

Looking at ratio of ptof/ms in AMS, SP-AMS data

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How to plot pToF/MS vs mz: Step 1

AMS Analysis

ToF-AMS Analysis Toolkit 1.56P

MANCHESTER 1824

Credits Version Website

FAQs, Support

HDF Index Corrections MS **PToF** Checks Misc

Species Convert to $\mu\text{g}/\text{m}^3$

Diameter axis Use MS AB correction

Ask for wave name suffix

Output Show DC regions Use norm. factor correction

Find, display mode, median stats Use nonzero frag. air (adv. users)

Diameter Base

As saved

Set interval # of bins min (nm) max (nm)

Custom wave (edges in nm, wave is in root) Wave name:

GP/PP boundary (nm)

max m/z (0 = default)

Size and Time

Species list to default

Calc. size distribution

Calc. 2-d time, size (image plot)

Mass Spectra

Species list to default

Calc. size-resolved mass spectra

Calc. time, size-resolved mass spectra (3-d matrix, not plotted)

MS vs PToF

Do calcs for panels below

MSSDM vs PToF species panel

MSSC Hz vs DC regions

ToDo Wave Selection

ToDo

ToDo Table

ToDo Graph

ToDo Wave Creation

Run Interval

Name

New ToDo

Blacklist runs

Time Base Selection

As saved

Set interval (m):

Custom wave:

Time stamp is

Review Batch

Review Frags

Done.

PToF Tab:

- Check Set interval with
 - 1 bin
 - lower size in between gas-phase and particle-phase signals
 - upper size after particle-phase signals
- Click “Do calcs for panels below”
- If doesn’t work, try unchecking “Use wave name suffix”

How to plot pToF/MS vs mz: Step 2

AMS Analysis

ToF-AMS Analysis Toolkit 1.56P

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HDF Index Corrections MS PTOF Checks Misc

Species: Org,NO3,SO4,NH4,CHl

Diameter axis: dXdlogDa vs logDa

Output: Plot single

Convert to $\mu\text{g}/\text{m}^3$

Use MS AB correction

Ask for wave name suffix

Use norm. factor correction

GP/PP boundary (nm): 100

Use nonzero frag_{air} (adv. users)

Diameter Base: As saved

Set interval: # of bins: 1, min (nm): 20, max (nm): 2000

Custom wave (edges in nm, wave is in root) Wave name:

Size and Time

Species list to default

Calc. size distribution

Calc. 2-d time, size (image plot)

Mass Spectra

Species list to default

Calc. size-resolved mass spectra

Calc time, size-resolved mass spectra (3-d matrix, not plotted)

MS vs PTOF

Do calcs for panels below

MSSDiff vs PTOF species panel

MSSC Hz vs DC regions

ToDo Wave Selection

ToDo: pToF7_LOff

ToDo Table ToDo Graph

ToDo Wave Creation

Run Interval: allPToFGrp08 and Amb_LOn_B

Name: pToF8_LOn

New ToDo Blacklist runs

Time Base Selection

As saved

Set interval (m): 0

Review Batch

Time stamp is: End

Custom wave:

Review Frags

Done.

