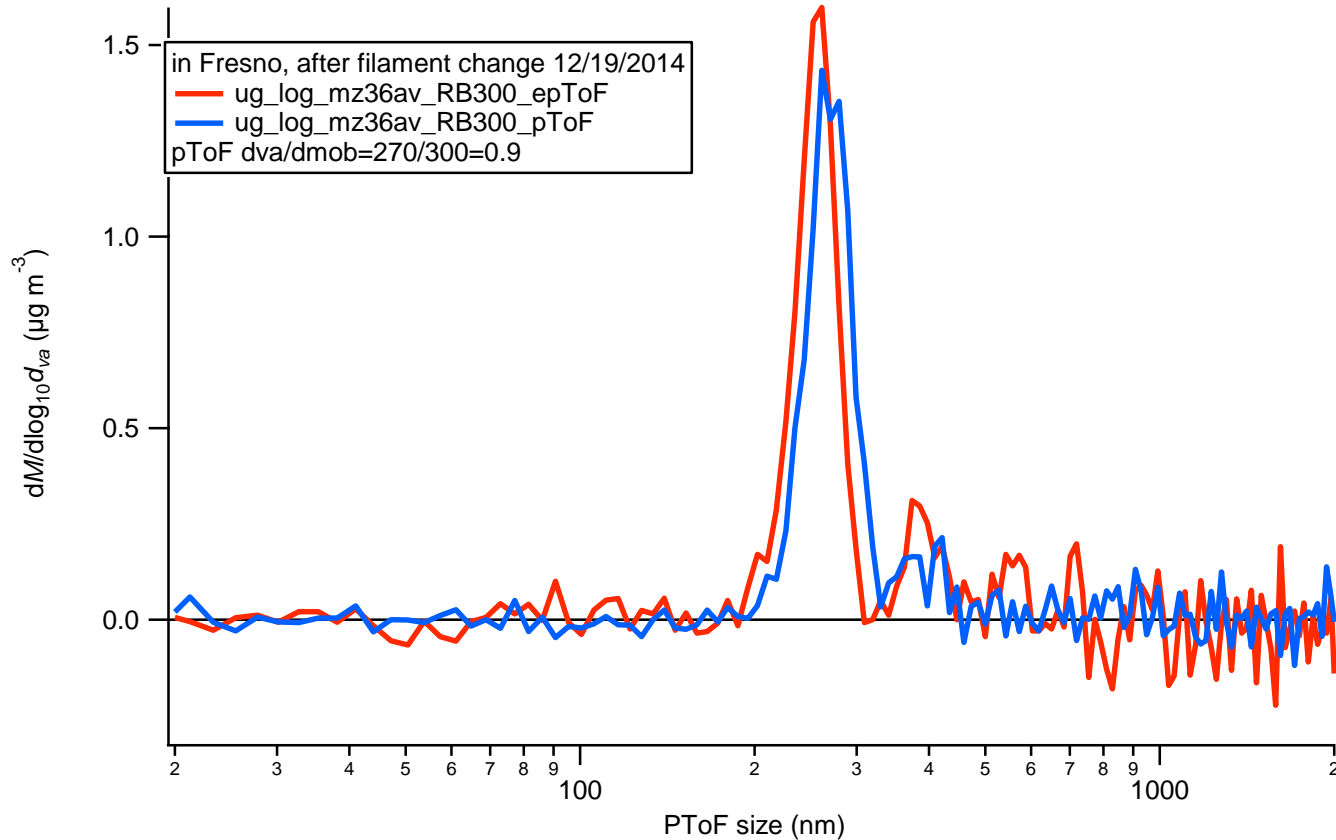


Comparing epToF and pToF data:

- Field campaign in Fresno, CA, Dec 2014 – Jan 2015
- SP-AMS with laser vaporizer only = low signals
- Alternated epToF (27 s/2 minute run) and pToF (45 s/2 minute run)
- epToF duty cycle = 50%, pToF duty cycle = 2%
- epToF should have better S/N by $\sqrt{25} * \sqrt{27/45} \sim 4$

