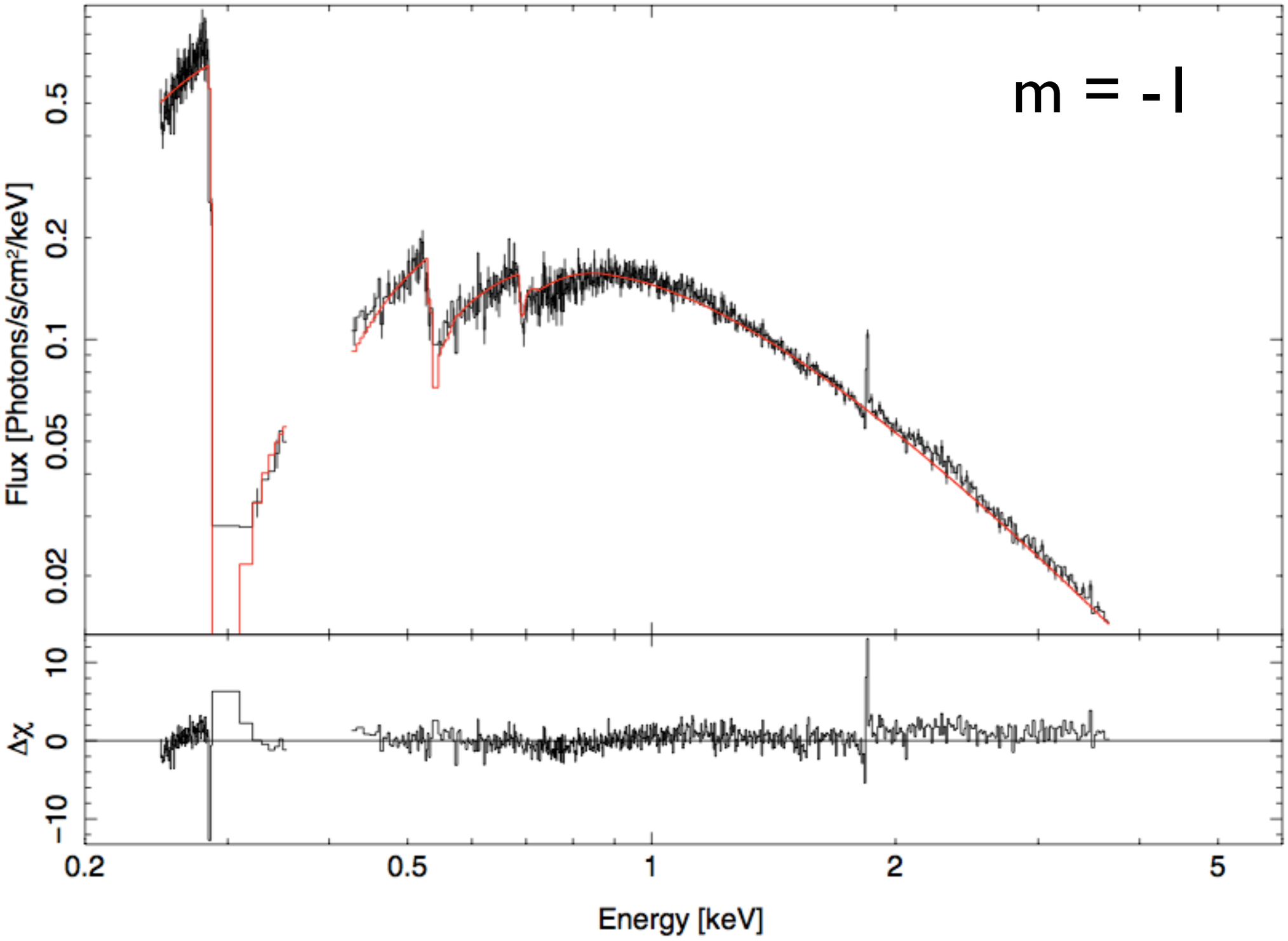
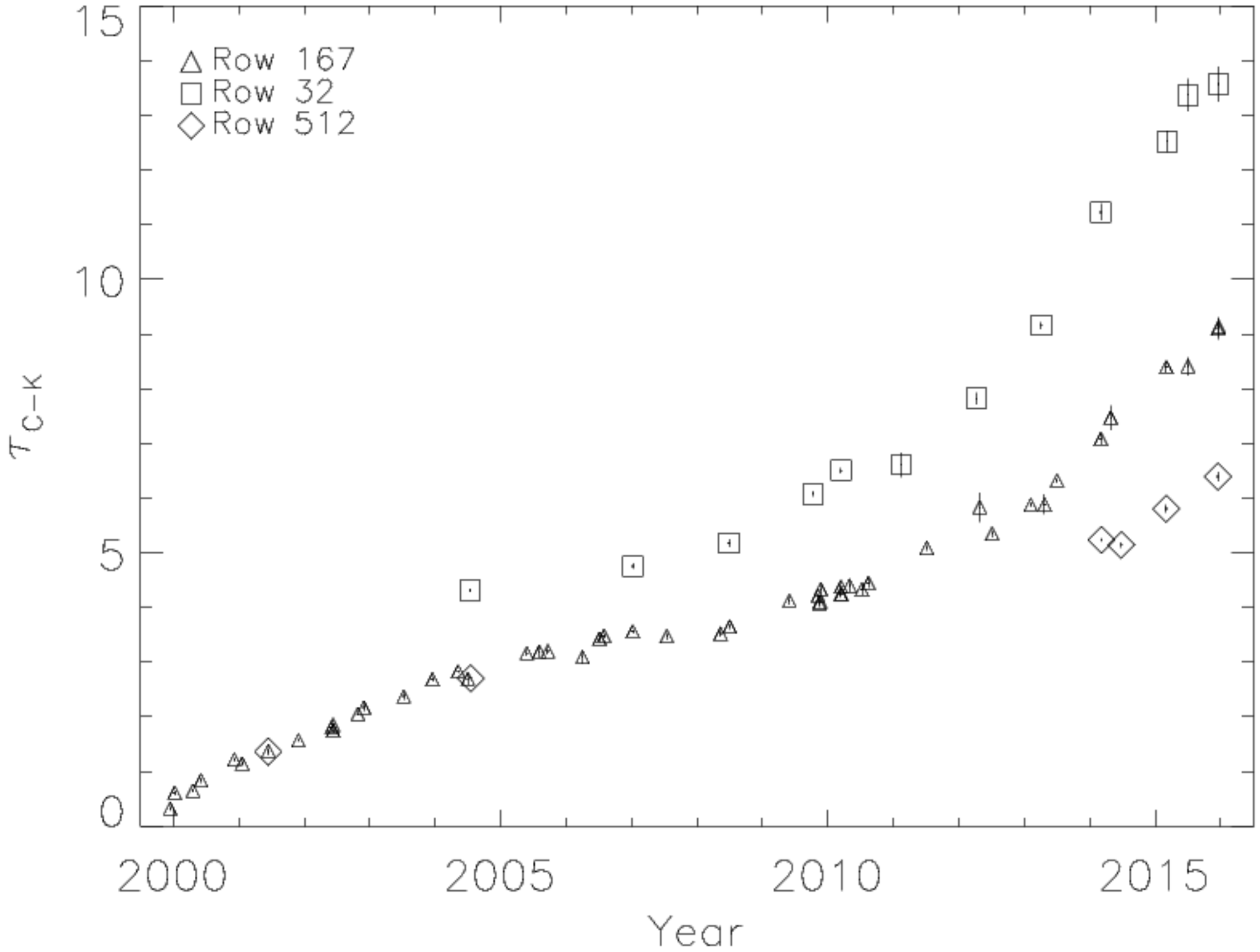
ACIS Contaminant Update

