

# ACIS Contaminant: *What now?*

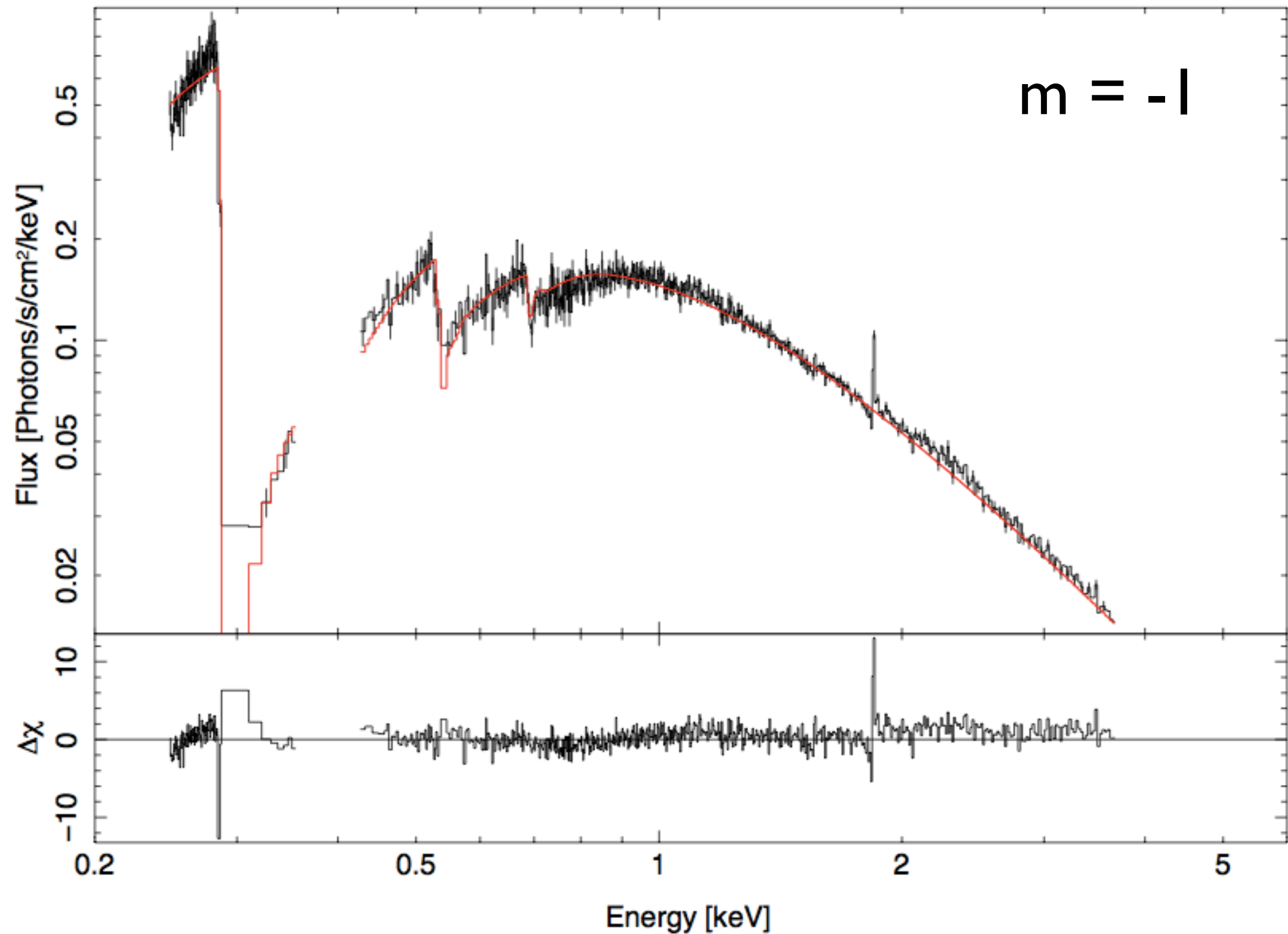
Herman L. Marshall

# New Approach, Again

