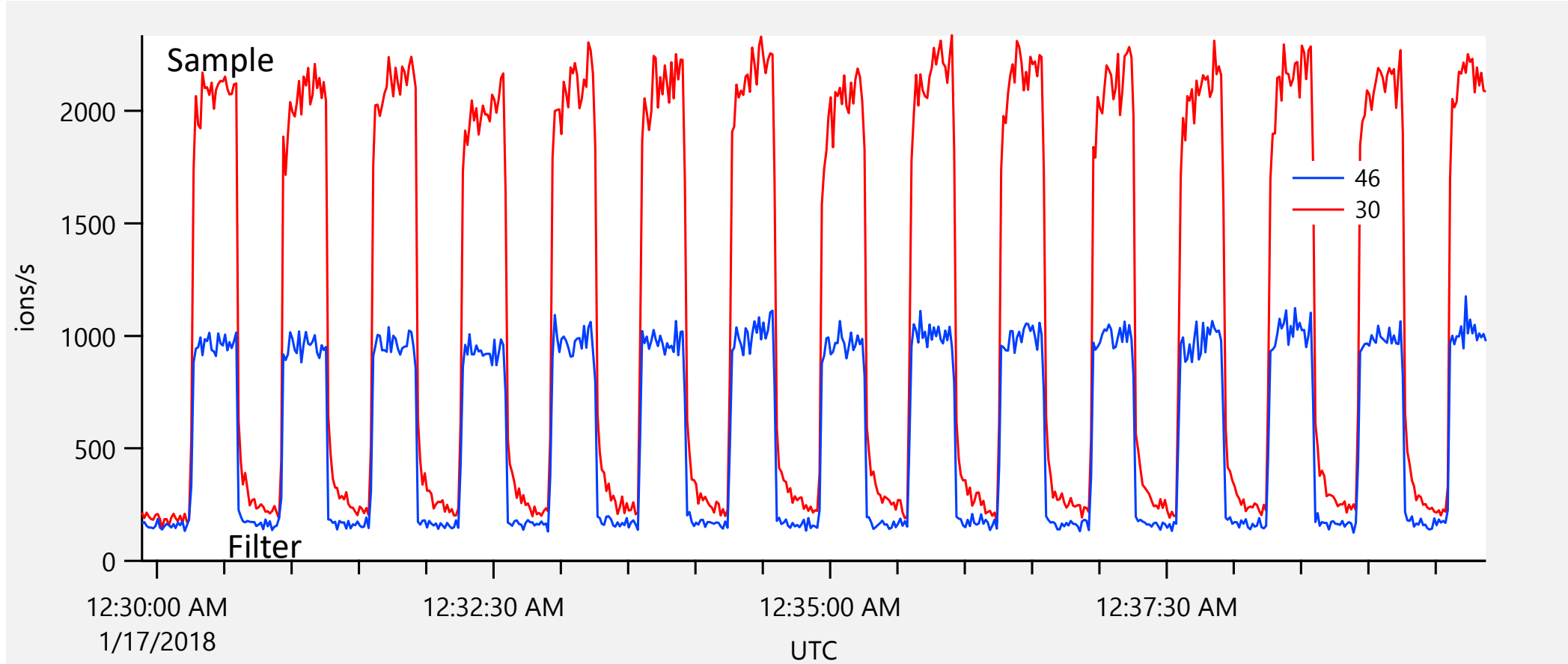


ToF-ACSM Valve Switching