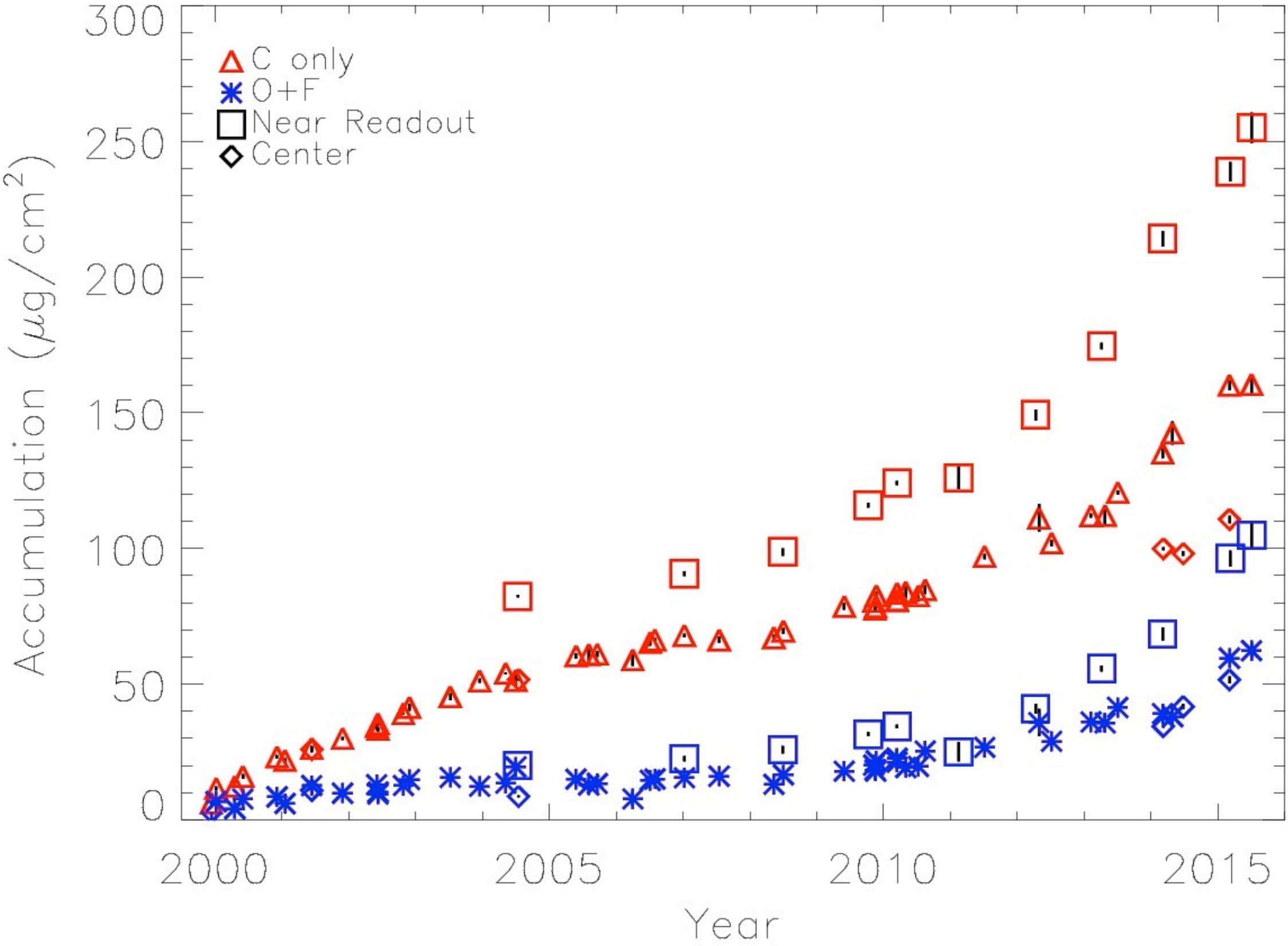
Herman L. Marshall

Uncorrected

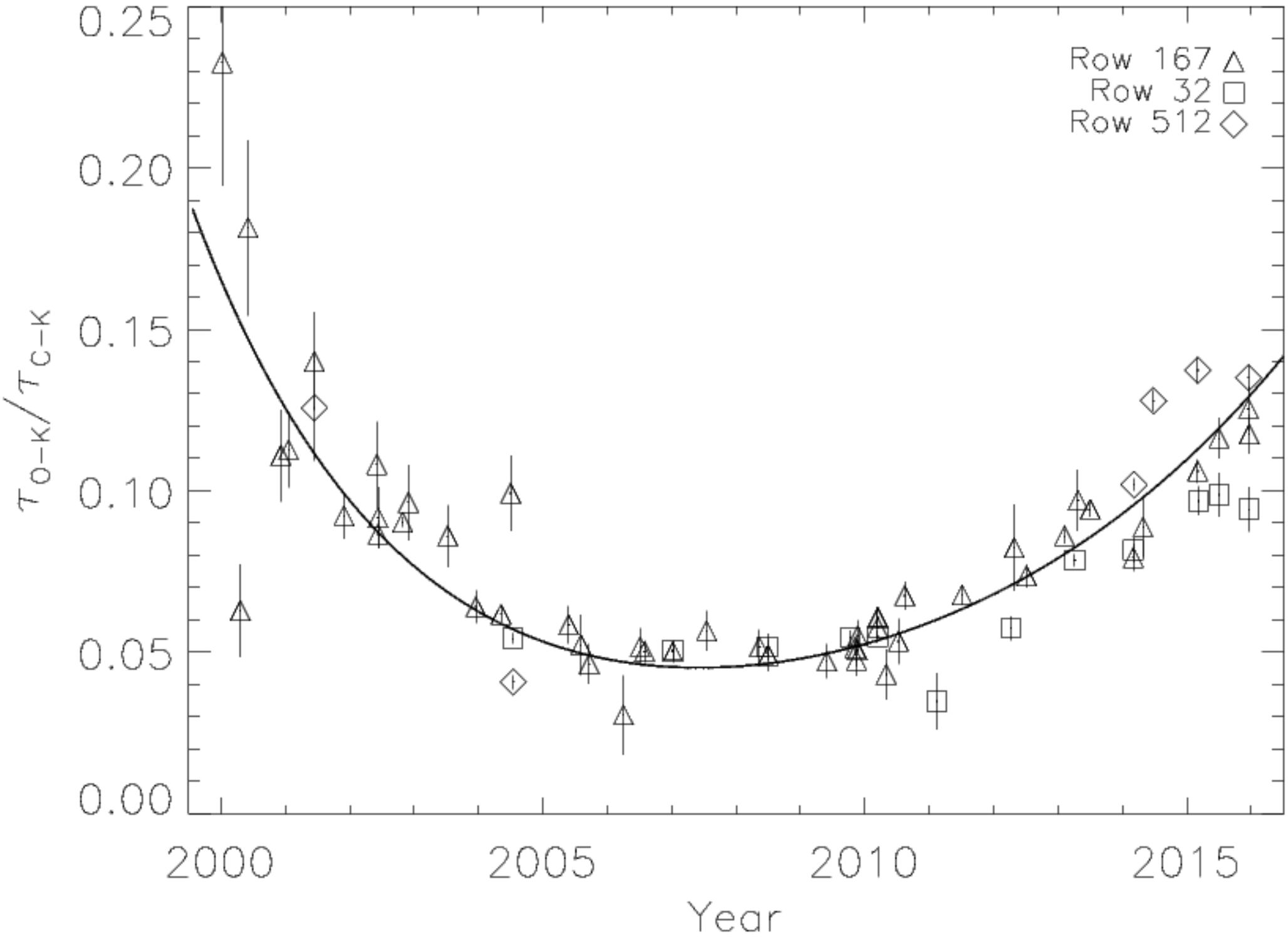


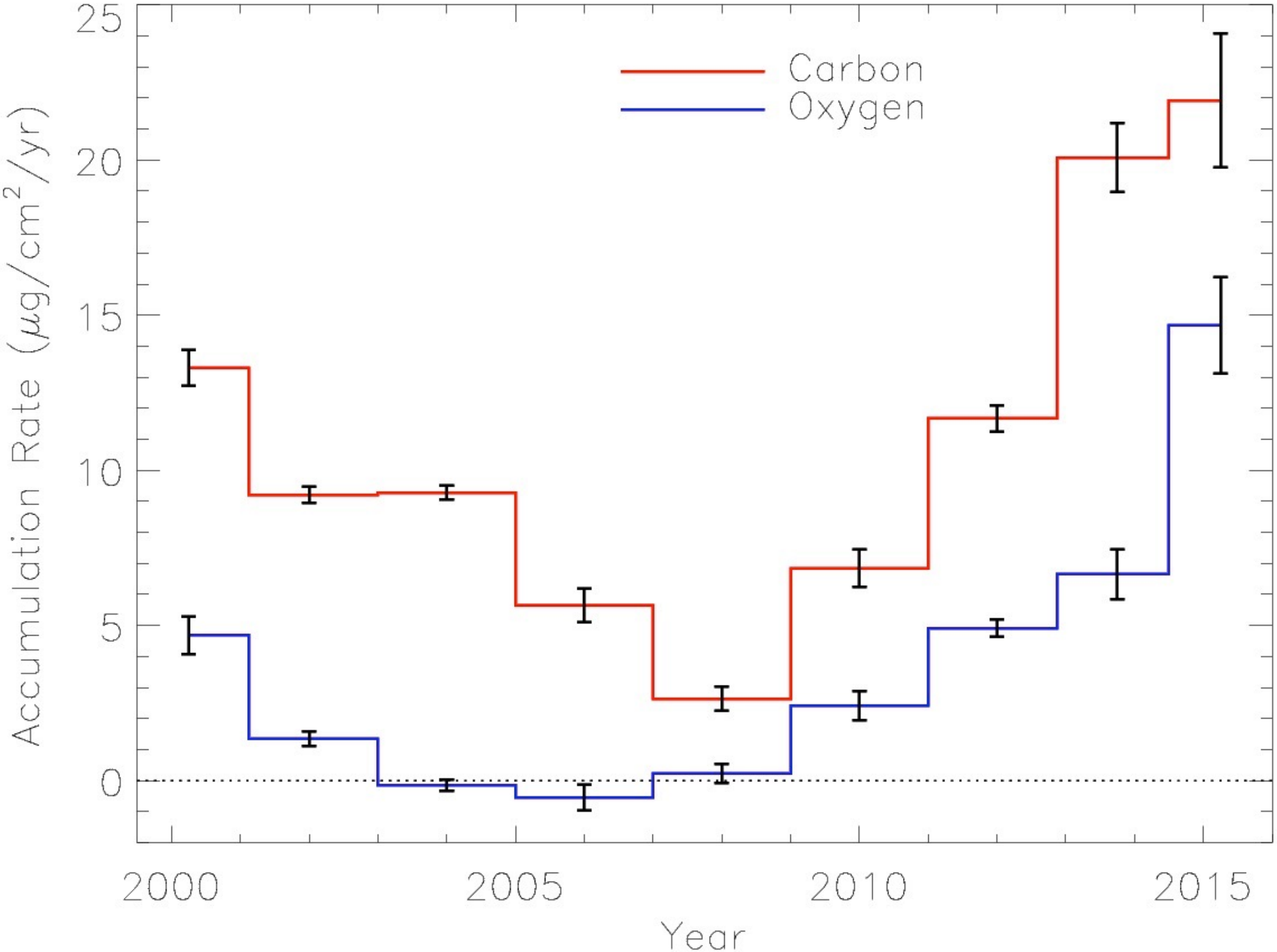
Time Dependences



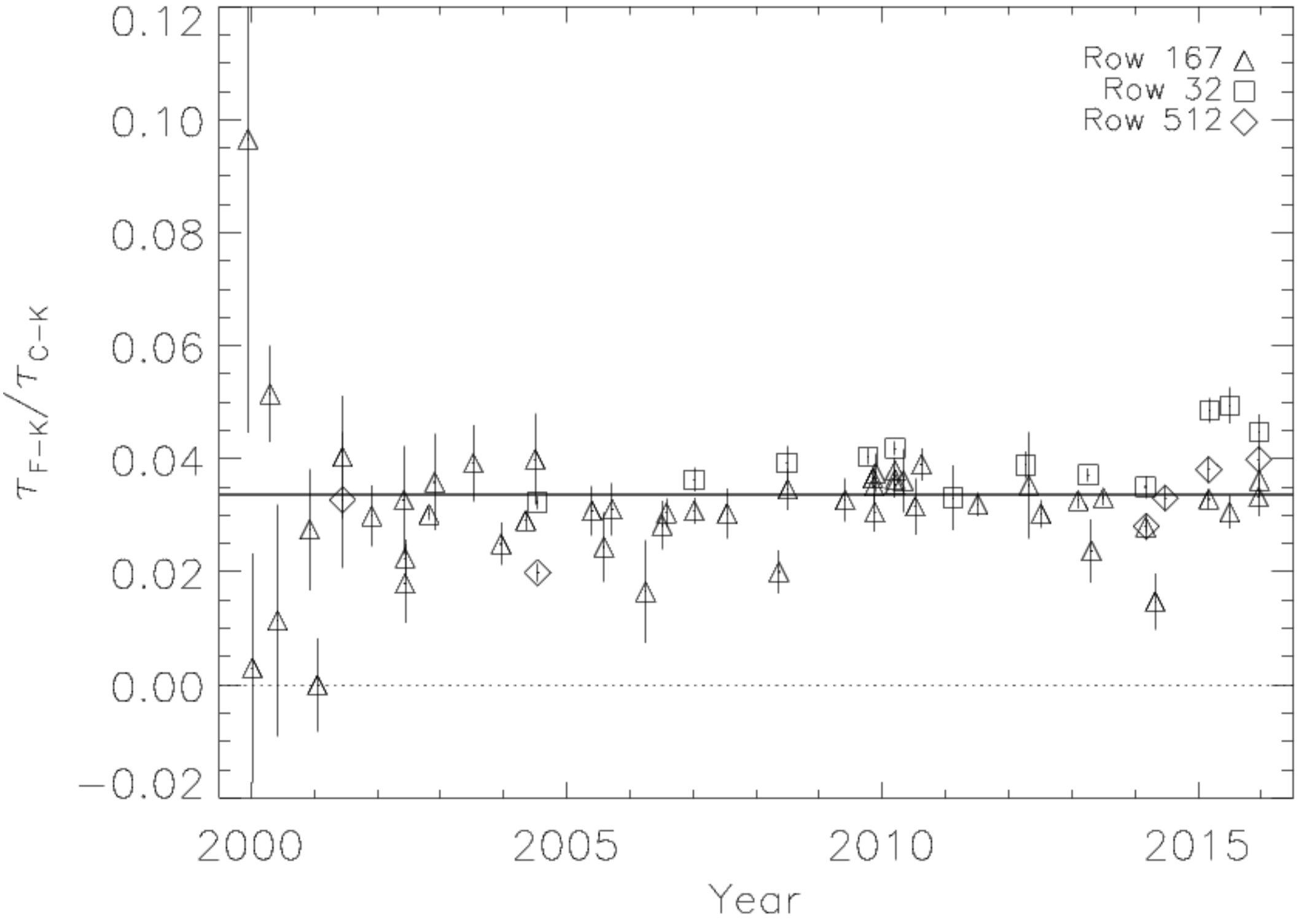

C only
O+F