pToF vs MS by species: MS and t_series

MSvsPToF_Panel

MS mode Diff vs PTOF v1.0

todo:pToF7_LOff

use AB correction: Yes

diam. min: 20nm diam. max: 2000nm

Black: PTOF mode; Colored = MS mode

Org: SO4, NO3, NH4, CHl

Time Series

Time Series Scatter

Mass Spec

Mass Spec Scatter

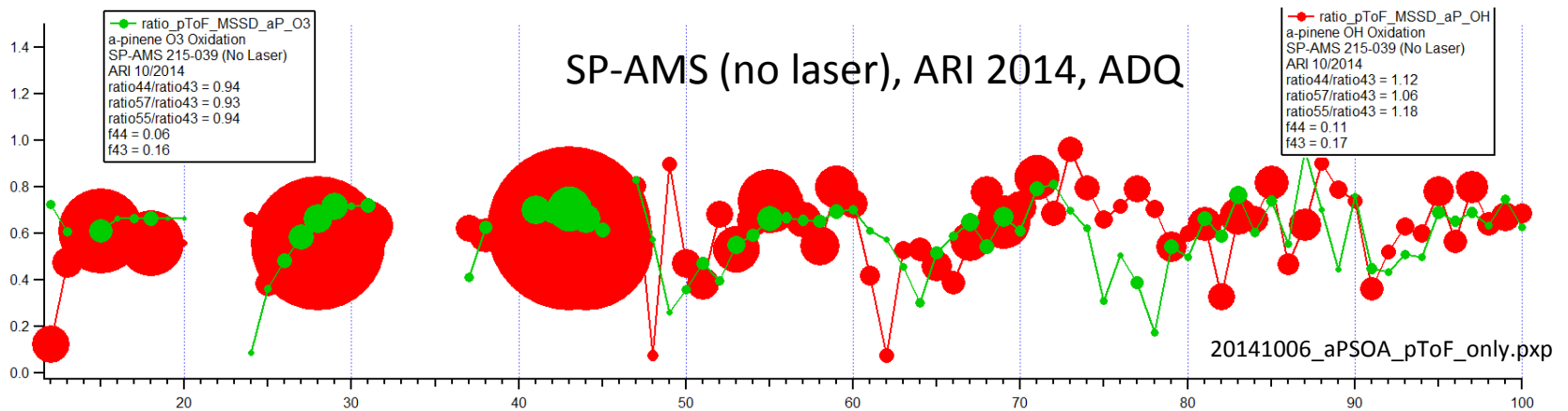
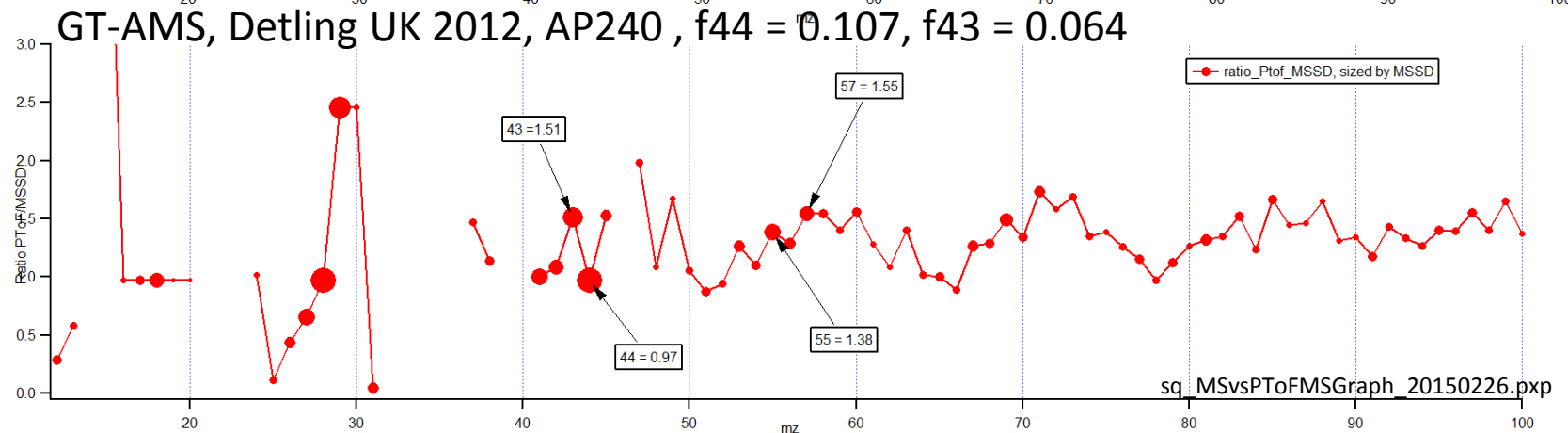
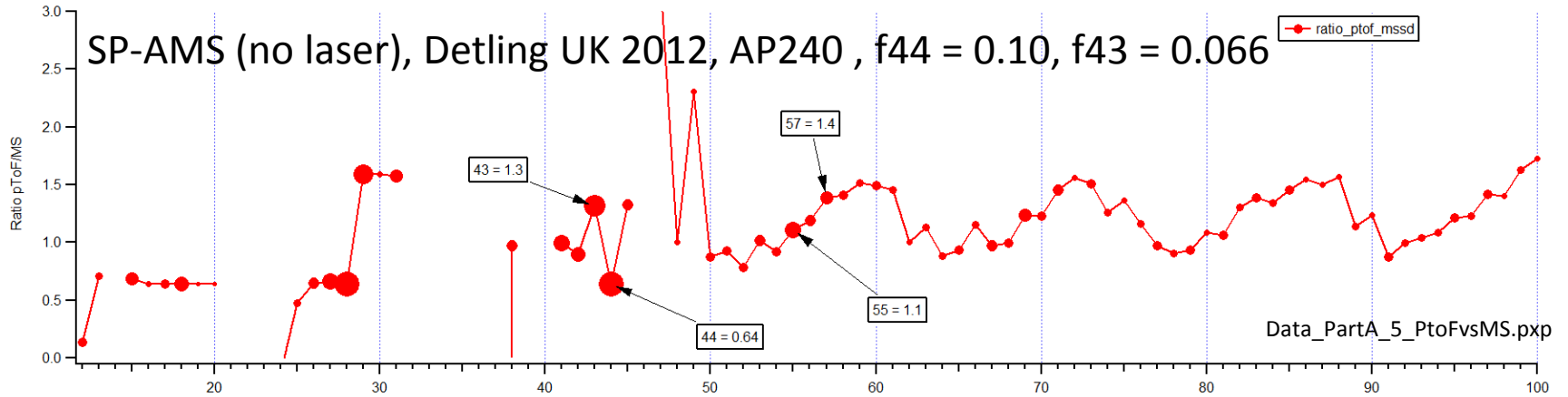
Waves in root:PTOF
Find waves in MS graph.
Take ratio. Plot vs root:diagnostics:amus