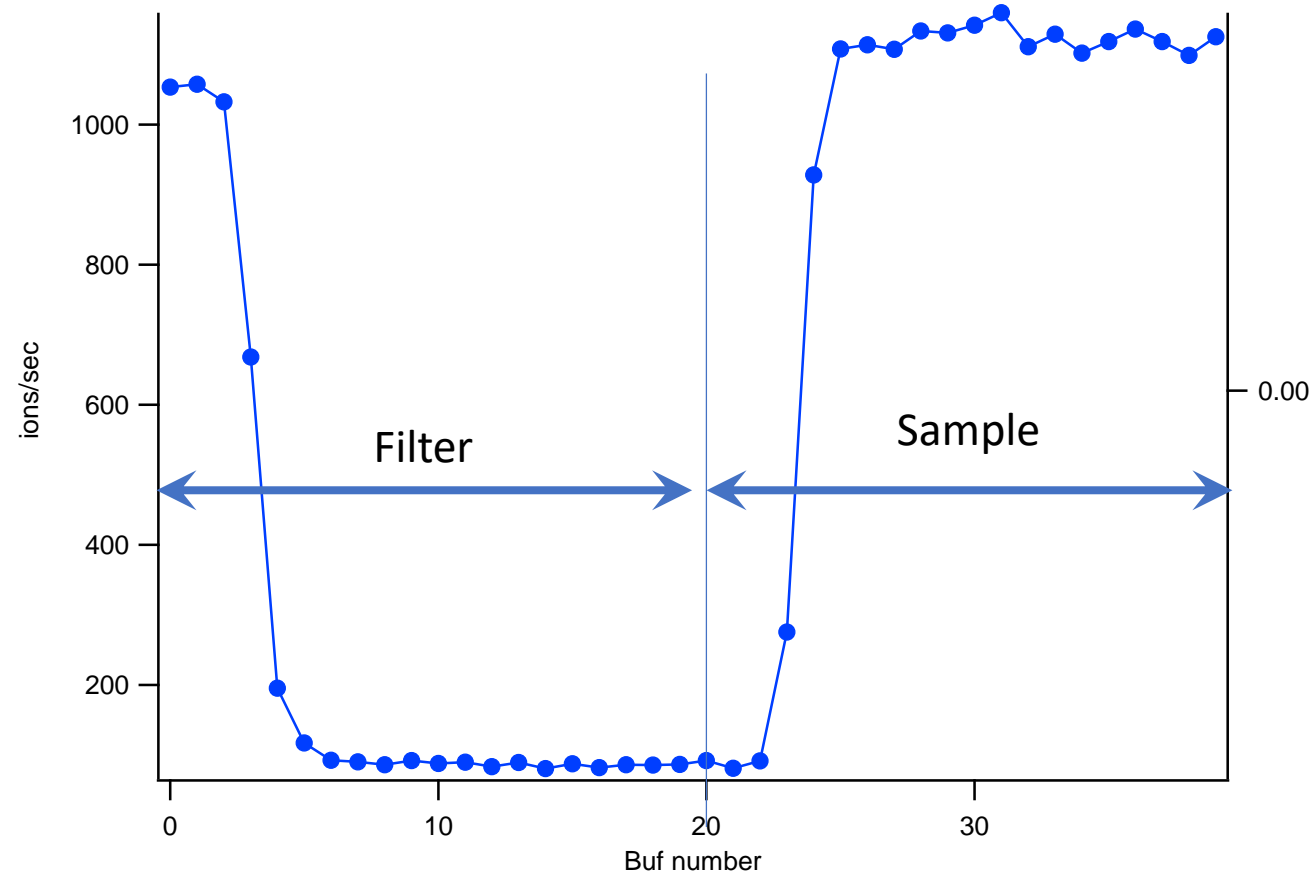
Switching Valve Between Filter/Sample Every 20 secs