Near Readout
Center
Accumulation (μg/cm^2)
300
250
200
150
100
50
0
2000
2005
2010
2015
Year

Time Dependences

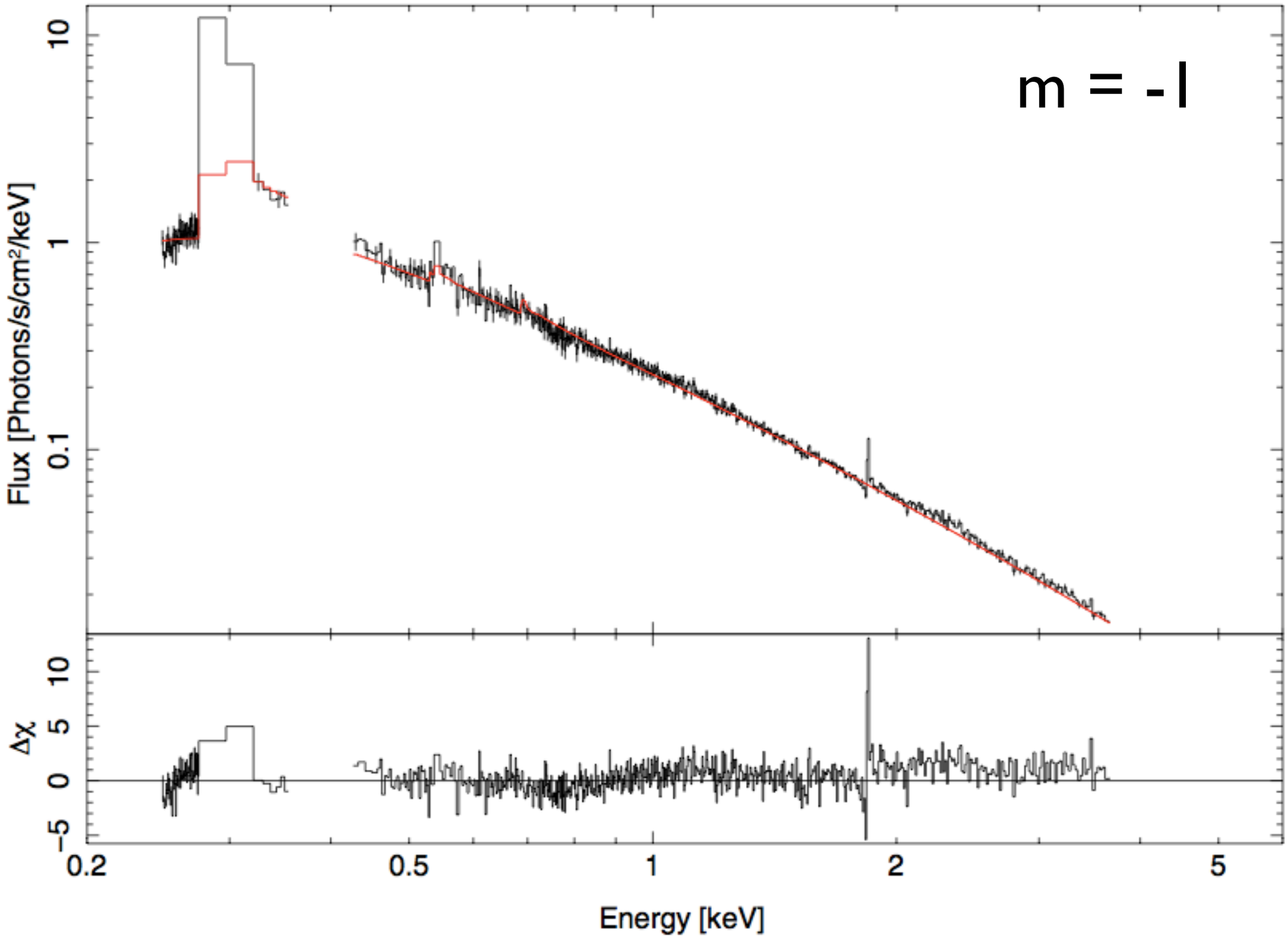



Carbon
Oxygen
Accumulation Rate (μg/cm^2/yr)
25
20
15
10
5
0
2000
2005
2010
2015
Year

