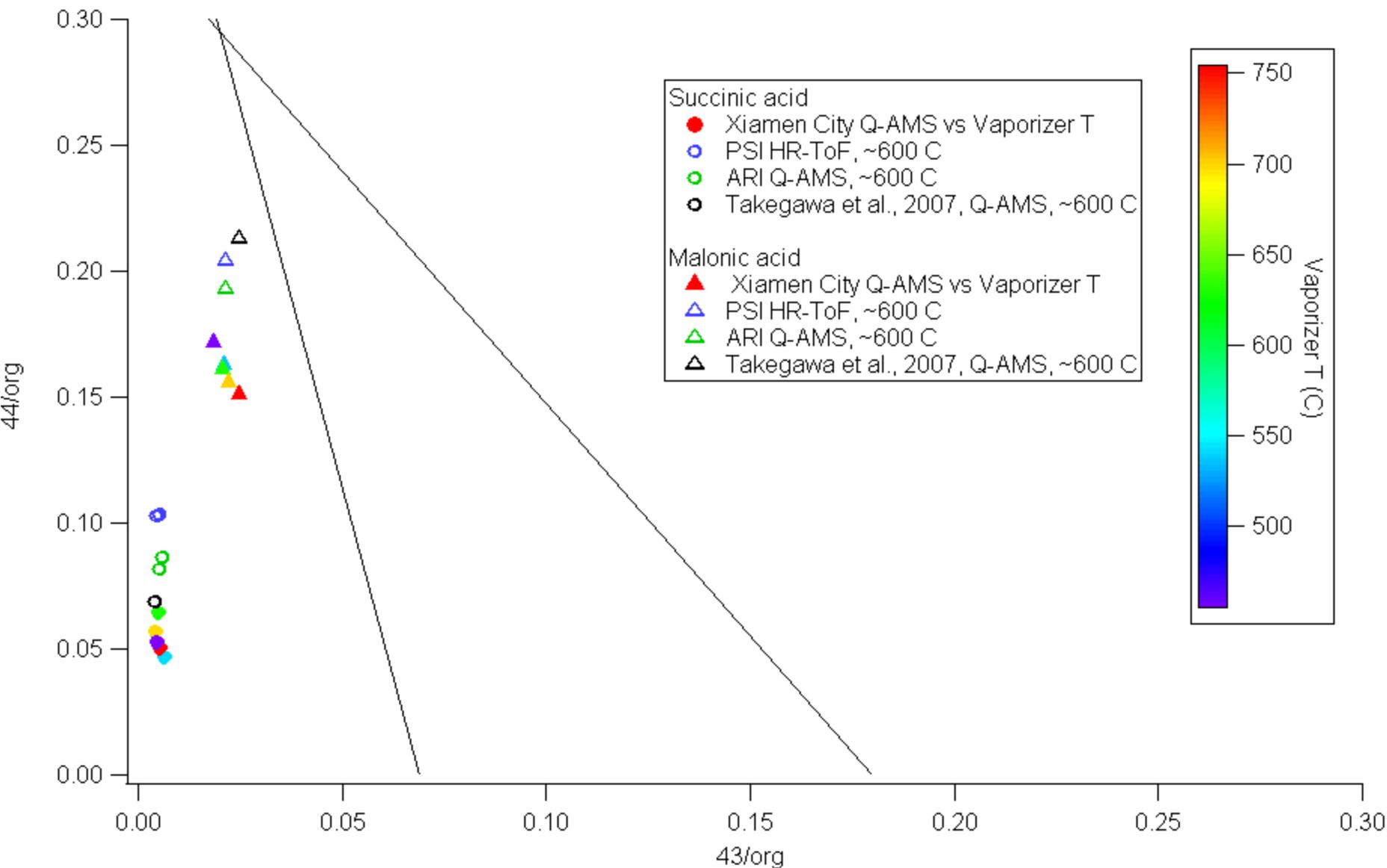
- If vaporizer current is NOT about 1, need to check true vaporizer temperature! Probably should check it anyway.
- Warning: T/C readout can be off by 100's of degrees.
- Look at NaNO₃ mz30 PToF. Sharpens up at 700 to 750 C. Subtract 0.1 from amps to get operating current.