NH₄NO₃ Particles

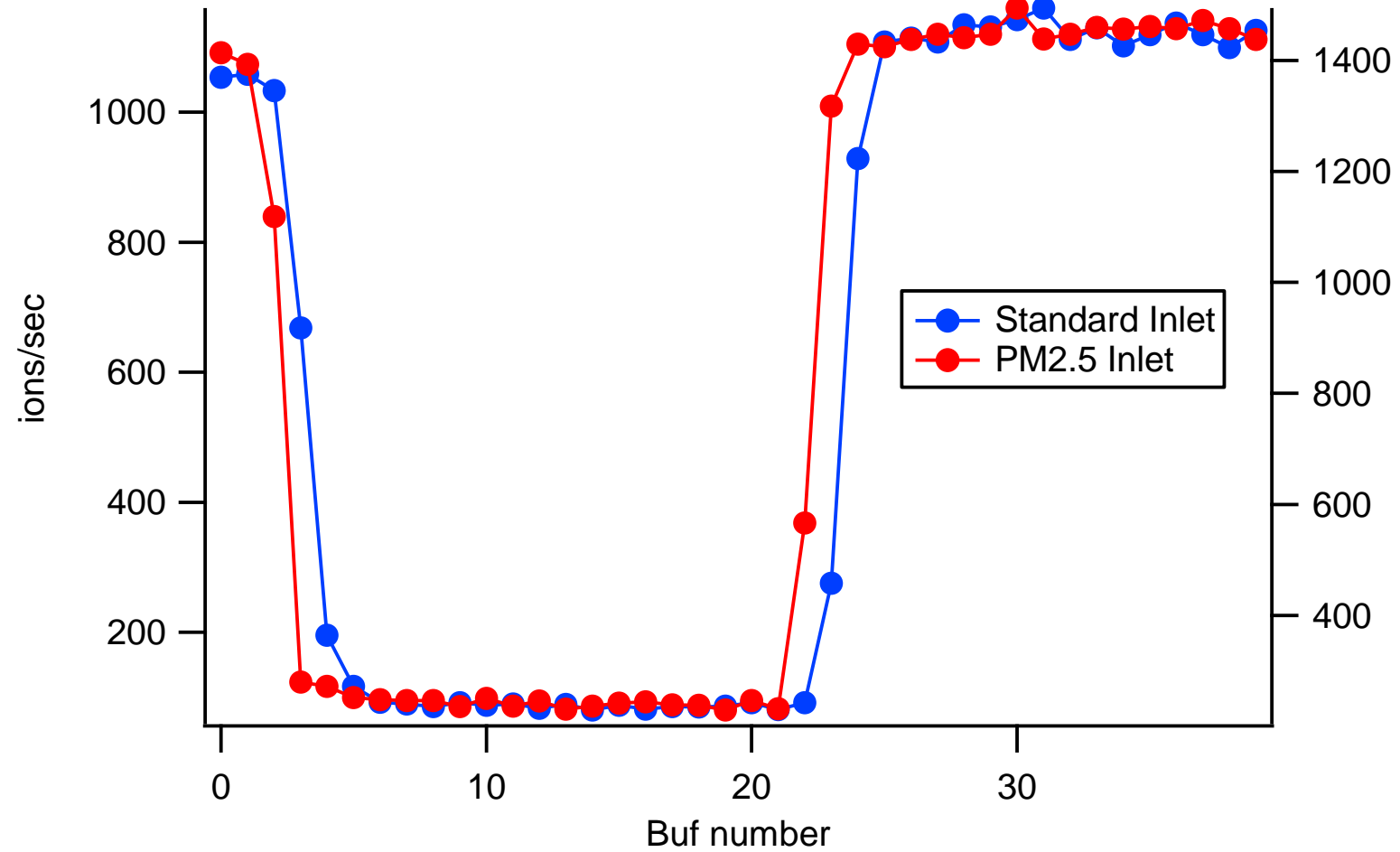
- Note that slowly vaporizing species (m/Q 30 = NO⁺) take a few seconds for signal to fall and rise. Also, m/Q 44 = CO₂⁺ from oxygenated organics.
- Timing will affect f44. Not as fast as AMS (5sec open/closed). Not as slow as Q-ACSM (~ 30 sec filter/sample).