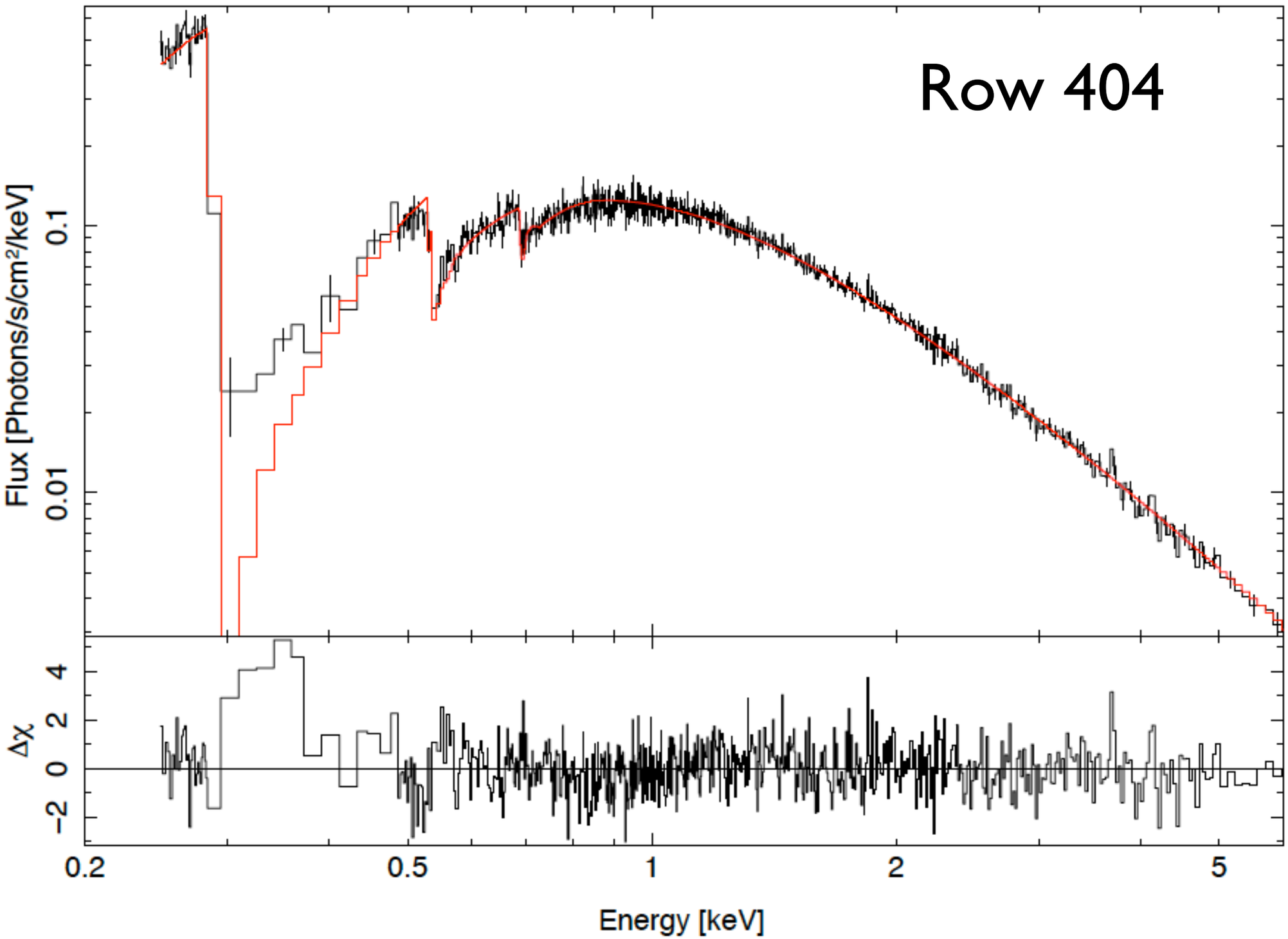
Time Dependences



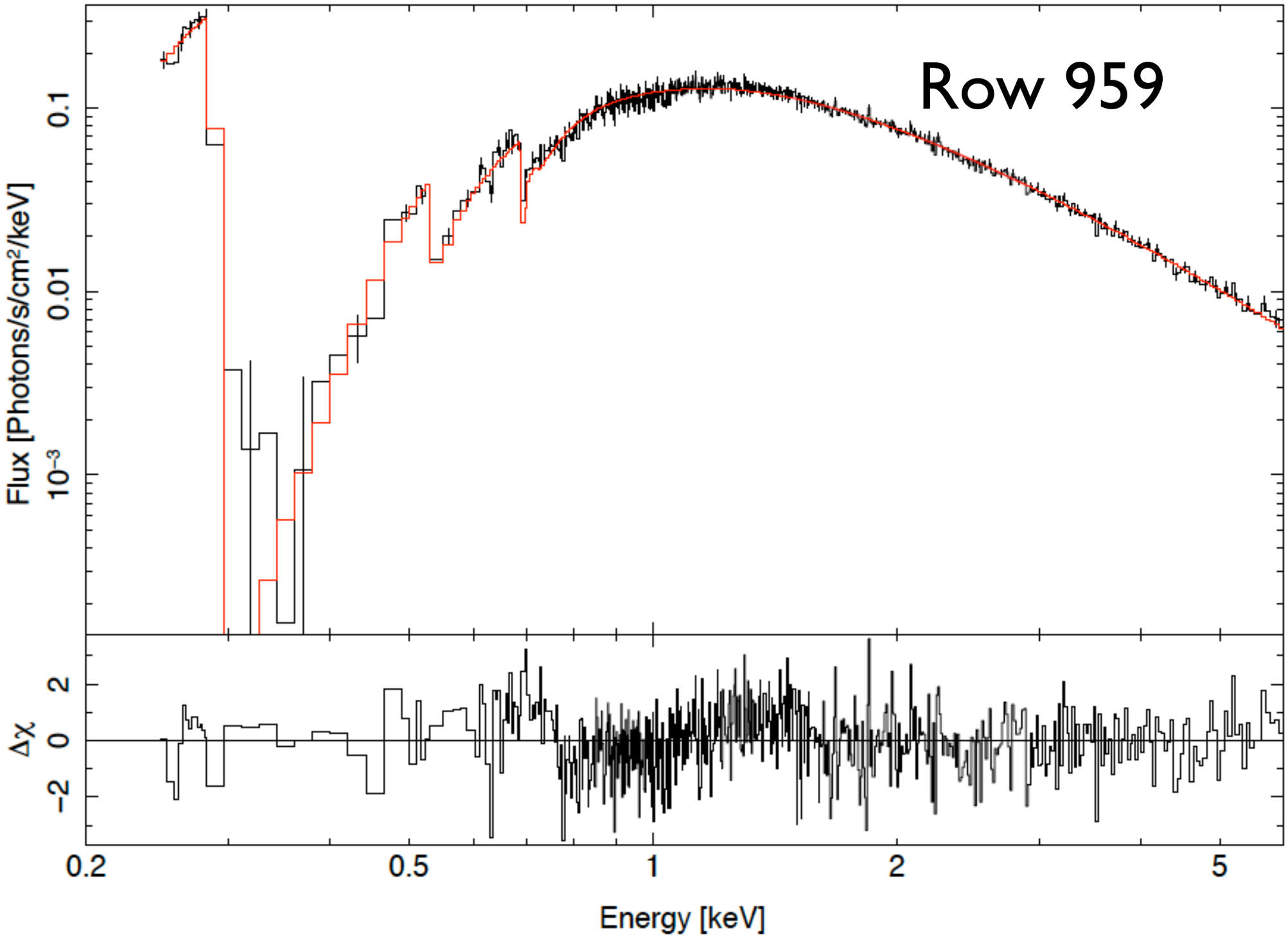
Caldb-corrected



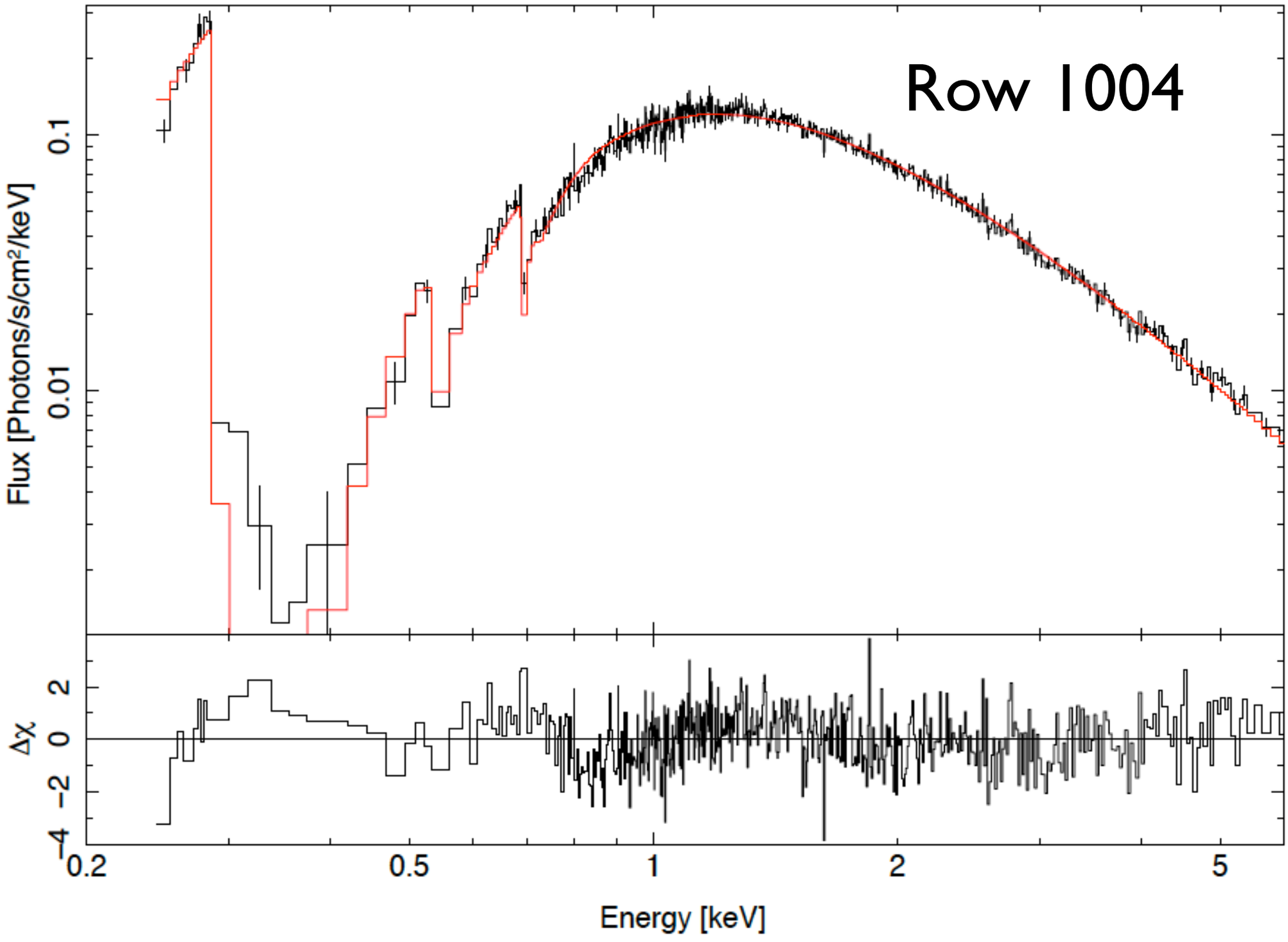
Spectral Data



Spectral Data



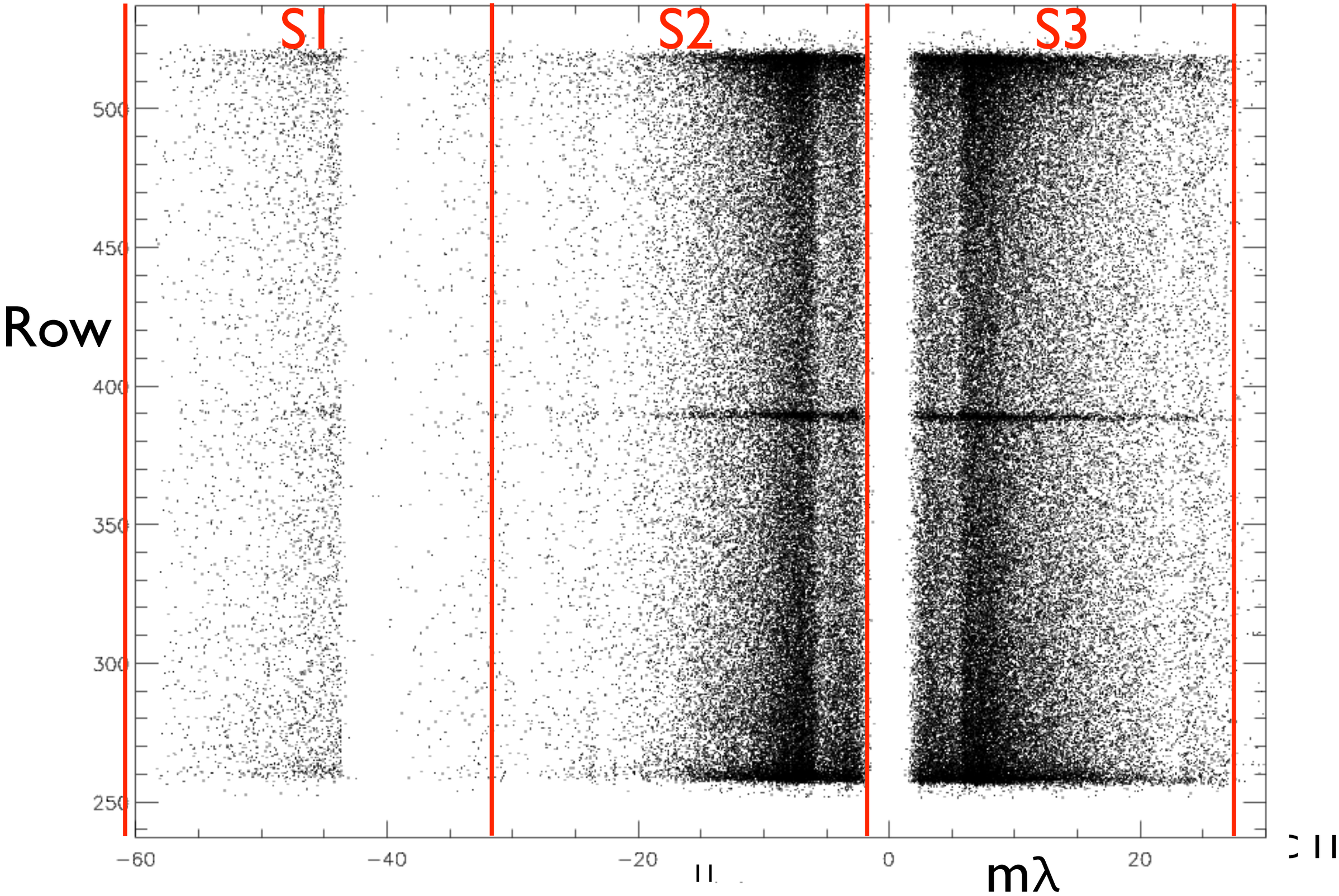
Spectral Data



Setup

- Mk 421 observed with LETG/ACIS
- Pointings, 60 ks each
- Y-axis dither is nominal (+/-8”, 1000 s period)
- Z-axis dither is expanded