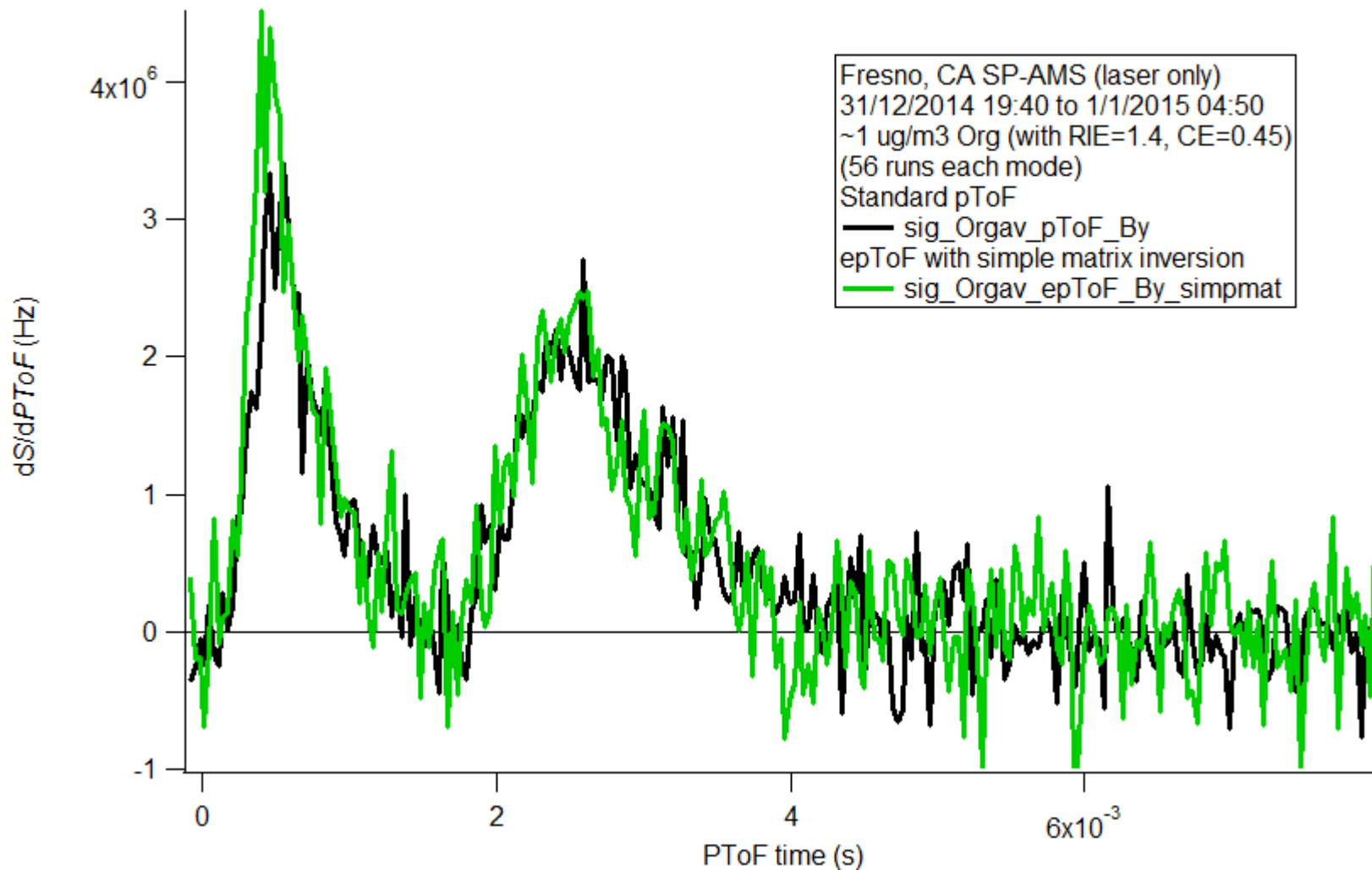
Leah Williams
Aerodyne Research, Inc.
HR Clinic, June 2015



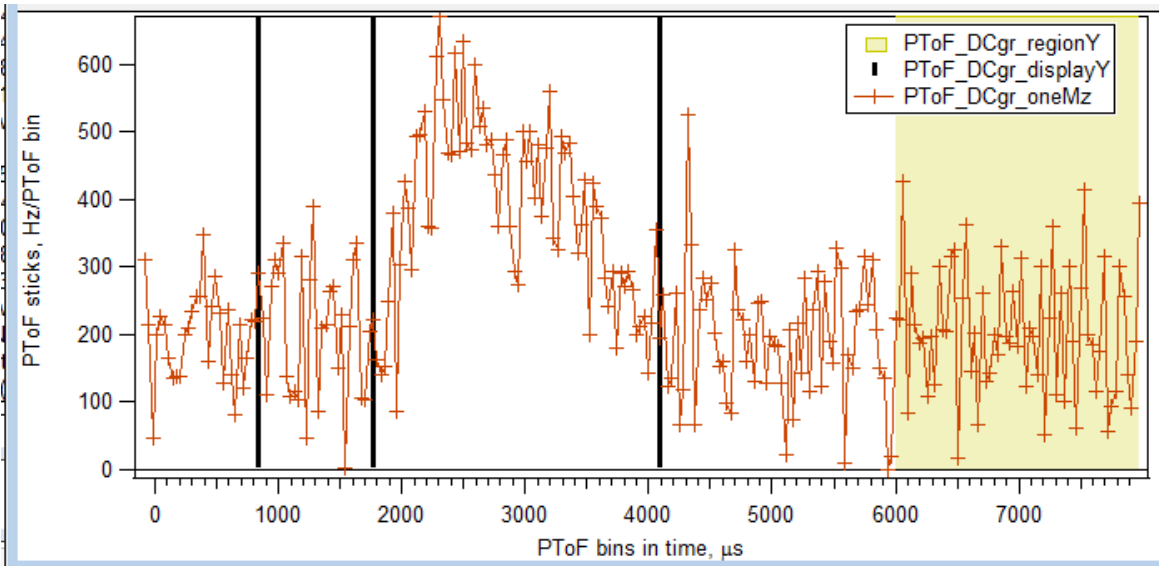
Regal black, 300 nm size-selected.

Need new size calibration for epToF!

Donna – Can we have two sets of vel cal parameters that get applied separately to epToF and pToF?