Regular Acquisition: Average 20 sec for 1 filter point, 20 sec for 1 sample point

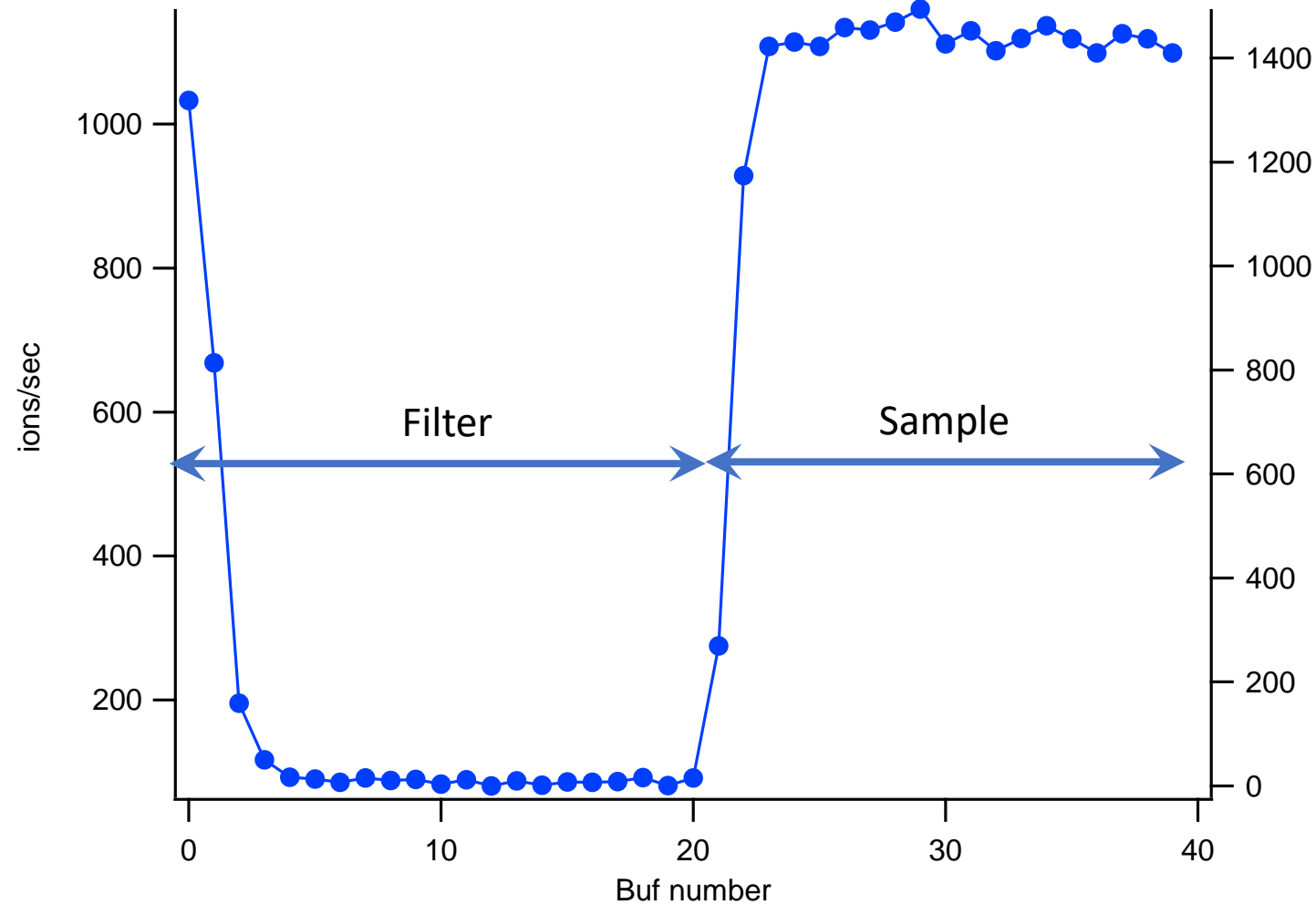
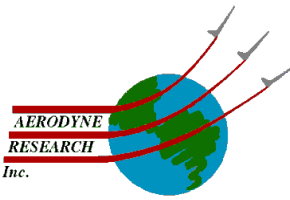


- Takes 2-3 secs for command from Acquility to result in valve actually turning due to electronics, CANbus, tubing.
- Prioritizing valve switching on CANbus has helped (firmware upgrade).
- But, averaging several seconds of sample into filter point, several seconds of filter into sample point.