  - +/- 64” to span 128 rows
  - Period of 2647 s (rate is 2.1x normal)

High Row



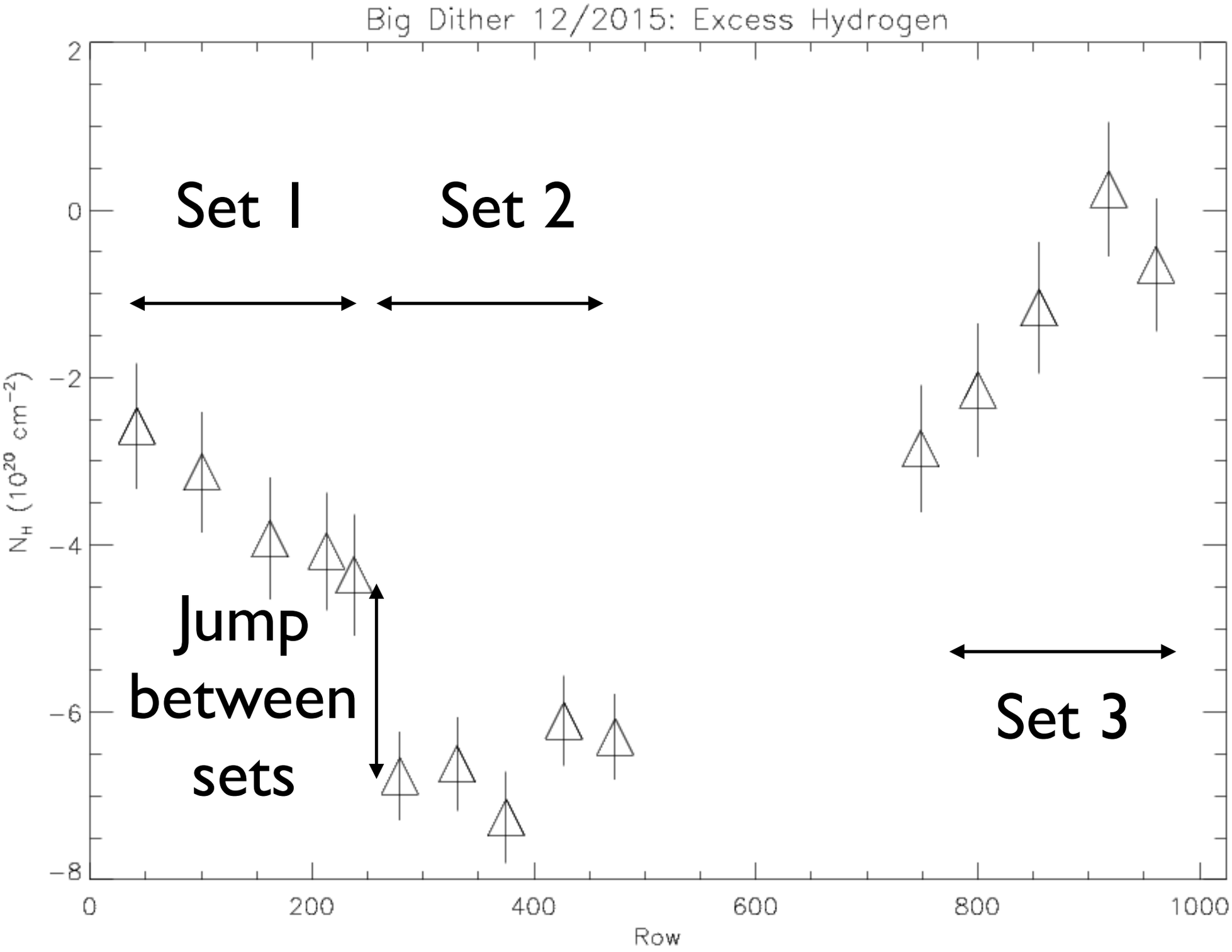
Setup of BD 12/15

- Same as other Big Dither Observations:
  - Mk 421 observed with LETG/ACIS
  - Dither amplitude was ±64” in Z ±8” in Y
- Same as others except:
  - Bottom half = rows 15-480
  - Top half: rows 725-975
  - 48-50 ks observations (prev: 60 ks)