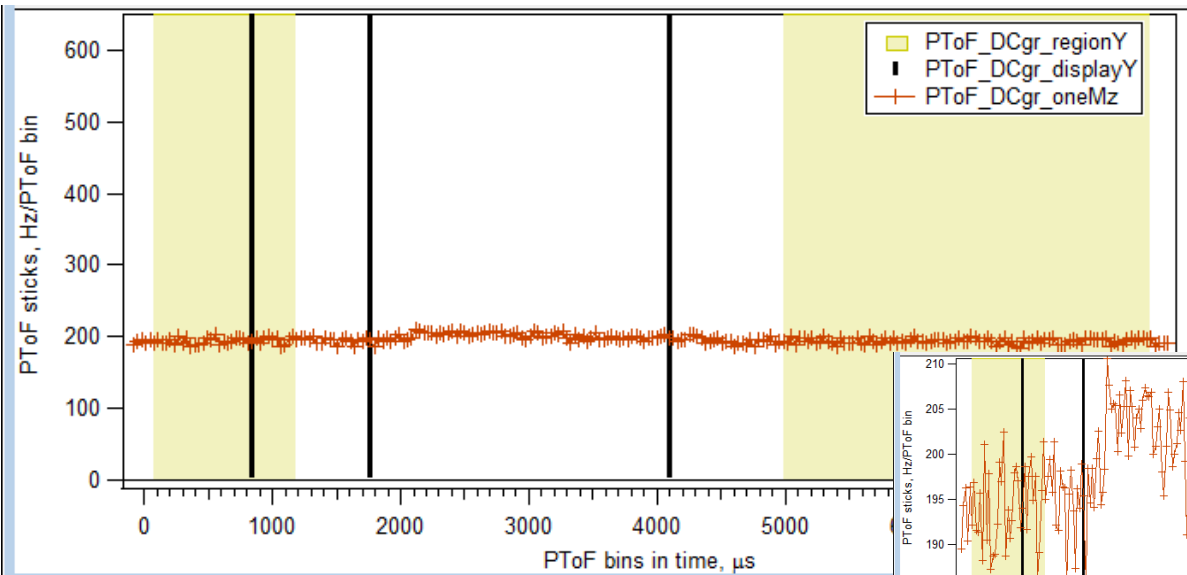


Ambient data, bypass only, 56 runs each mode.
 ~ 1 ug/m³ organics
 epToF does not look less noisy than pToF!