Some more examples of pToF/MS ratios attempting to answer the question:

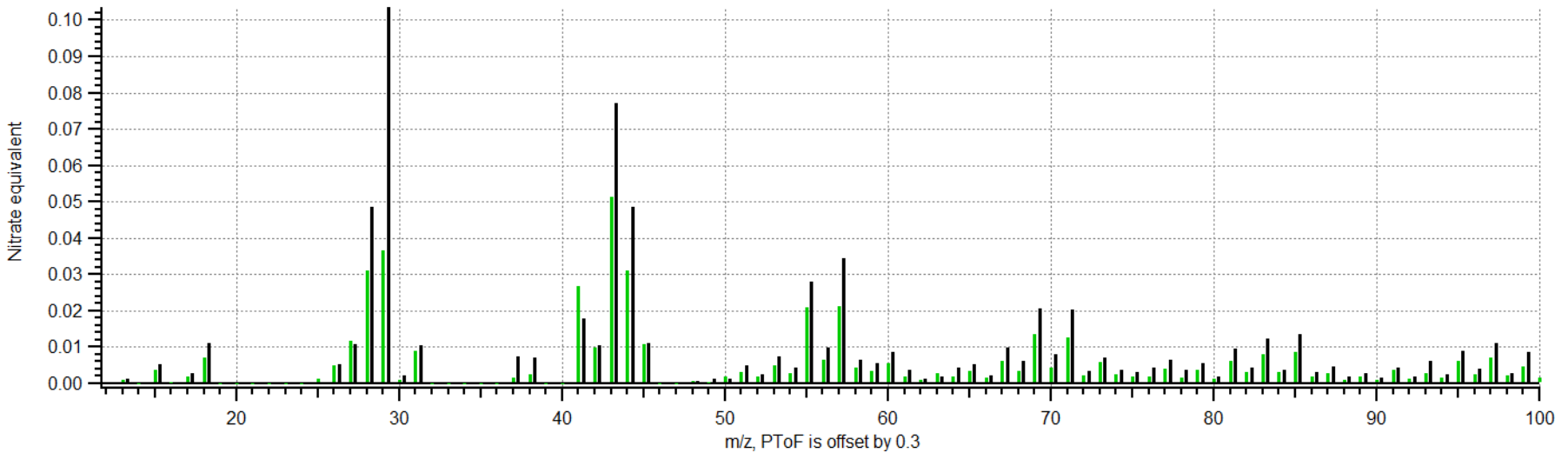
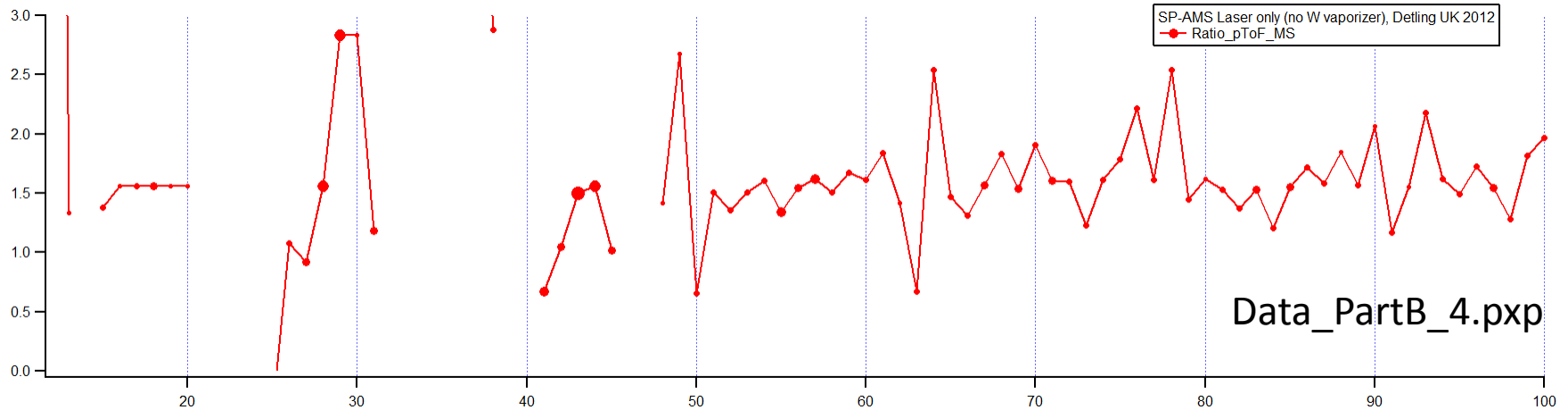
Is it vaporizer chemistry or AD board thresholding or ringing on MCP that introduces the oscillations as a fn of m/z in the ratio or pToF/MS?

- Slide 5 – two different instruments, two different DAQ boards, three different aerosol sources, all W vaporizer. All have oscillation.
- Slide 6 – SP-AMS with laser only, W vaporization removed, AP240 board. No oscillation, but spikes at 49/50 and 63/64 (due to low signals?). Ratio 43 = Ratio 44 as expect for no sources of slow vaporization.
- Slide 7 – Same instrument with ADQ board. No oscillation, but spikes at 49/50 and 63/64 (due to low signals?). Oddly Ratio 43 > Ratio 44, indicating slow vaporization on some other surface? Or that we just a