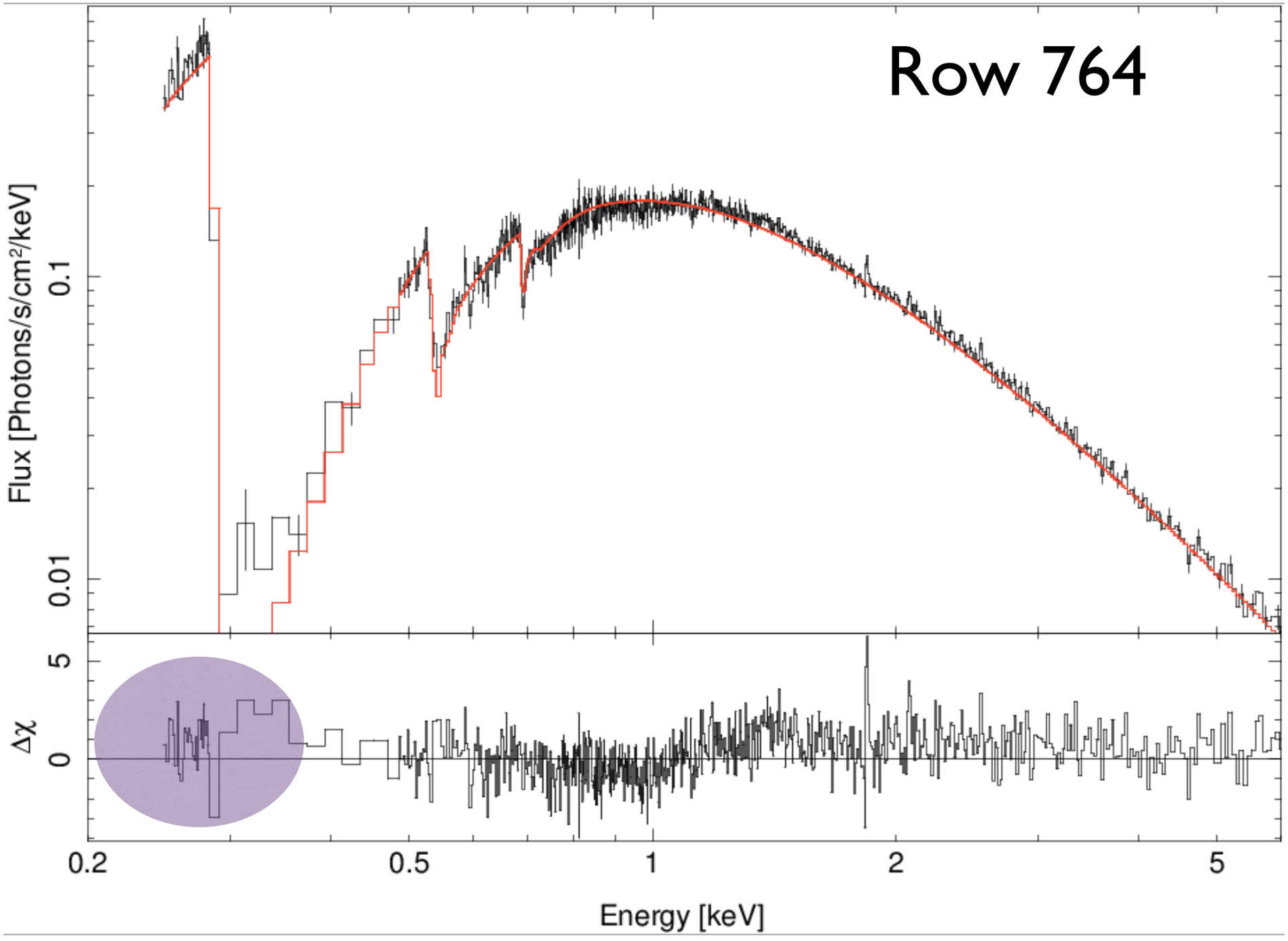
Fit Methods

- All: N_H = Galactic (1.61e20 for Mk 421)
- Single obs'n: curvepl + CFO (6 params)
- Dither set (single obID, split to 5 regions)
  - region is a range of rows, eg: 15-70, 70-130
  - curvepl (3 params = norm, slope, curvature)
  - CFO ODs for each region (15 params)
  - Const norm, wrt region1 (4 params)
  - Optional: extra N_H for each region (5 params)