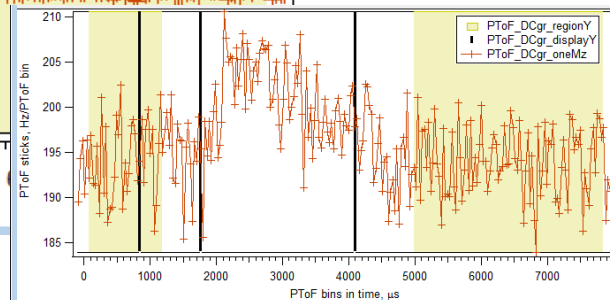
epToF – simple matrix inversion

- baseline ~ 200 Hz
- peak + 300 Hz

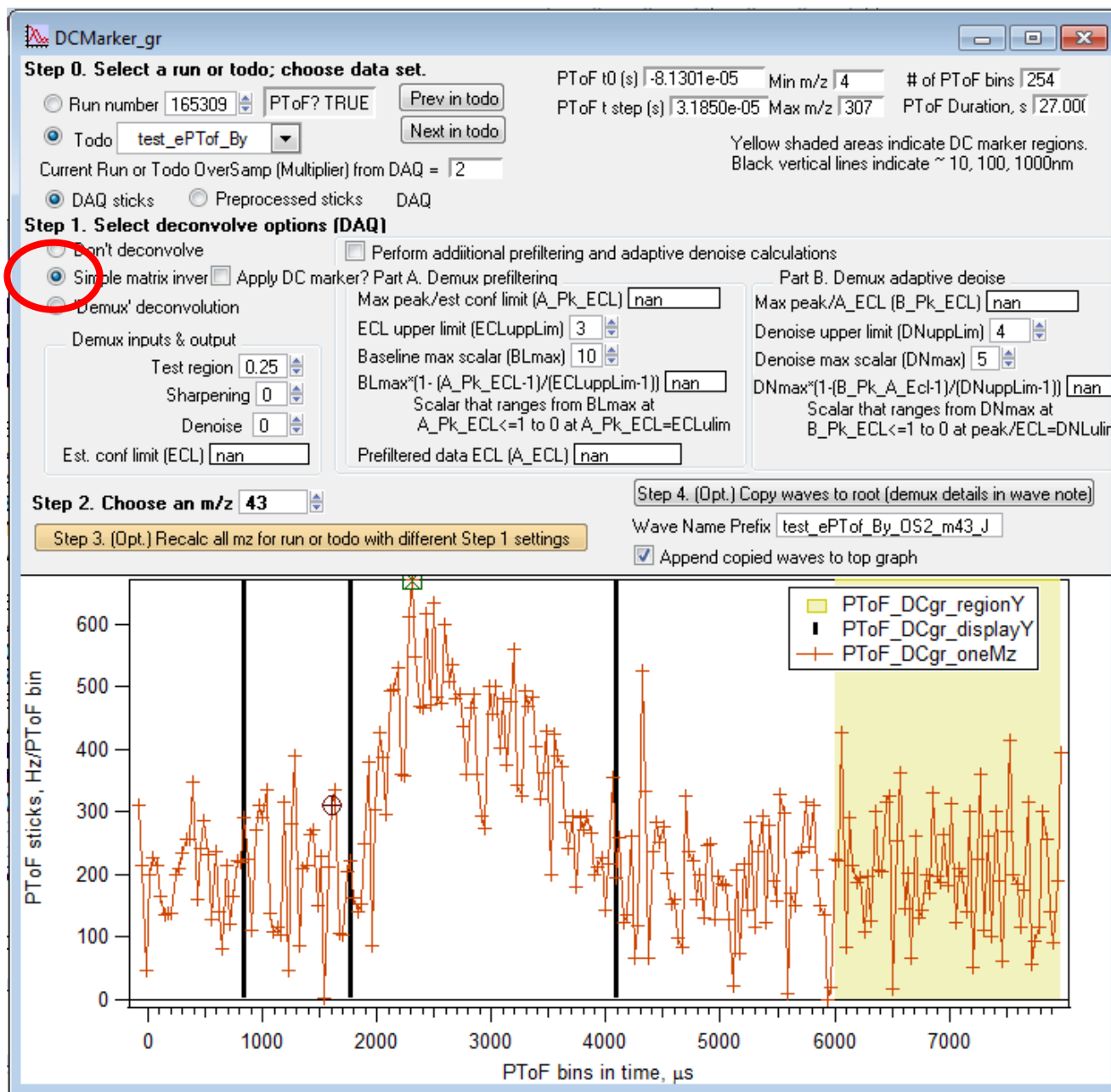


pToF

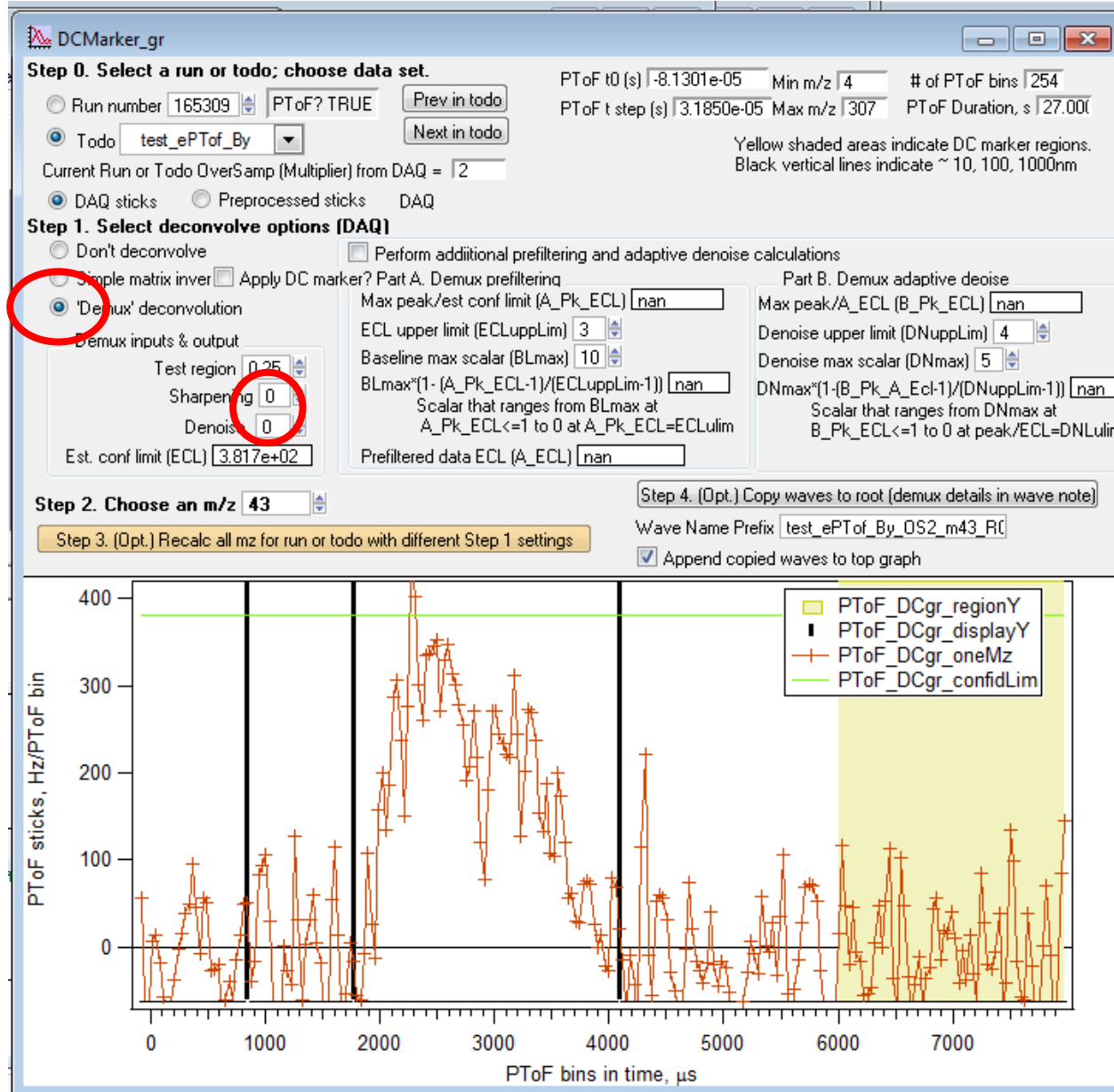
- baseline ~ 200 Hz, less noisy because 25 times more time spent sampling
- peak + 12 Hz, consistent with 25 times less signal