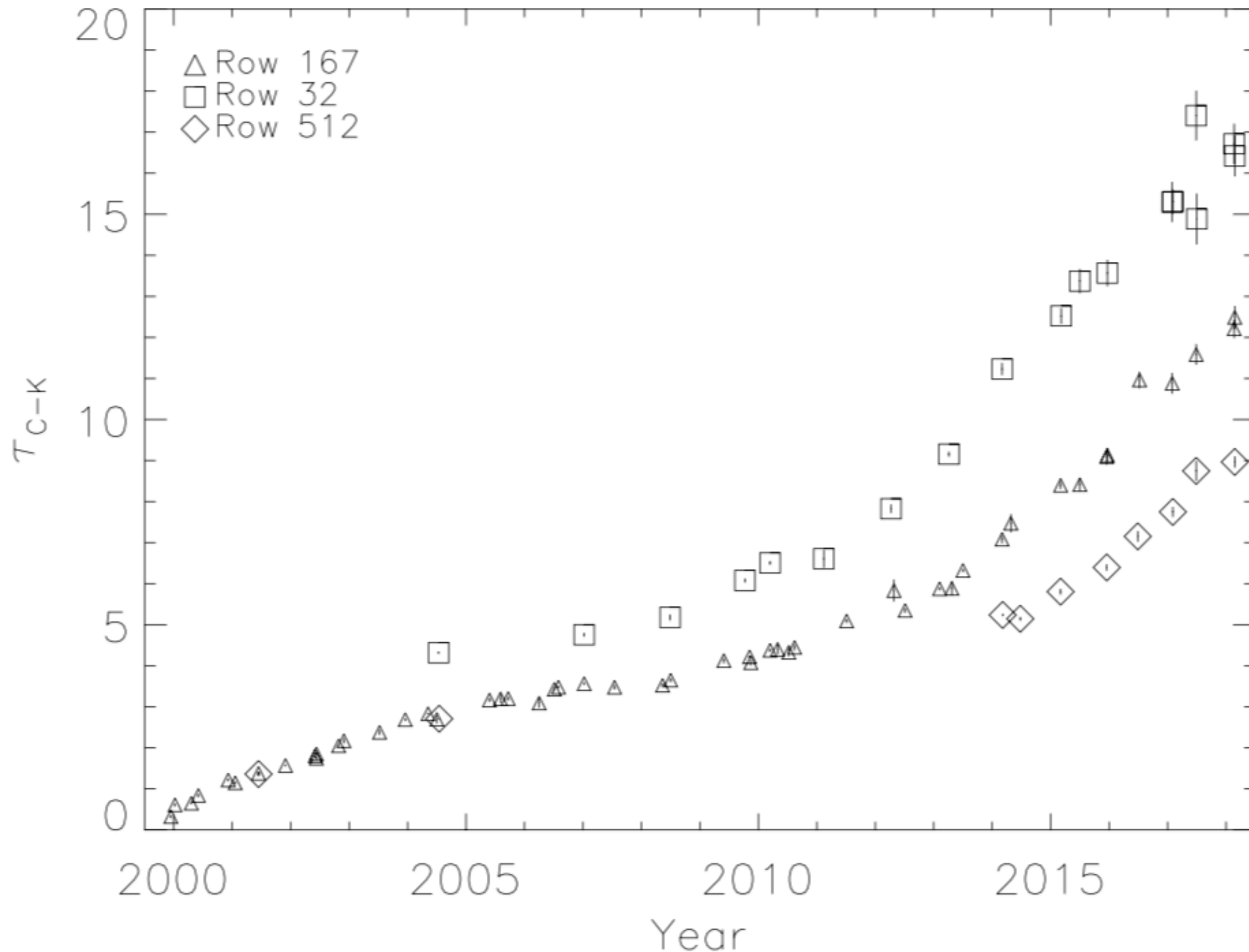
- Model:  $\tau_C = \tau_{C0} + t_{C1}(t) f(x,y)$
- LETG/ACIS of blazars, 'Big Dither'
  - measure O-K as  $h(t,y)$