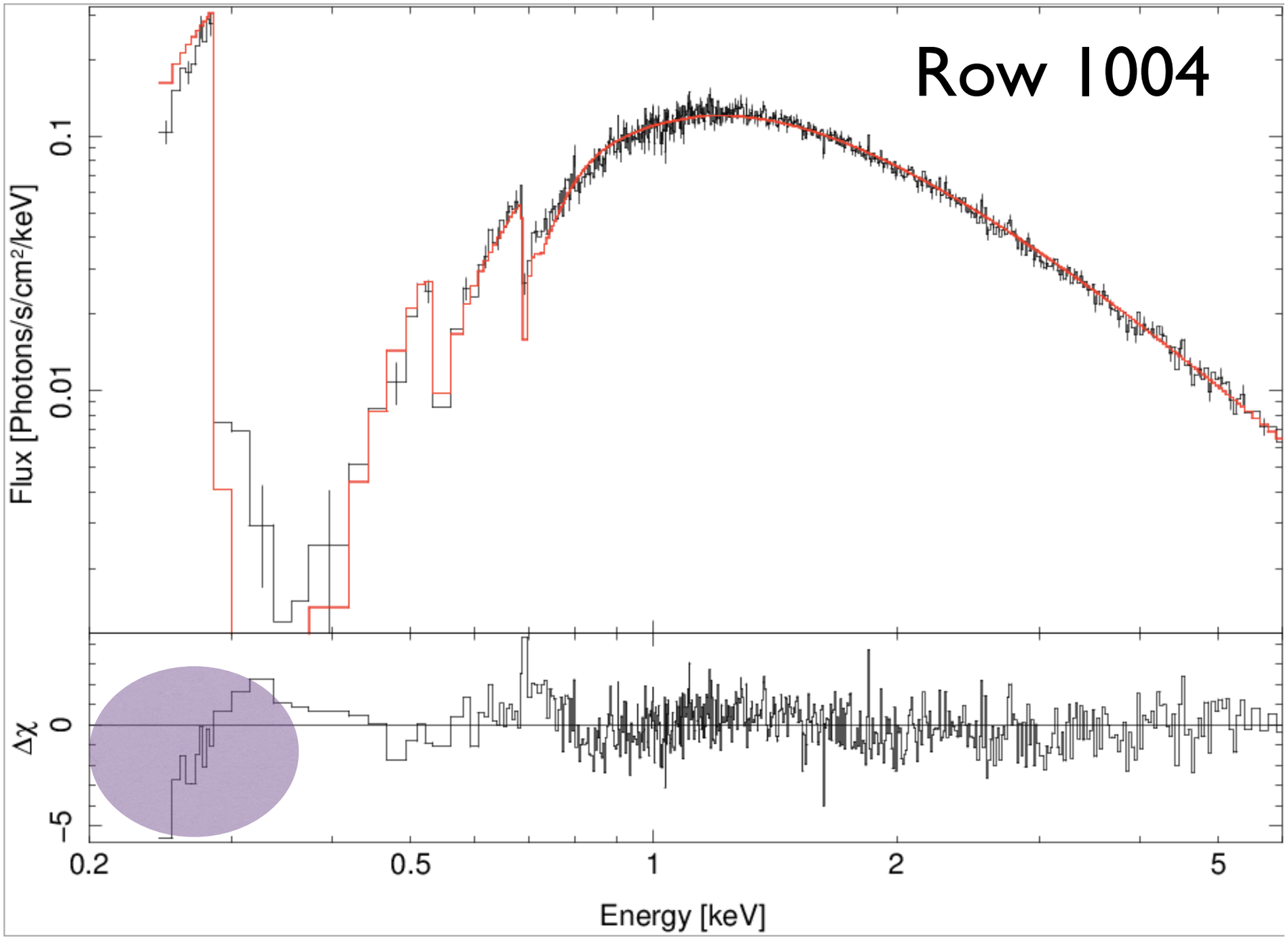
Free N_H fits: oddities



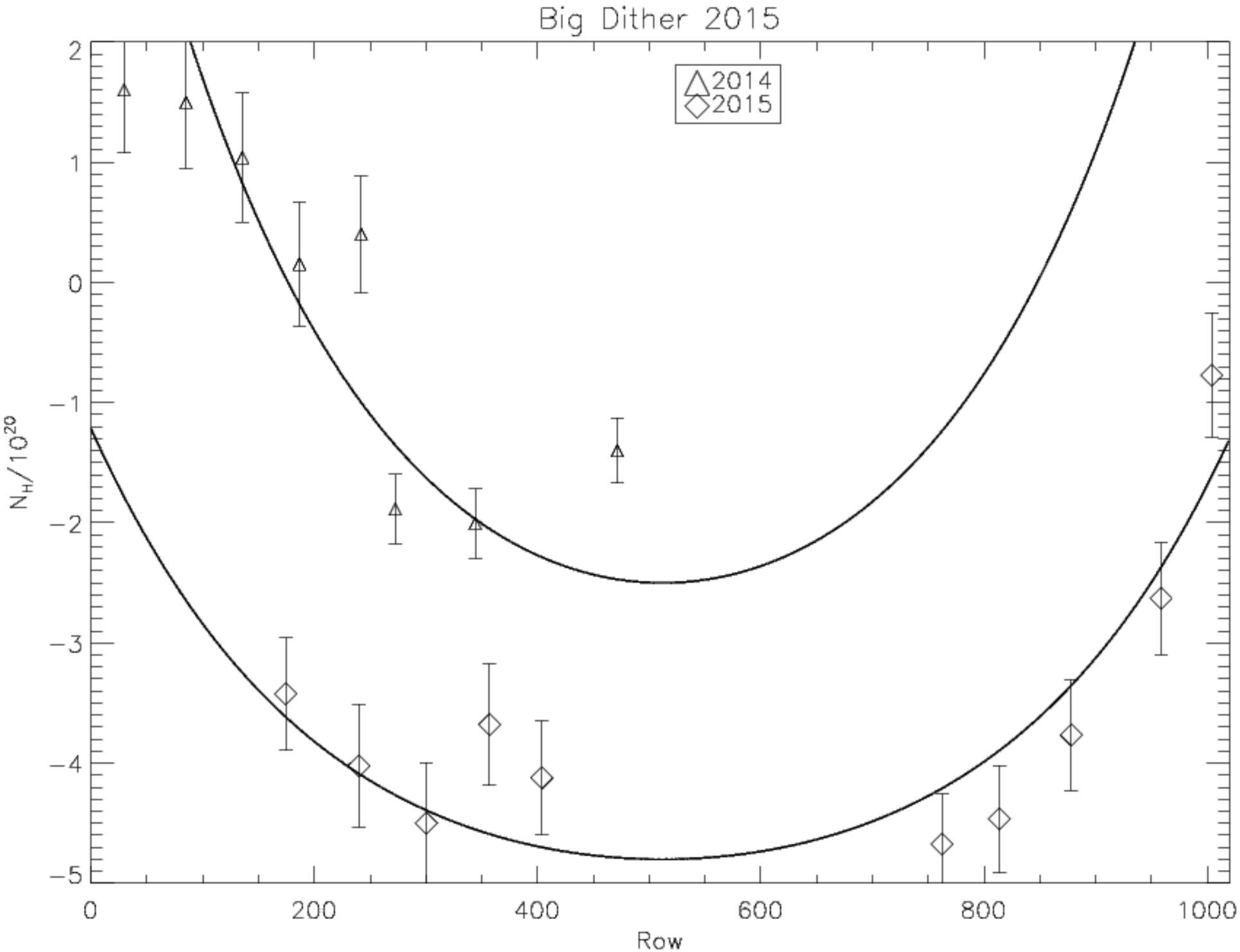
Issue for E < 0.28 keV



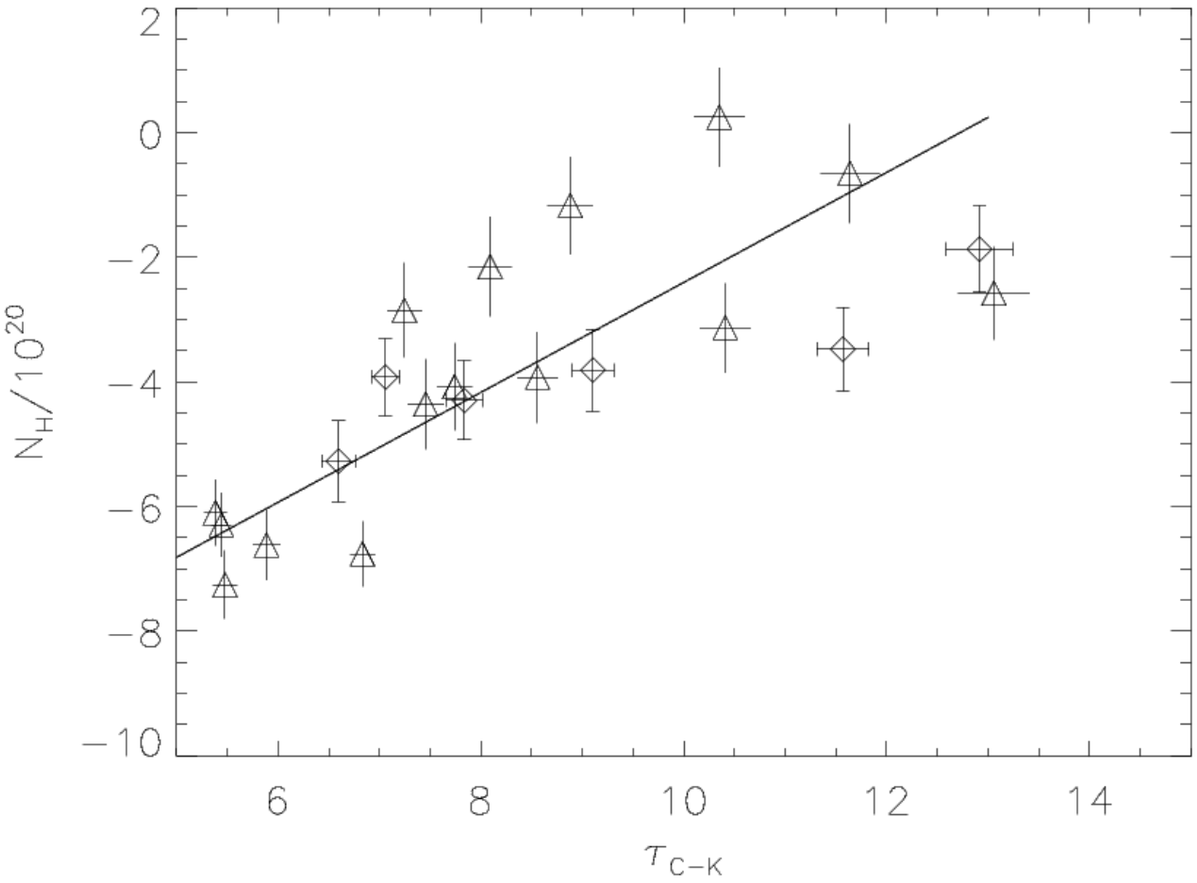
Issue for E < 0.28 keV



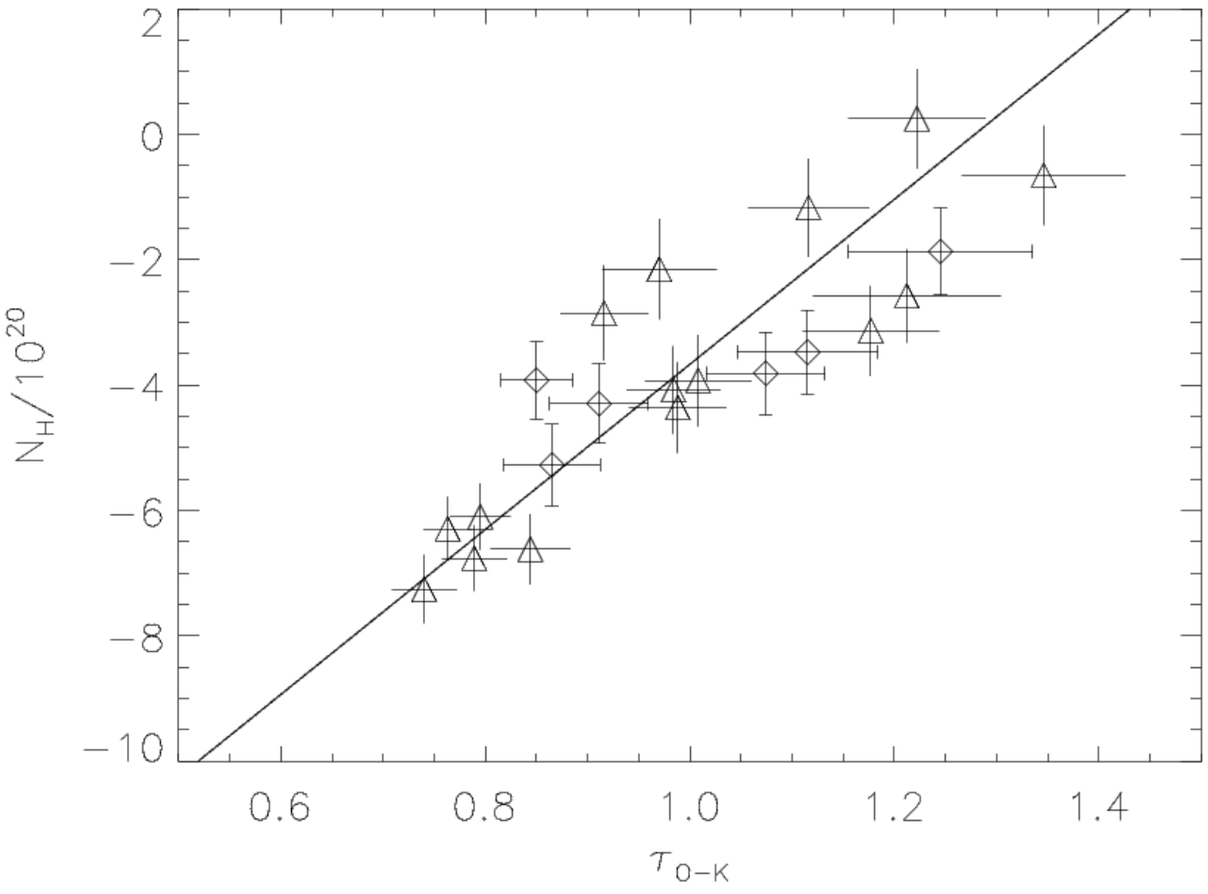
Is There Much H?