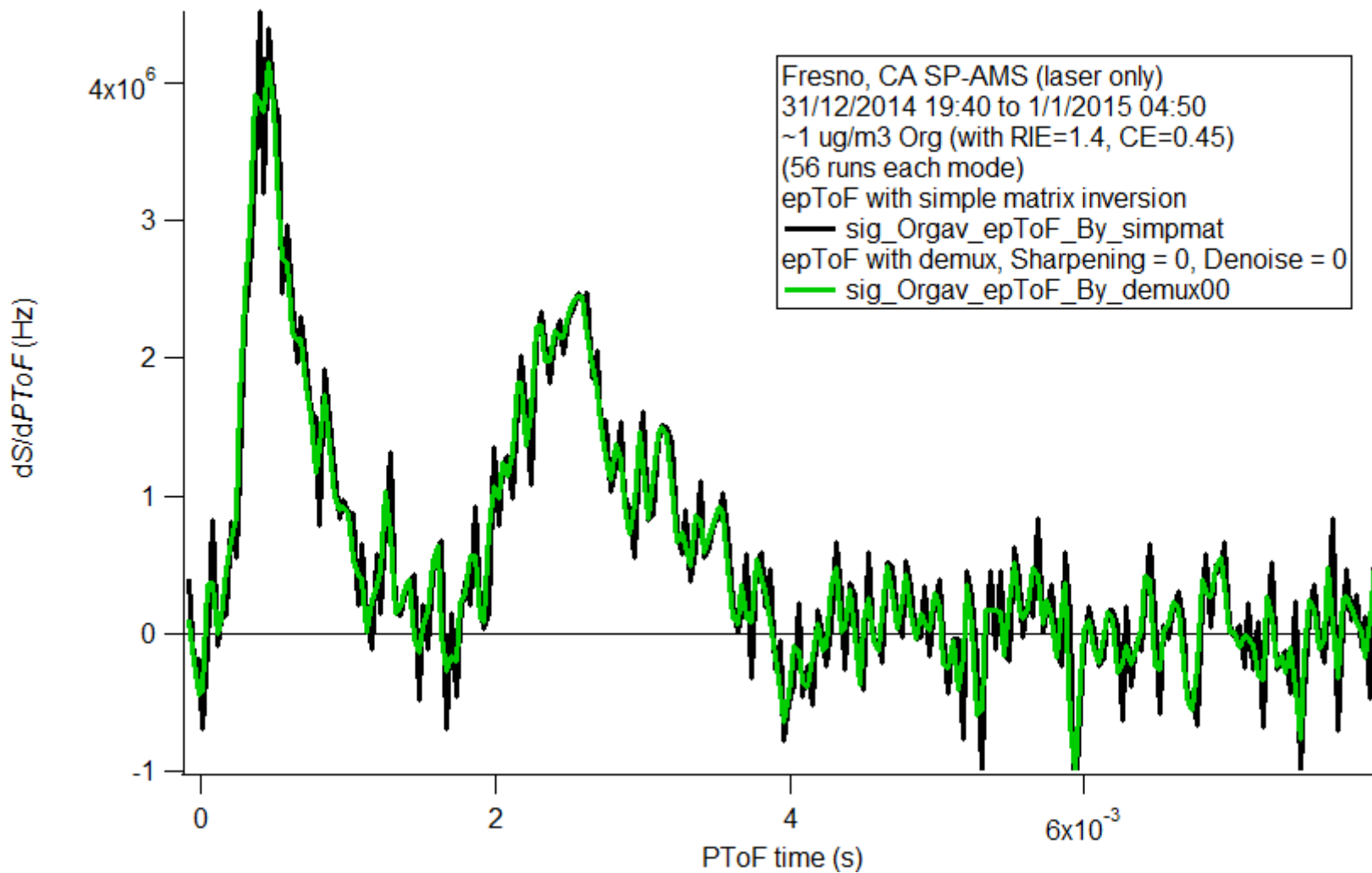


Latest version of DCMarker panel – work in progress!

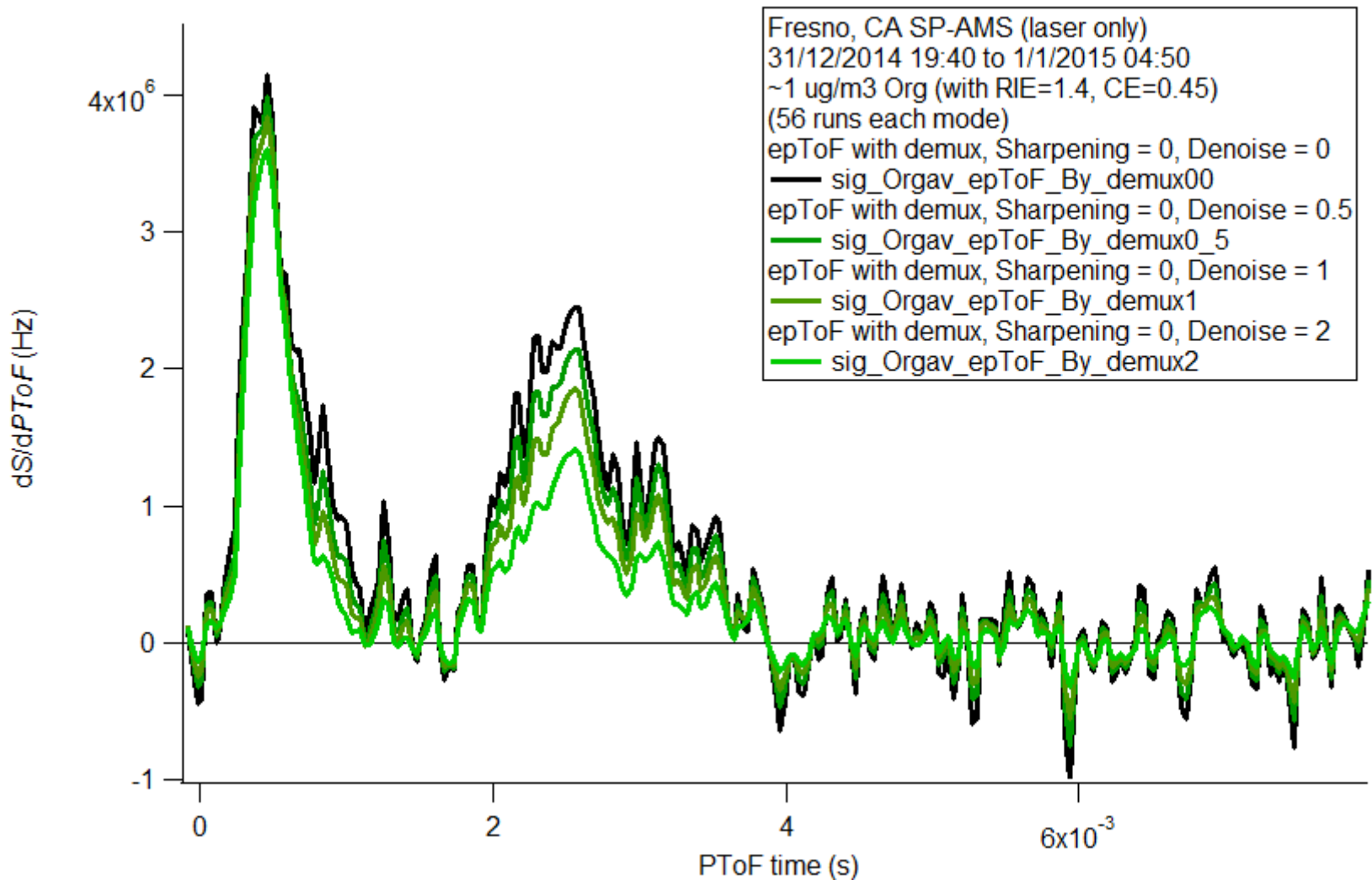


Rich Knochenmuss, Tofwerk, Demux deconvolution. Less noisy than simple matrix inversion, but how to set Sharpening and Denoise? Sharpening currently not recommended for ambient data. Note green estimated confidence limit (ECL).