  - measure F-K as  $k(t,y)$
- Determine  $\tau_{C, \text{Henke}}$  from cluster data, corrected for  $\tau_{O-K}, \tau_{F-K}$
- Adjust C-K edge

$$f(x, y) = e^{-y/a_1} + e^{(y-1024)/a_2} - e^{-512/a_1} - e^{-512/a_2}, a_1 = 106.25, a_2 = 129.62$$

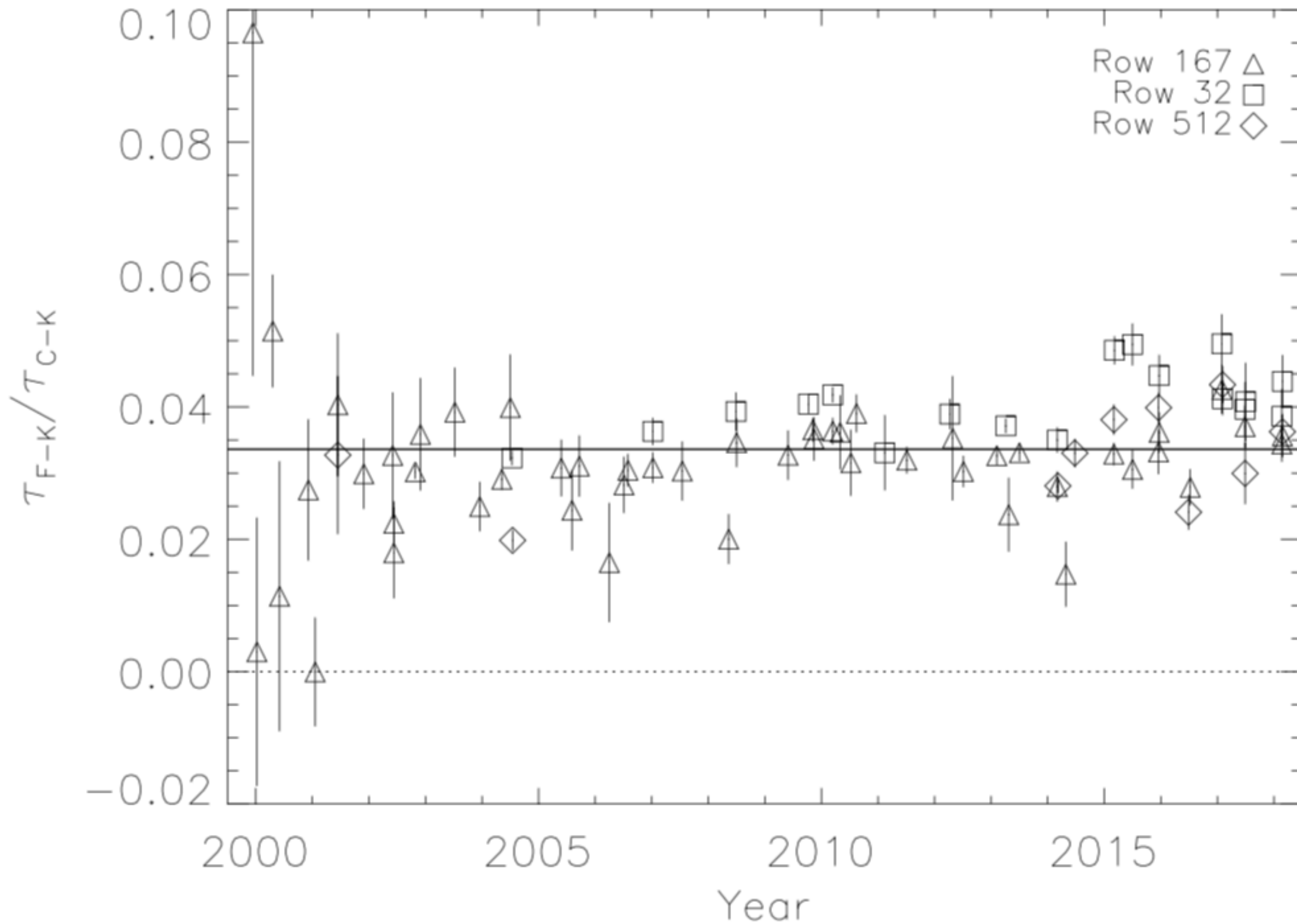