- Look at back of vaporizer. If glowing dull orange, 700 to 750 C. Too hot for normal operation.
- If vaporizer is 1.2 A and you think T is correct, check the yellow wire inside the electronics box. E-mail John Jayne for details. Also, check that T/C reading on front panel agrees with T/C reading in data acquisition program.

Does It Matter?

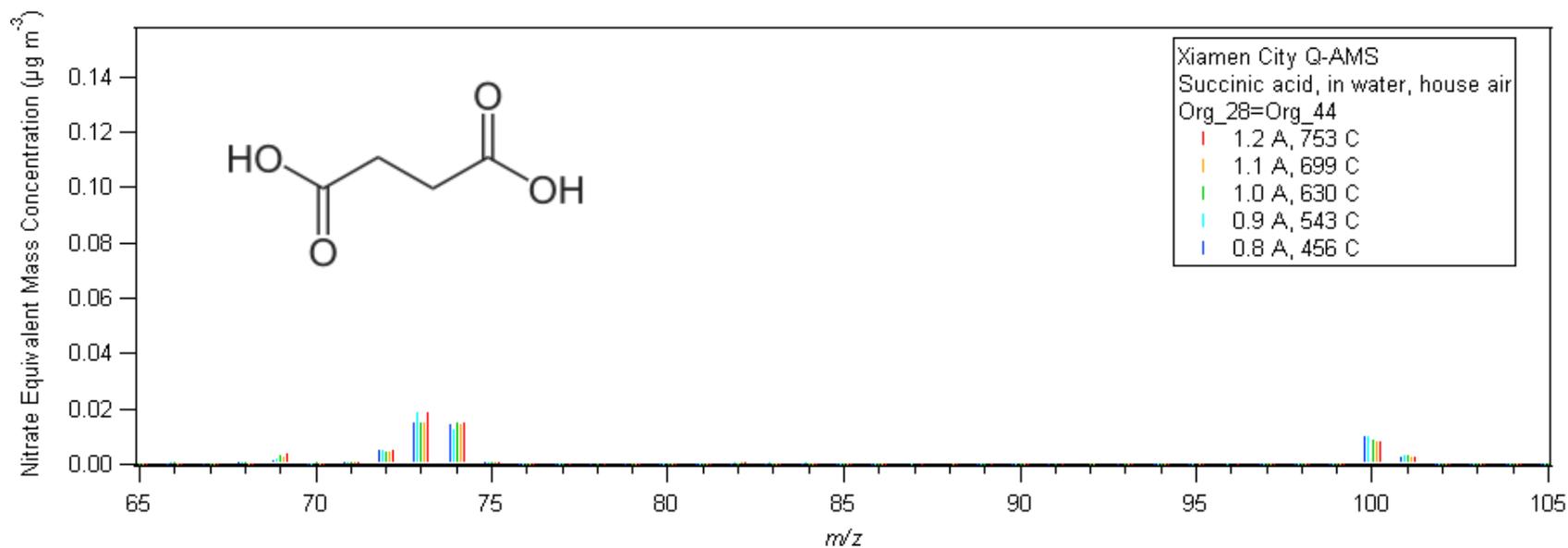
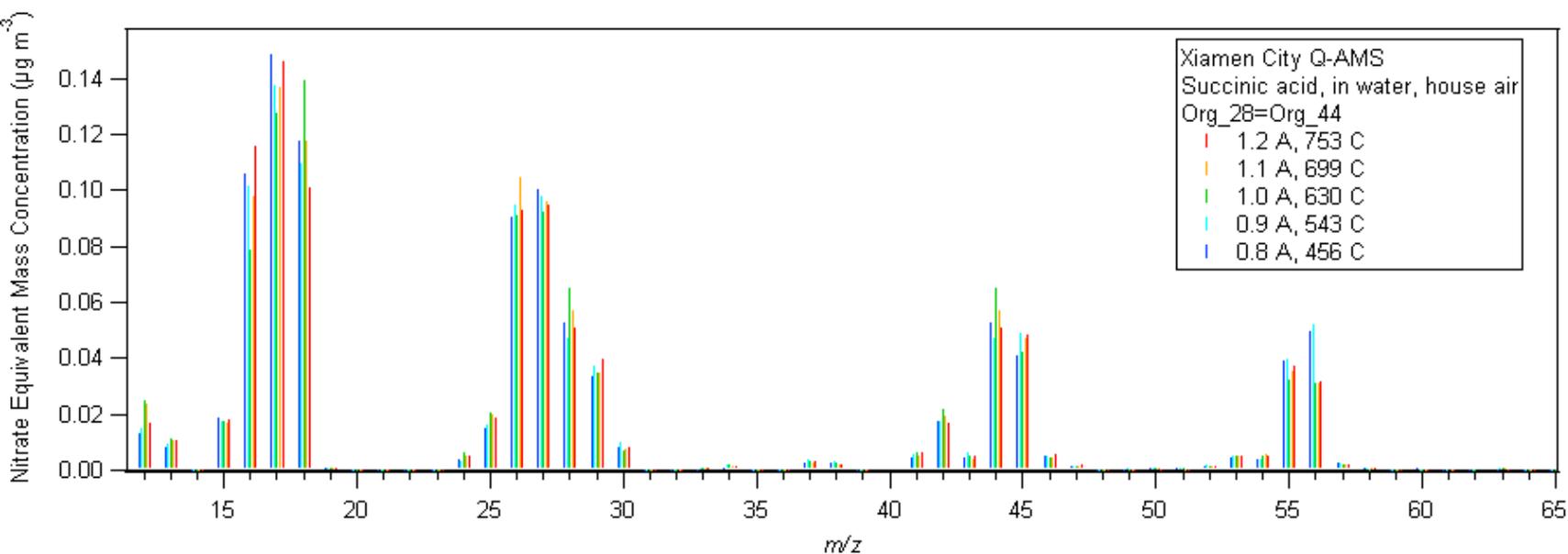