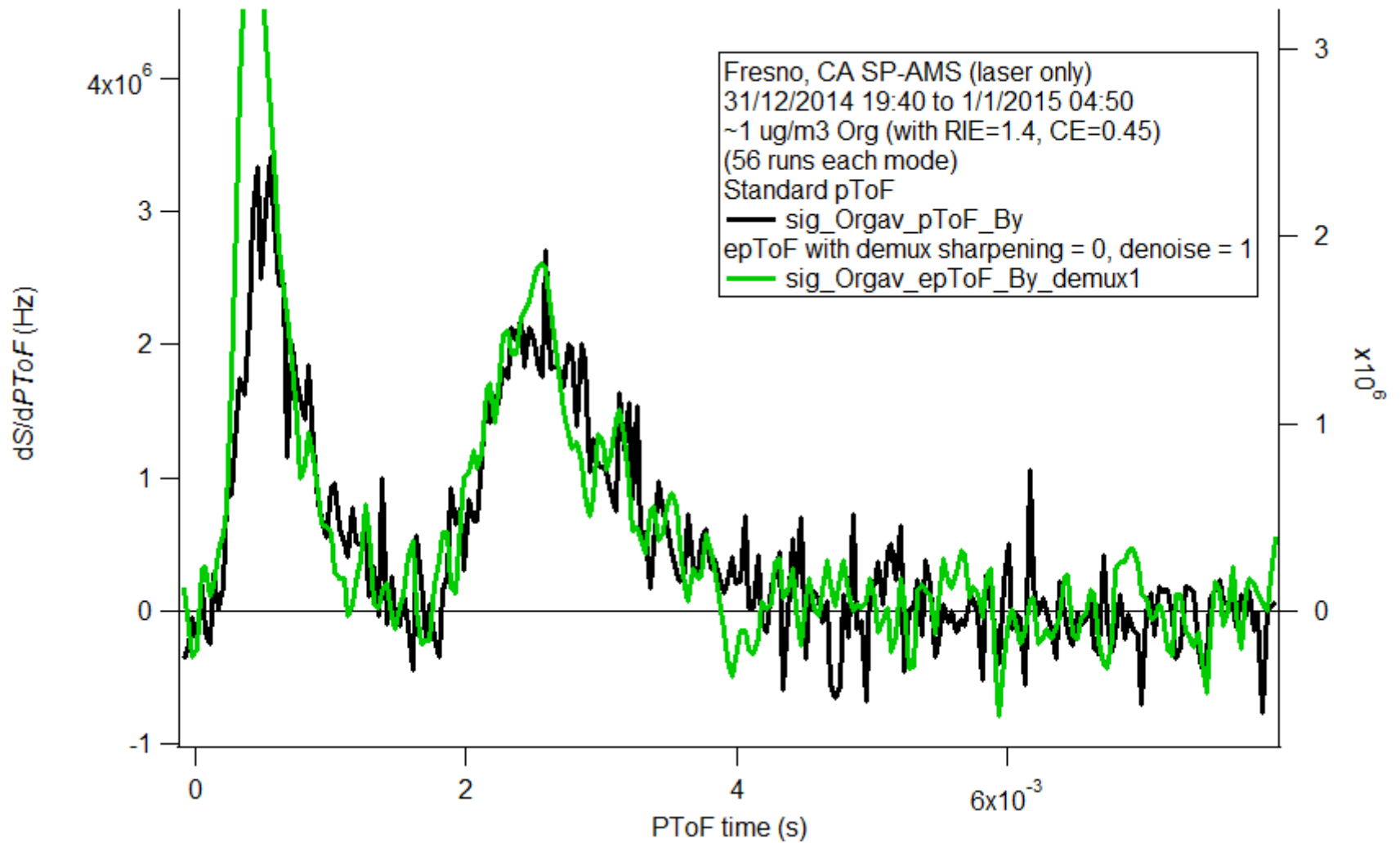




Rich's demux slightly less noisy than simple matrix inversion.