~1 sec of delay due to inlet tubing

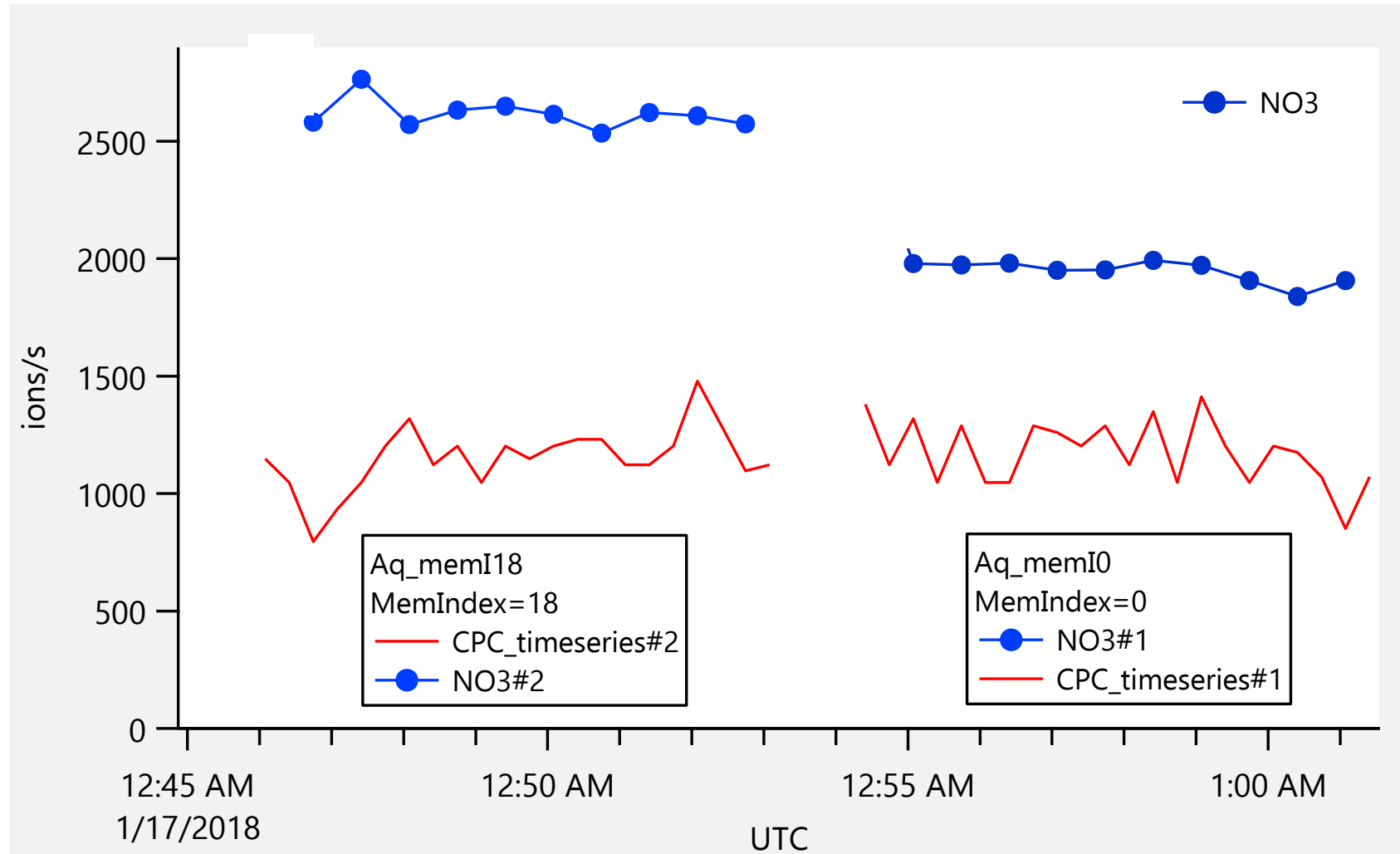


One Solution: Send switch command 2 sec earlier



Parameter MemIndex=18, now hardcoded in Acquility

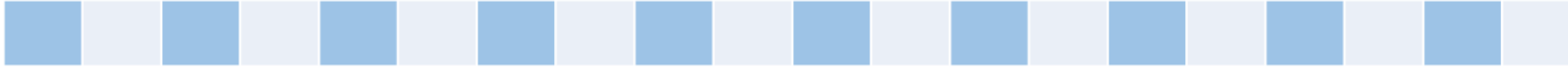
MemIndex = 18 → 30% More Diff Signal



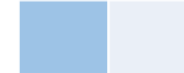
Important to use same MemIndex for calibration as for acquisition – now hardcoded in Acquility