A Topic for Discussion



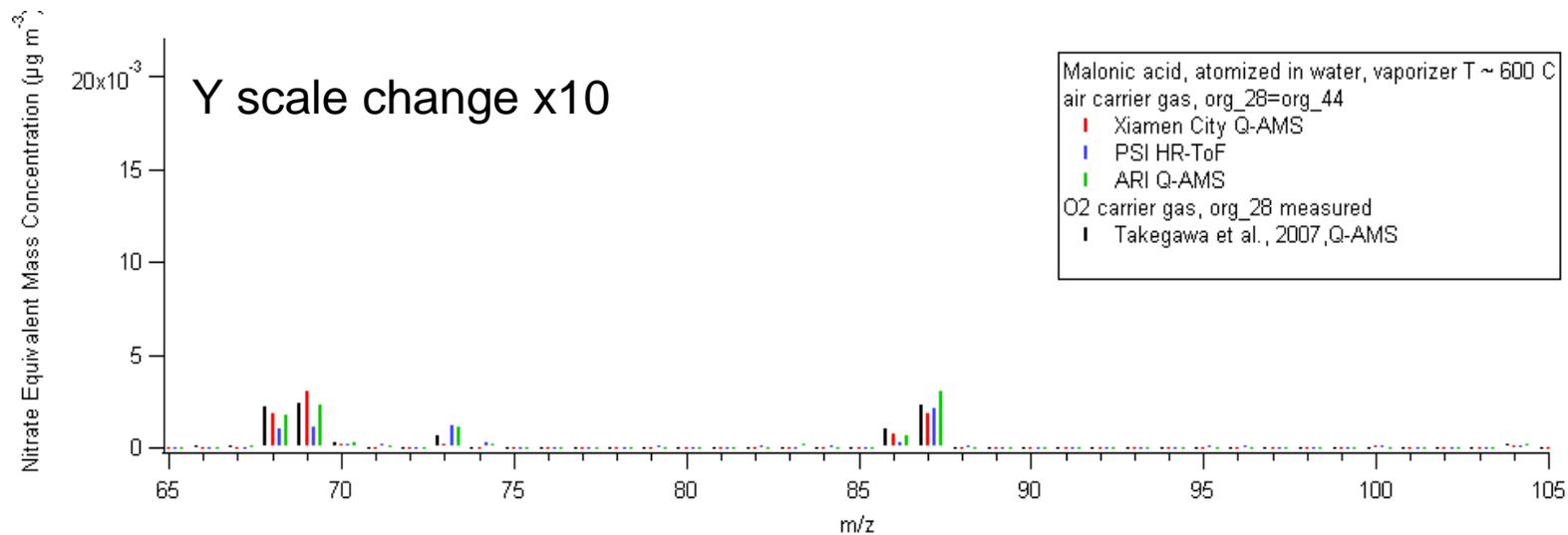
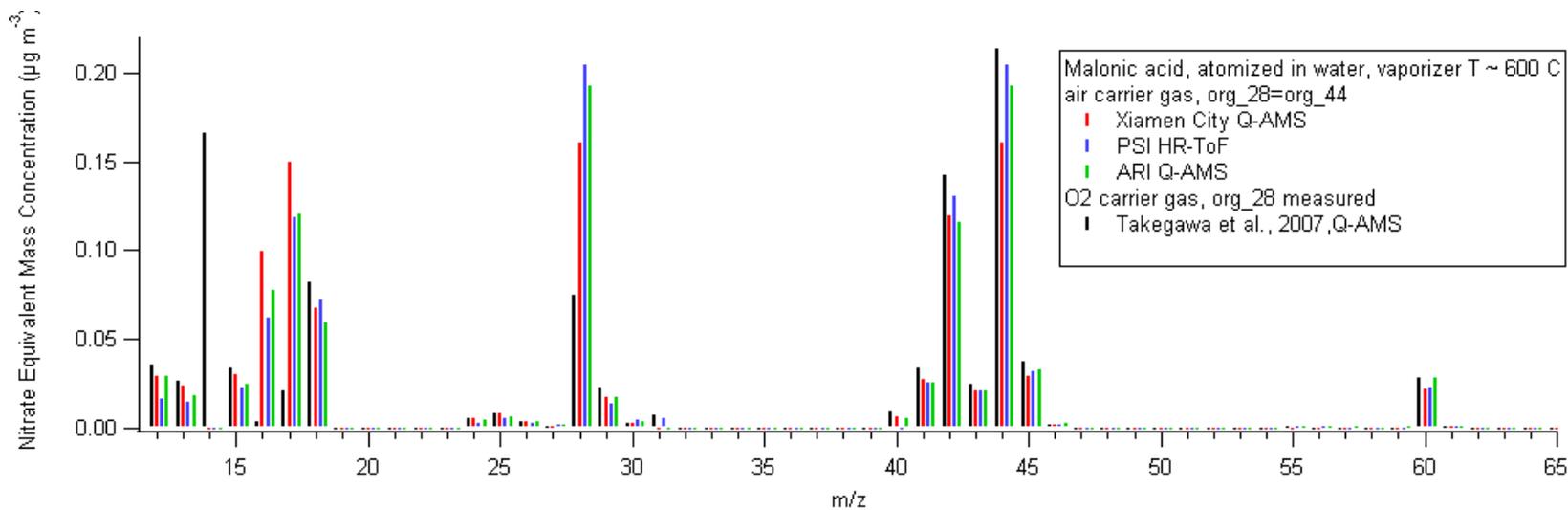
Malonic acid as function of vaporizer temperature. Looks more oxygenated at lower vaporizer T.