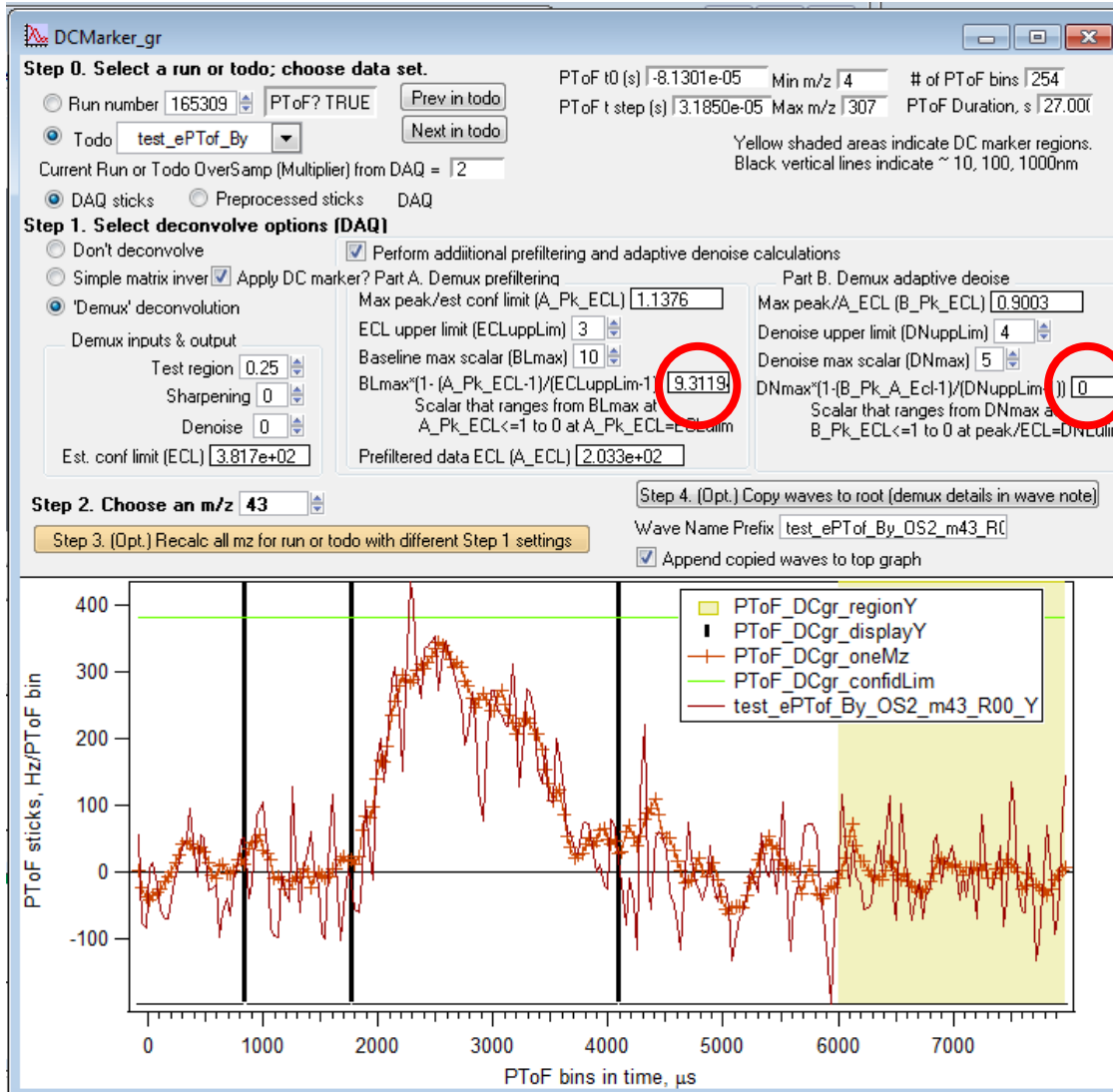
Increasing denoise makes pToF less noisy, but doesn't conserve area and changes shape of size distribution.



With denoise = 1, compared to standard ptof. Less noisy, but different shape.

Rich developed “adaptive filtering” algorithm. Incorporated in latest panel.

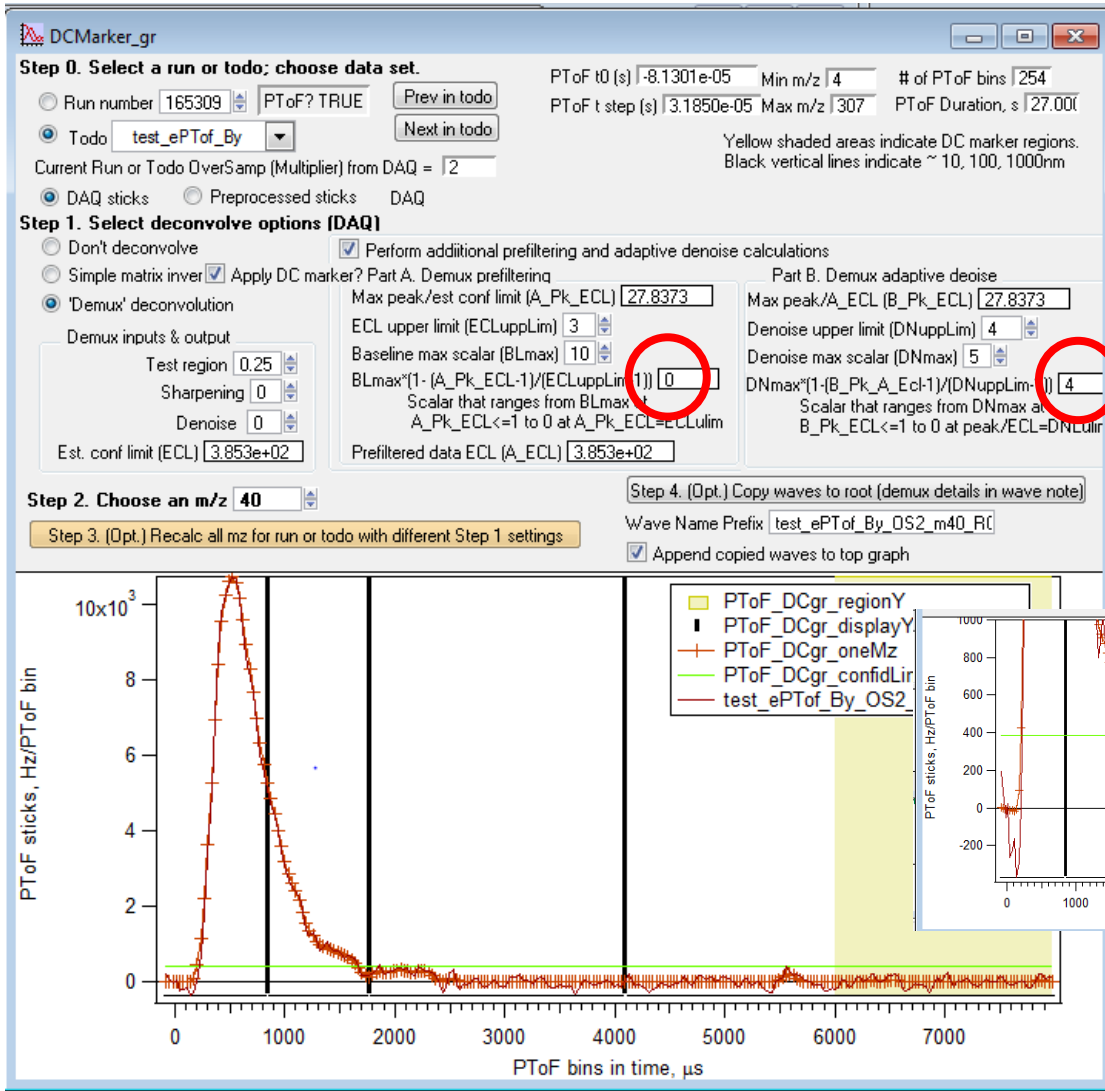
- First step: Smooth raw data before deconvolving.
- Second step: Deconvolve (with or without denoise depending on S/N).