Ratio of pToF/MS, AP240 Board, W vaporiser

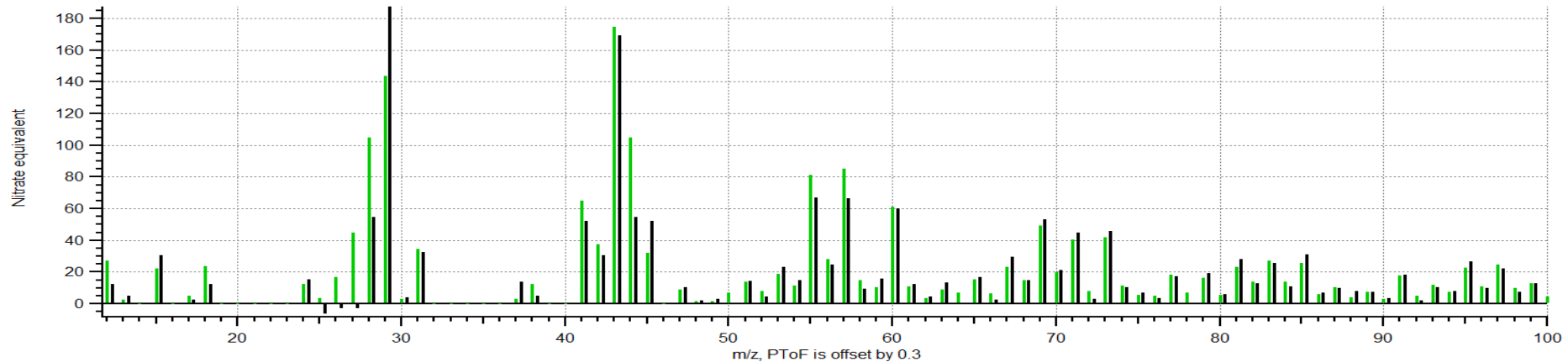
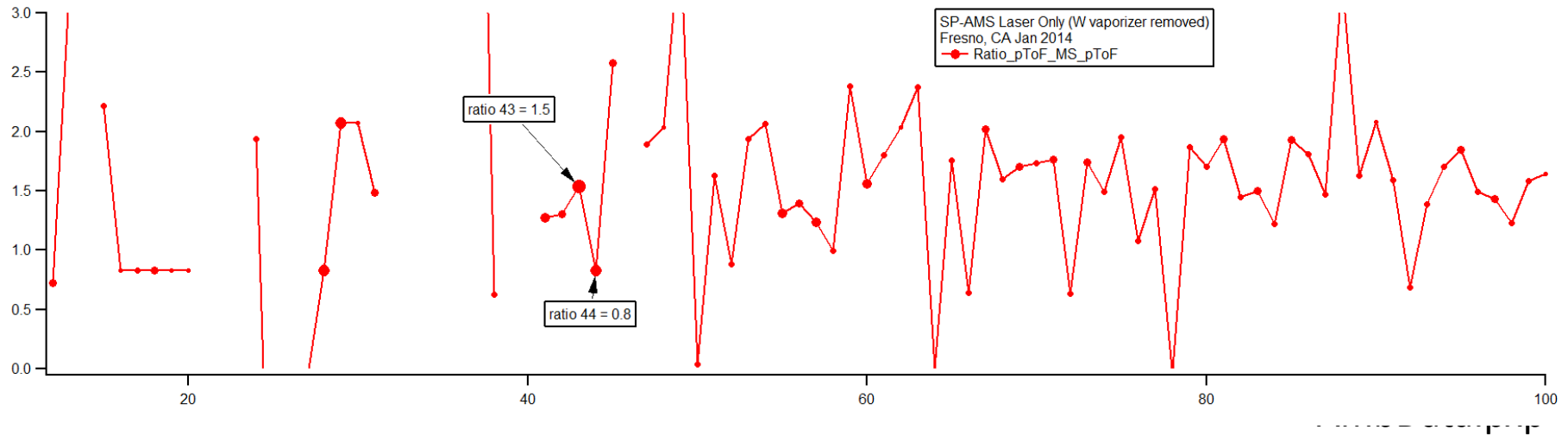


Ratio of pToF/MS, laser vaporizer only, AP240 Board



Laser vaporizer only (W vaporizer removed) – expect pToF=MS at all m/z's because there is no slow vaporization. Ratio at 43 and 44 are same. Spikes at 49/50, 63/64 due to small signal levels?

Ratio of pToF/MS, laser vaporizer only, ADQ Board



Same instrument as previous slide (laser only, W vaporizer removed), but ADQ board instead of AP240. Looks basically same, so probably not a thresholding issue. Oddly, ratio at 43 > ratio at 44. Slow vaporization from some other surface? Or comparing ratio at 43 to ratio at 44 is not a good diagnostic for slow vaporization?