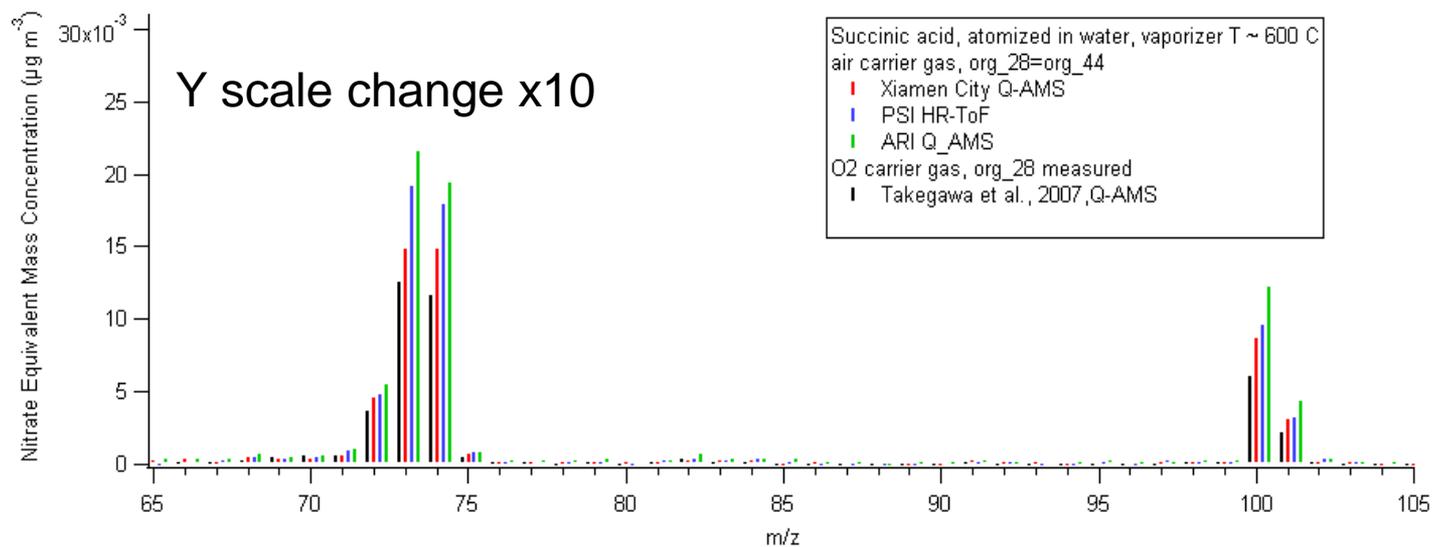
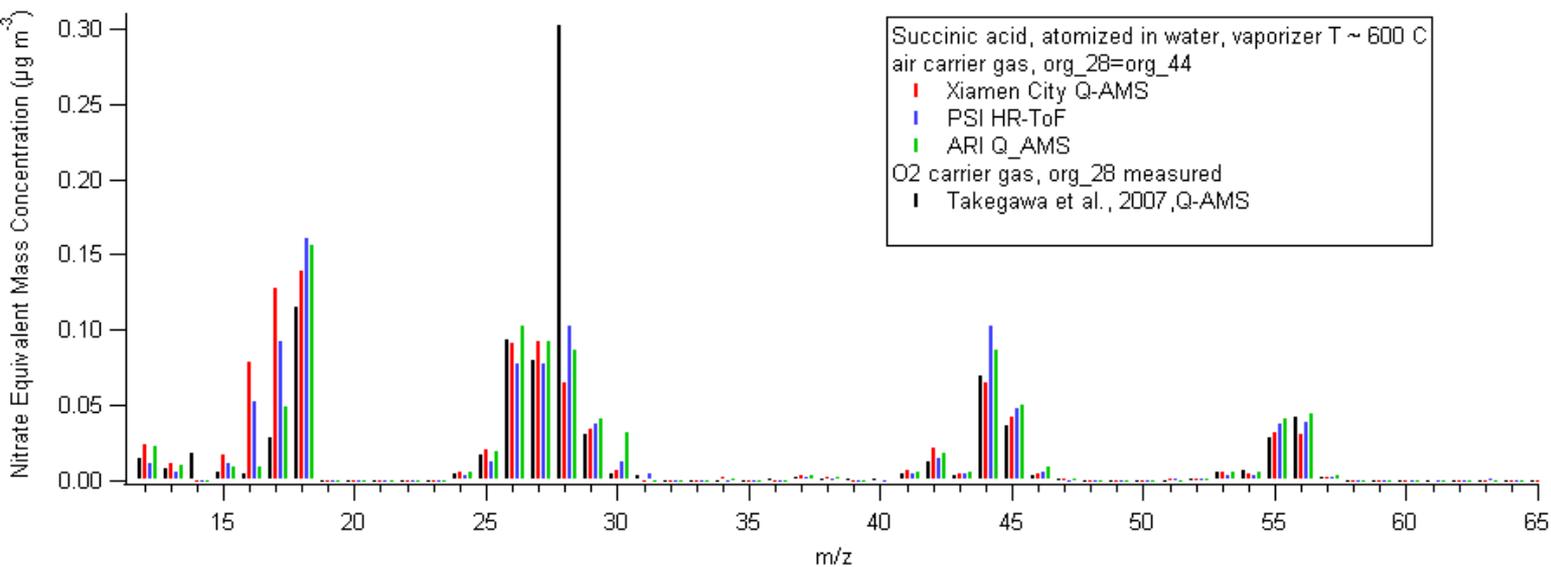
Another way of looking at the differences vs vaporizer T and the differences vs instrument. Differences vs instrument larger than differences vs vaporizer T.