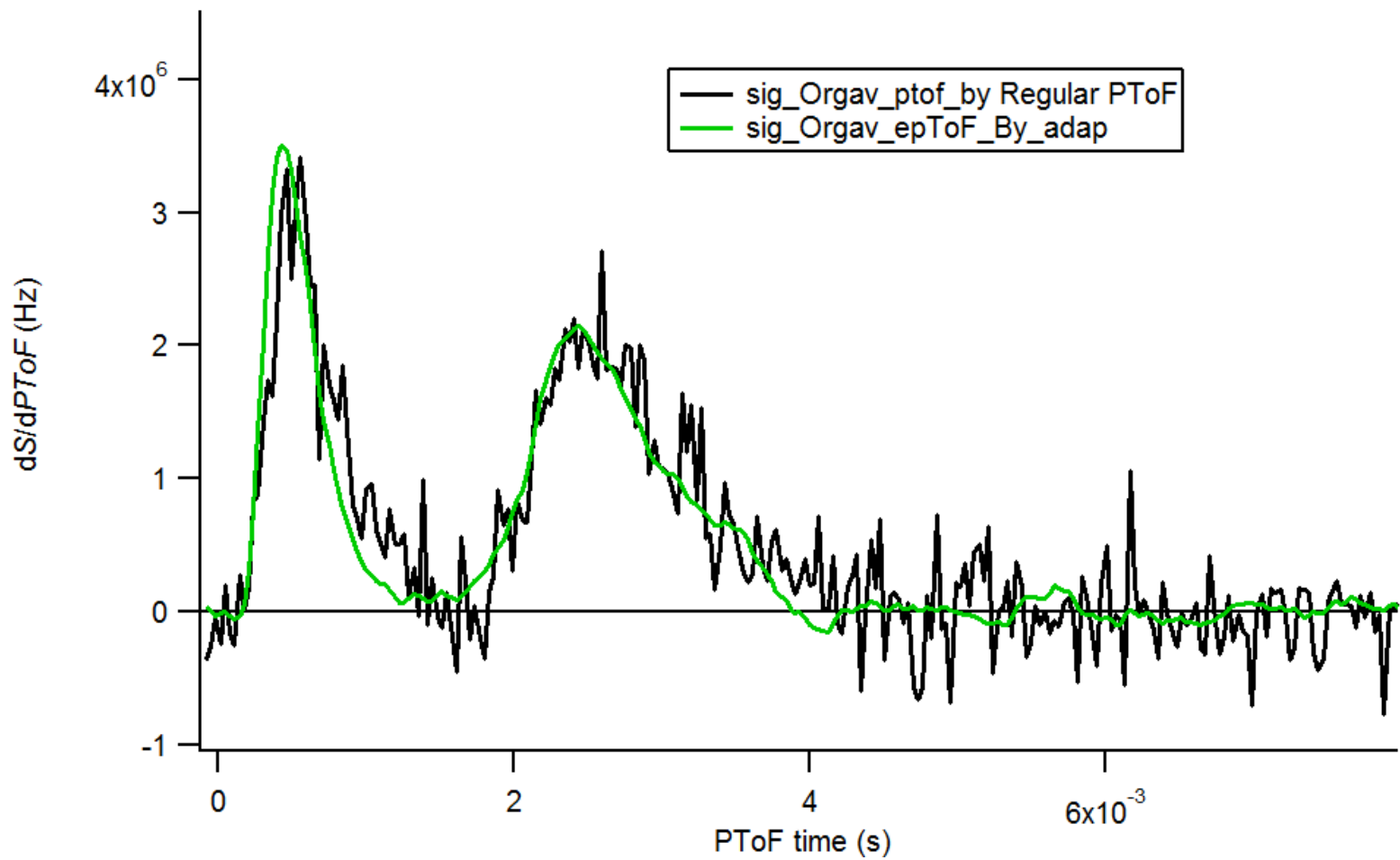
- Ratio of max signal to ECL guides settings.
- First guess -10 point smooth, reduced for better S/N.
- Donna – shouldn't part B use max peak/ECL for smoothed data? Looks like it using ECL for raw data.
- ECL seems high compared to peak signal.

Look at $m/z=40$, more signal, ECL about the same.

- No smoothing applied.
- Denoise = 4 (max allowable, because peak signal >> ECL)



Maybe air peaks shouldn't be included when determining smoothing and denoise?



With adaptive filtering, epToF looks very nice! Much less noisy than pToF.

Look at just a few runs (5 of pToF, 8 of epToF). I'm a believer!