# Uncorrected Spectrum



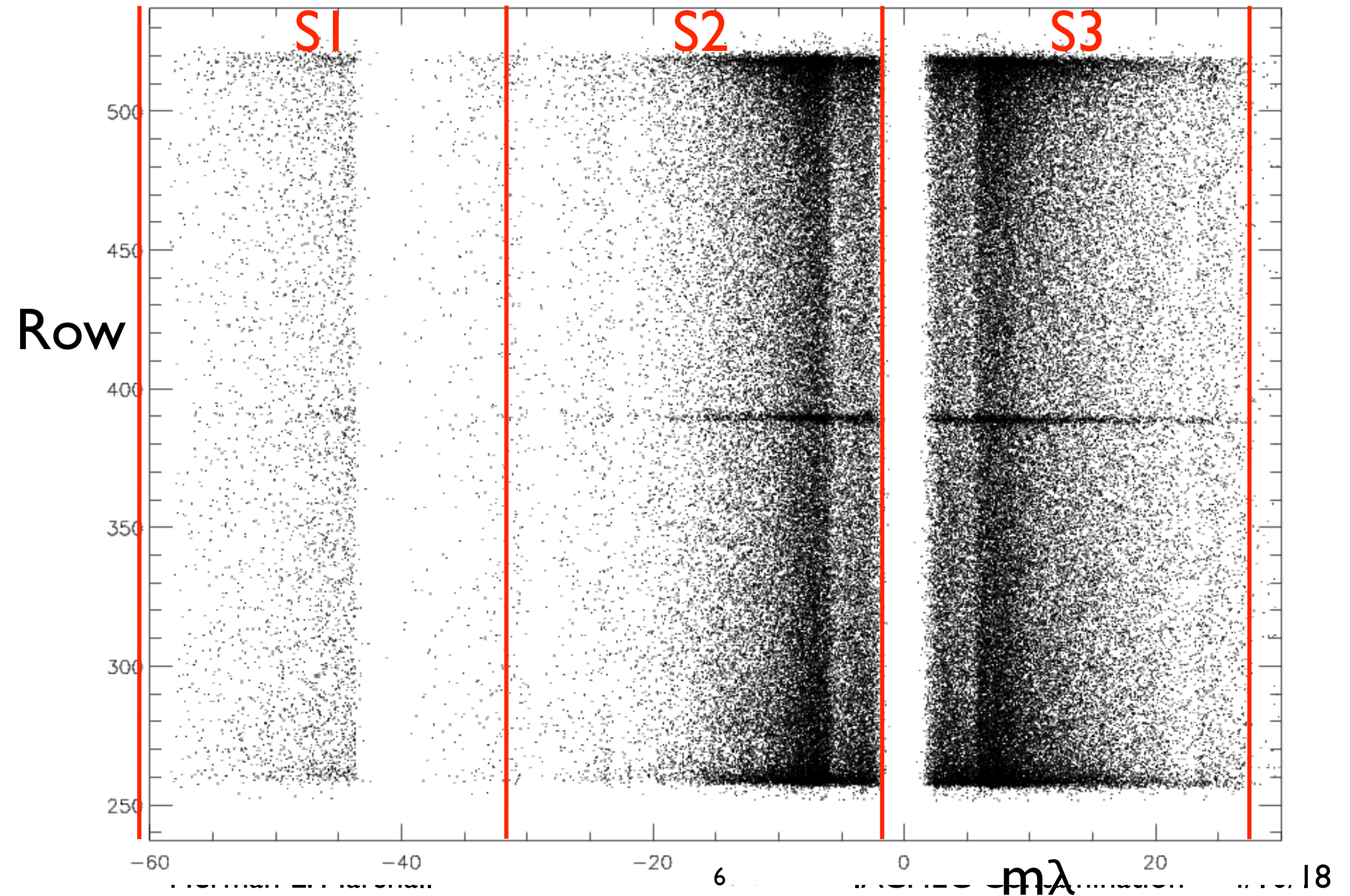
# Time Dependences



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