Succinic acid as a function of vaporizer T. No clear pattern.



Malonic acid, 4 different instruments. Differences among instruments larger than differences vs vaporizer T.



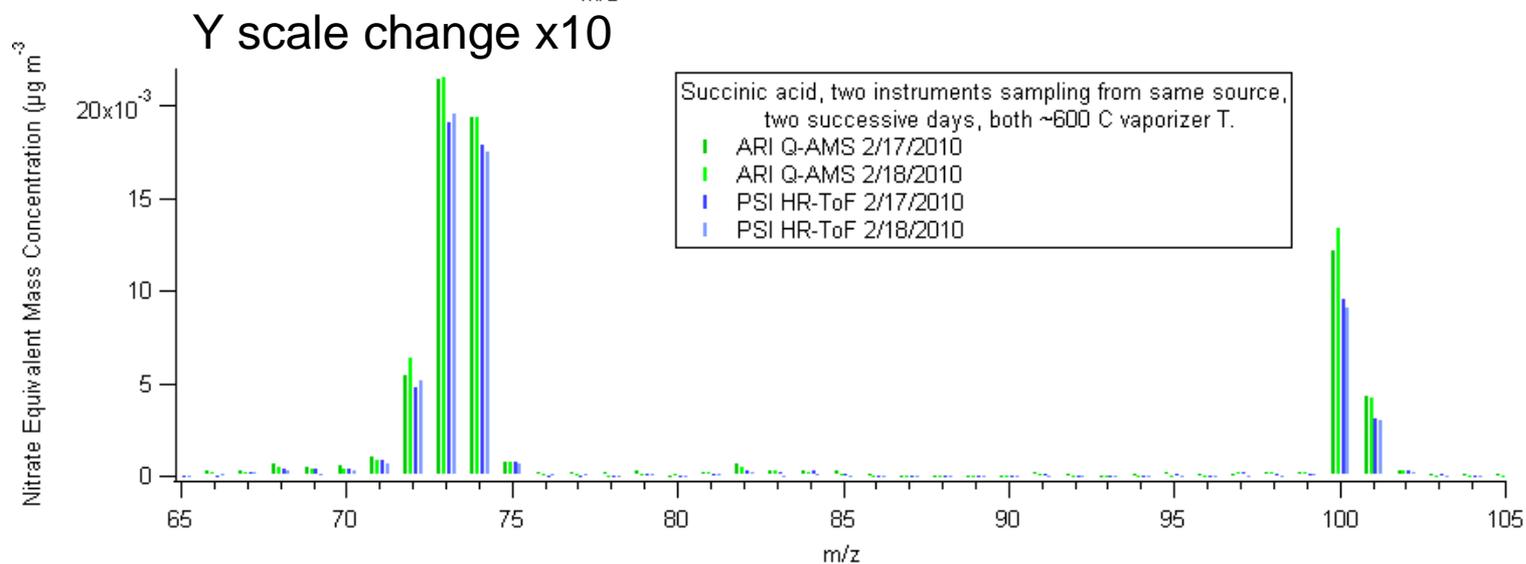
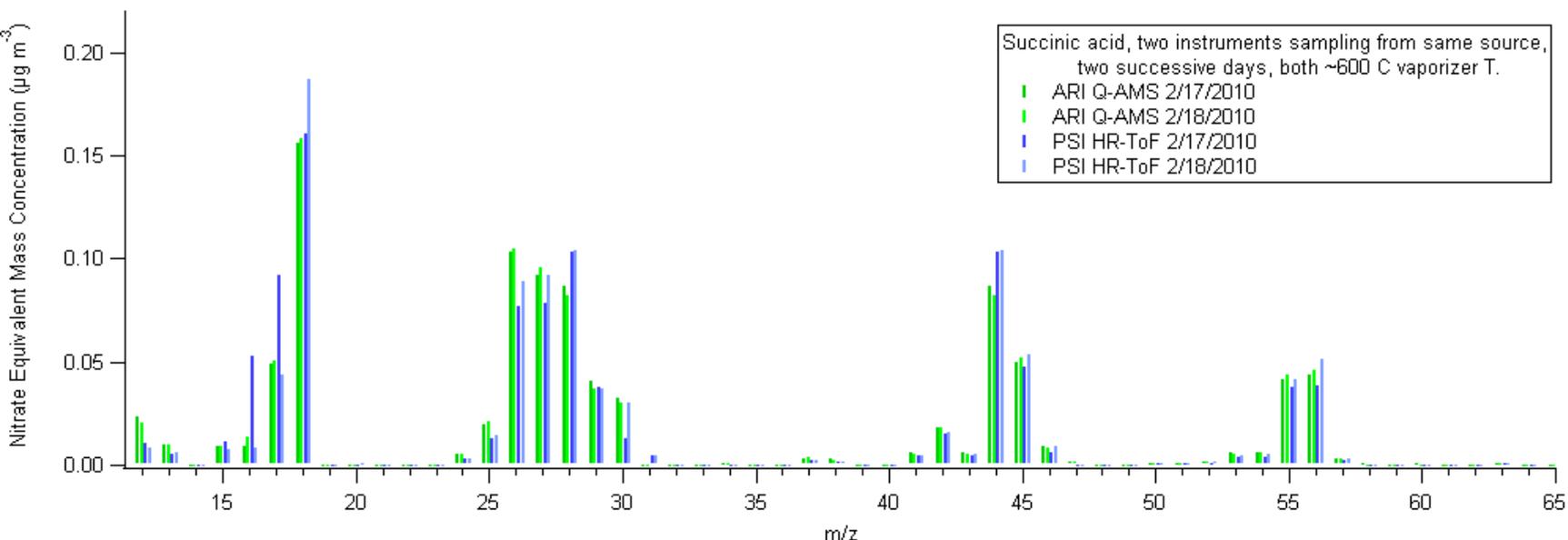
Succinic acid, 4 different instruments. Differences among instruments larger than differences vs vaporizer T.

Extras: Fragmentation pattern has only organics and air. Org_28=org_44

m/z	frag_air	frag_RH	frag_O16	frag_CO2	frag_organic	frag_water	frag_NH4	frag_nitrate	frag_H2SO4	frag_SO3
12					12					
13					13					
14	14.-frag nitrate[14]									
15	0.0036*frag air[14]				15.-frag air[15]					
16	frag O16[16],frag	0.04*frag RH[18]	0.3172*frag air[14]		16.-frag air[16]					
17	0.000391*frag O1	0.271*frag RH[18]			17.-frag air[17]					
18	0.002*frag O16[18]	0.00227*frag air[2]			18.-frag air[18]					
19	frag RH[19]	0.000691*frag RH			0.000691*frag org					
20	20.-frag organic[20]	0.002*frag RH[18]			0.002*frag organic					
21										
22										
23										
24					24					
25					25					
26					26					
27					27					
28	28				frag organic[44]					
29	0.00736*frag air[2]				29.-frag air[29]					
30	0.0000136*frag ai				30.-frag air[30]					
31										
32	32.-frag sulphate[32]									
33	0.000763*frag air[33]				33.-frag air[33]					
34	0.00402*frag air[34]				34.-frag air[34]					
35										
36	0.00338*frag air[4]									
37					37.-frag chloride[37]					
38	0.000633*frag air[38]				38.-frag chloride[38]					
39										
40	0.014288*frag air[40]				40.-frag air[40]					
41					41.-frag K[41]					
42					42					
43					43					
44	frag CO2[44]			0.00004219*frag CO2	44.-frag air[44]					

Air frags set for a filter period.

Extra



Succinic acid, ARI Q-AMS and PSI HR-ToF sampling from same source, two different days, nominally same vaporizer T.