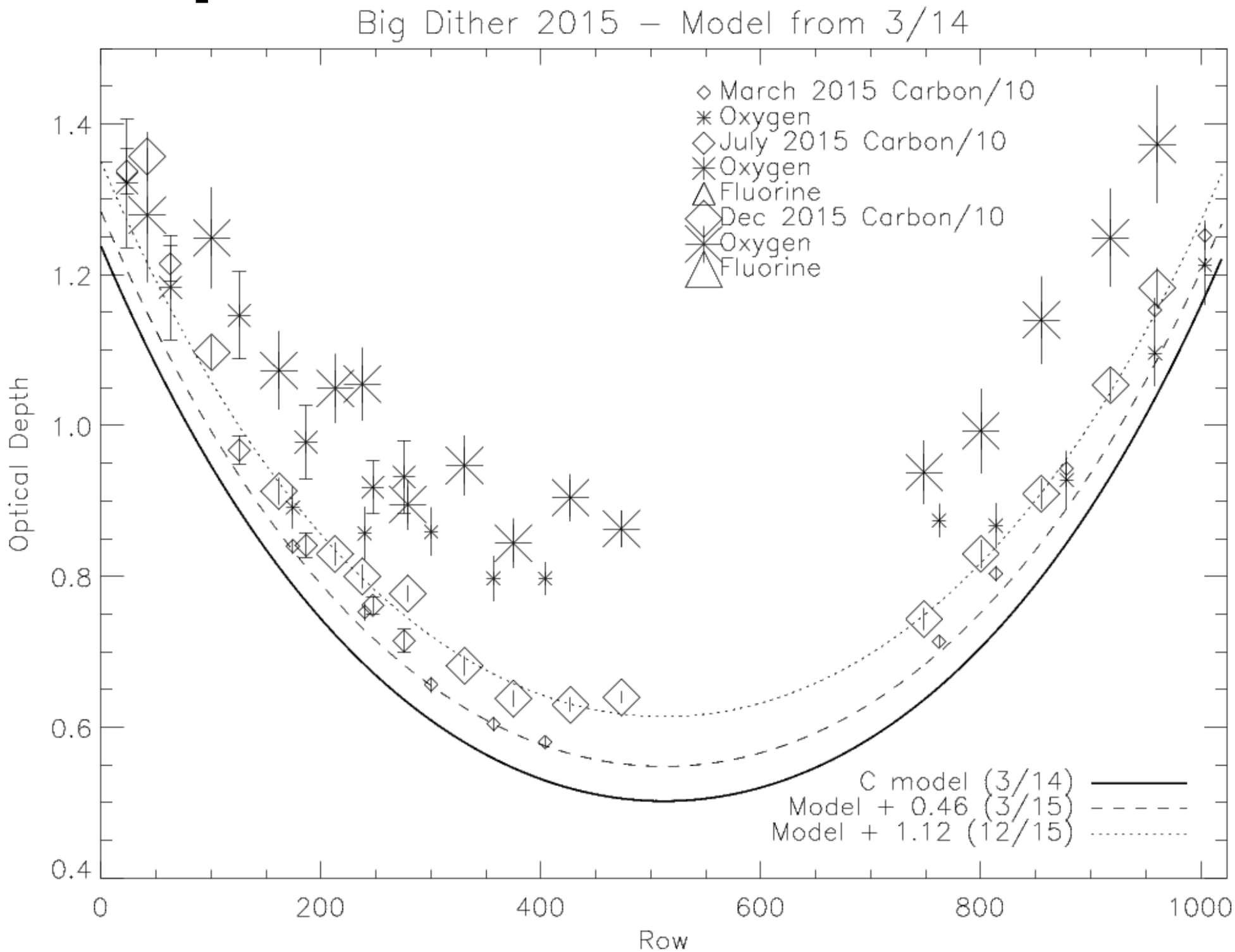
Linking N_H to C or O



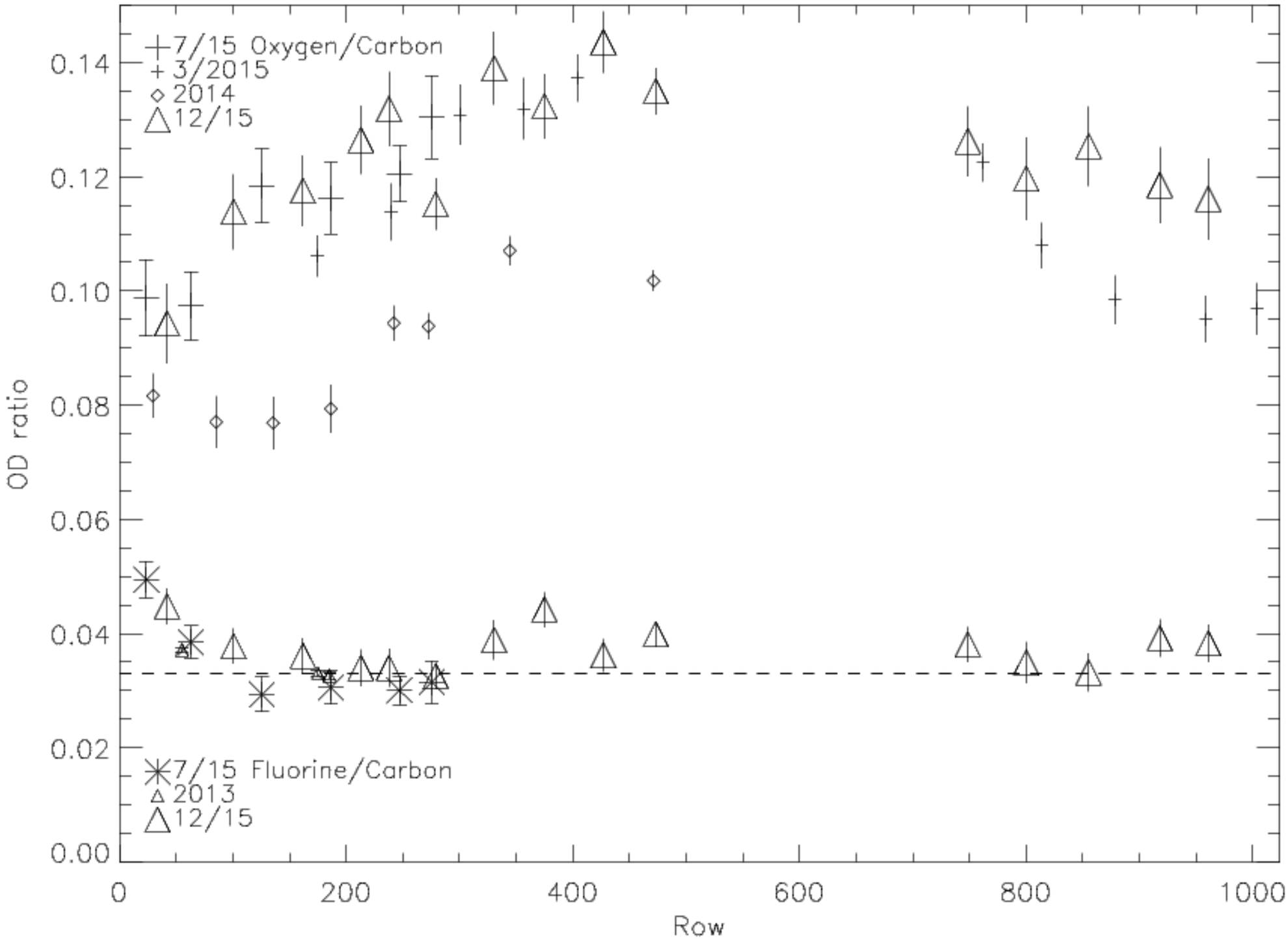
- Free N_H affects both C and O optical depths
- Could fix N_H/O ratio for fits



Spatial Distribution



O/C Spatial/Temporal



Summary

- τ(row) fits: τ_C increased 0.66 from 3/15 to 12/15
  - Increased 0.46 from 3/14 to 3/15
- No longer relying on fits with free N_H
  - Free N_H fits are better but jumps between sets
  - Could try tying N_H to τ_O
- O/C increased to 0.14 at the center of the detector
  - τ_O/τ_C was 0.10 in 2014
  - τ_O/τ_C is still higher in the center than edges
- F/C is slightly higher, from 0.033 to 0.036 ± 0.001
  - τ_F/τ_C is higher below row 100, up to 0.05