Second Solution: 1 sec Data with Cubes

Regular acquisition– switch valve every 20 seconds



Average all sample and filter periods to make one write

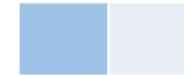


Integrates over
switching
transients

Time-resolved evaporation (TRE) – switch only twice per write



Ignore starred bufs when averaging sample and filter to make one write



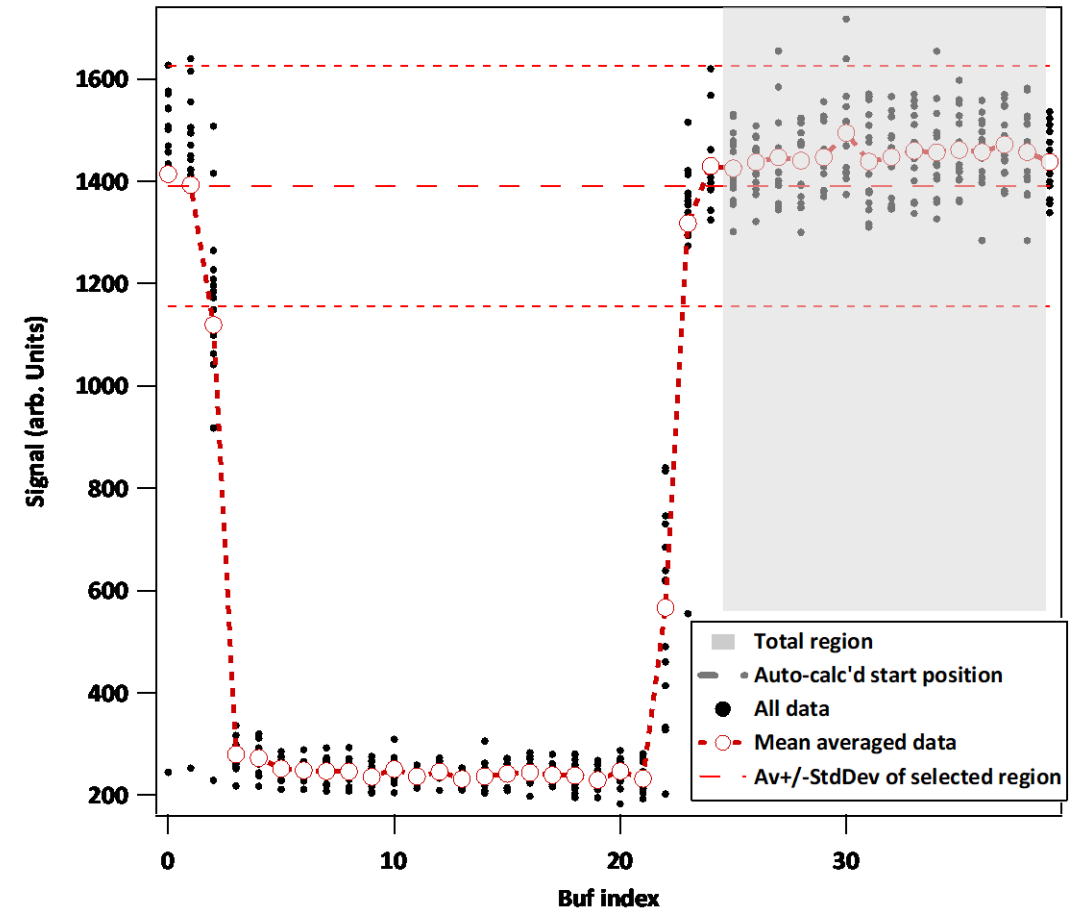
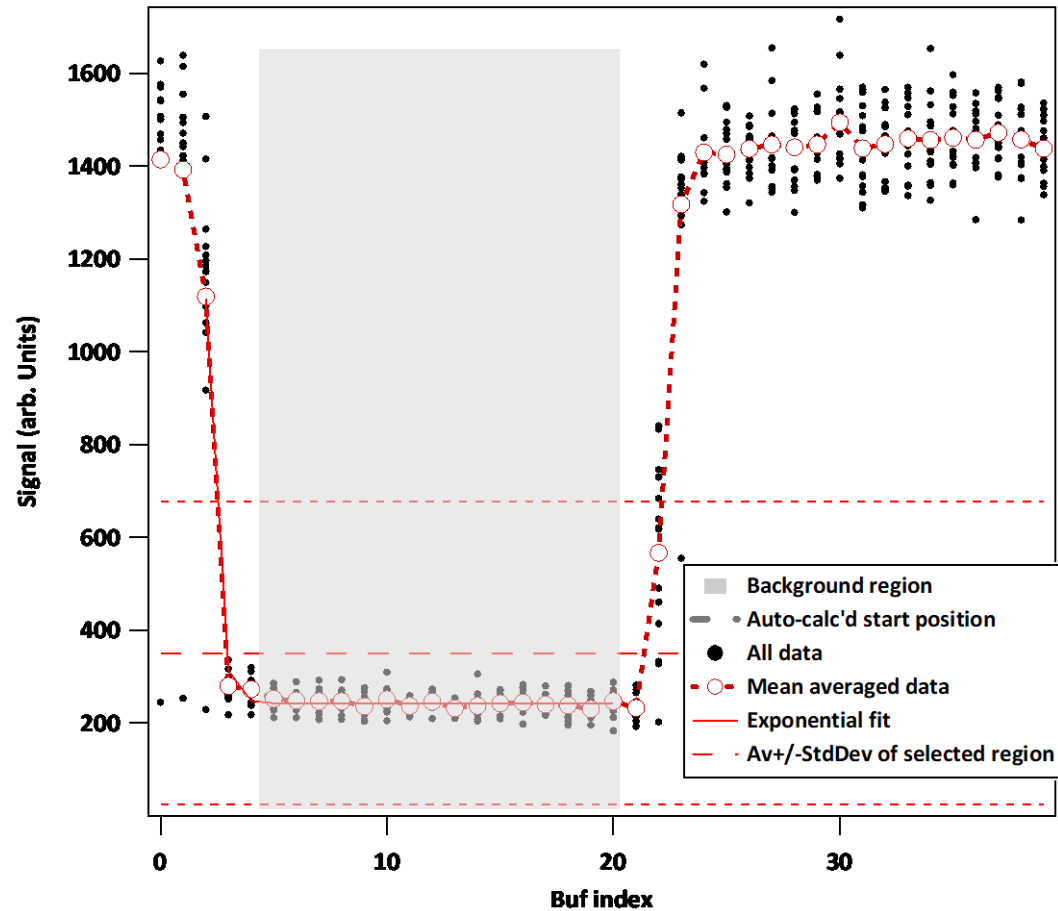
Can ignore the
transients during
switching, but
get large
datafiles

Cubes – average repeated 1 sec data

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
20	21	..																	
40	41	..																	

Average 20 cubes
to get same size
datafile, lose time
resolution

Tofware has panel for setting filter/sample regions
BUT, IE and RIE calibrations MUST have same settings
AND, different instruments might get different f44



Decision point coming with Tofware 3!