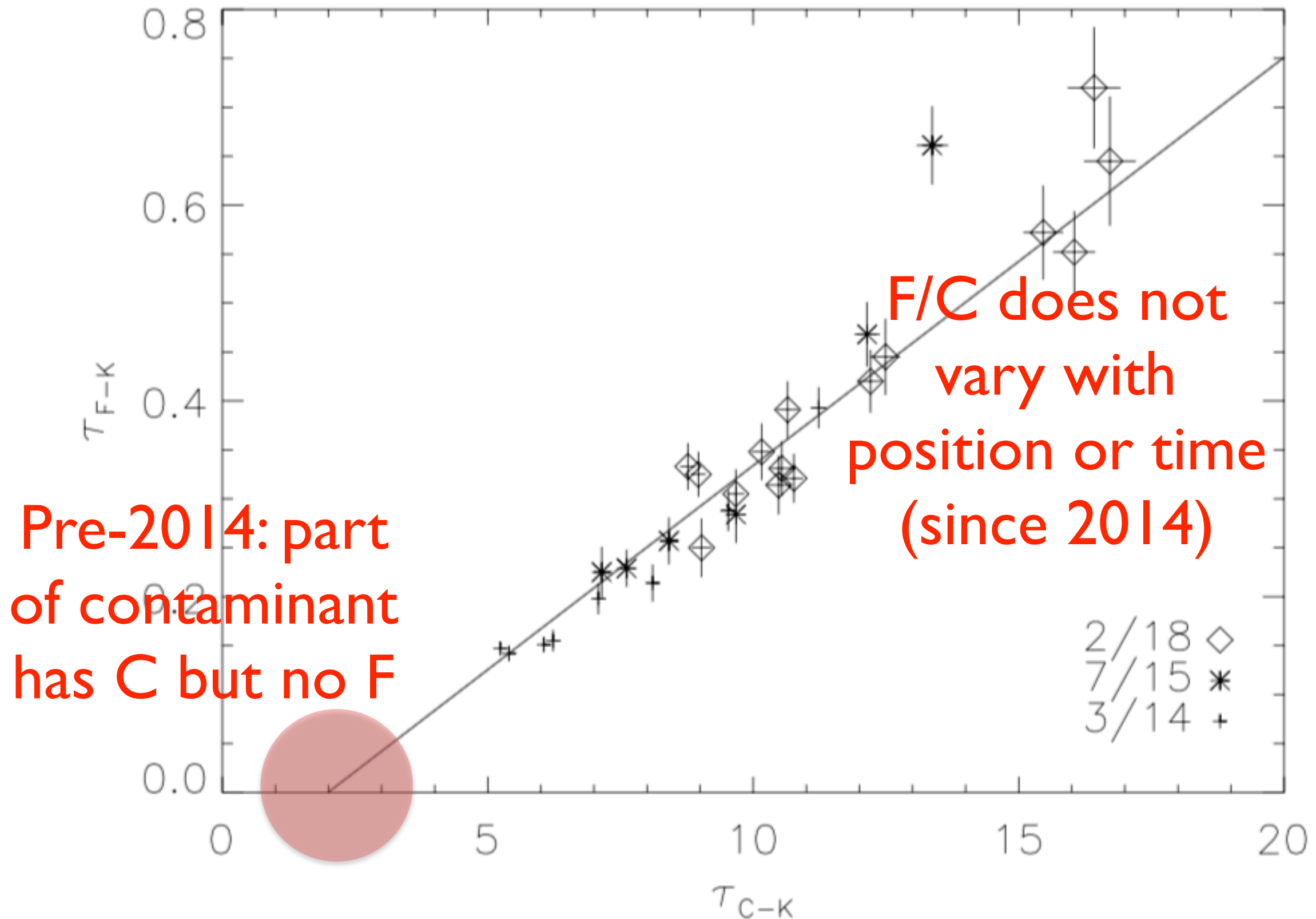
# Mid-Row





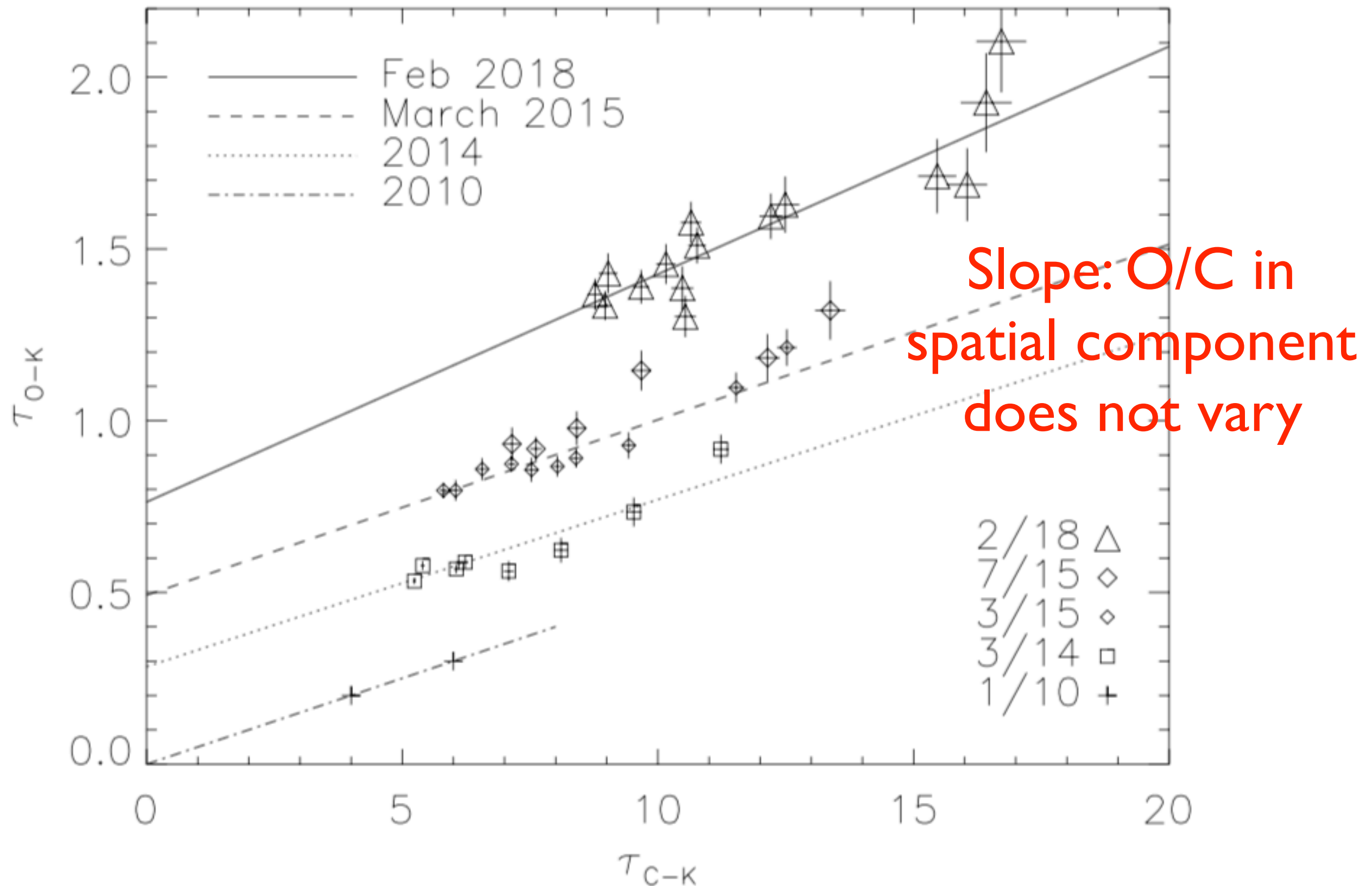


# Relating F-K to C-K

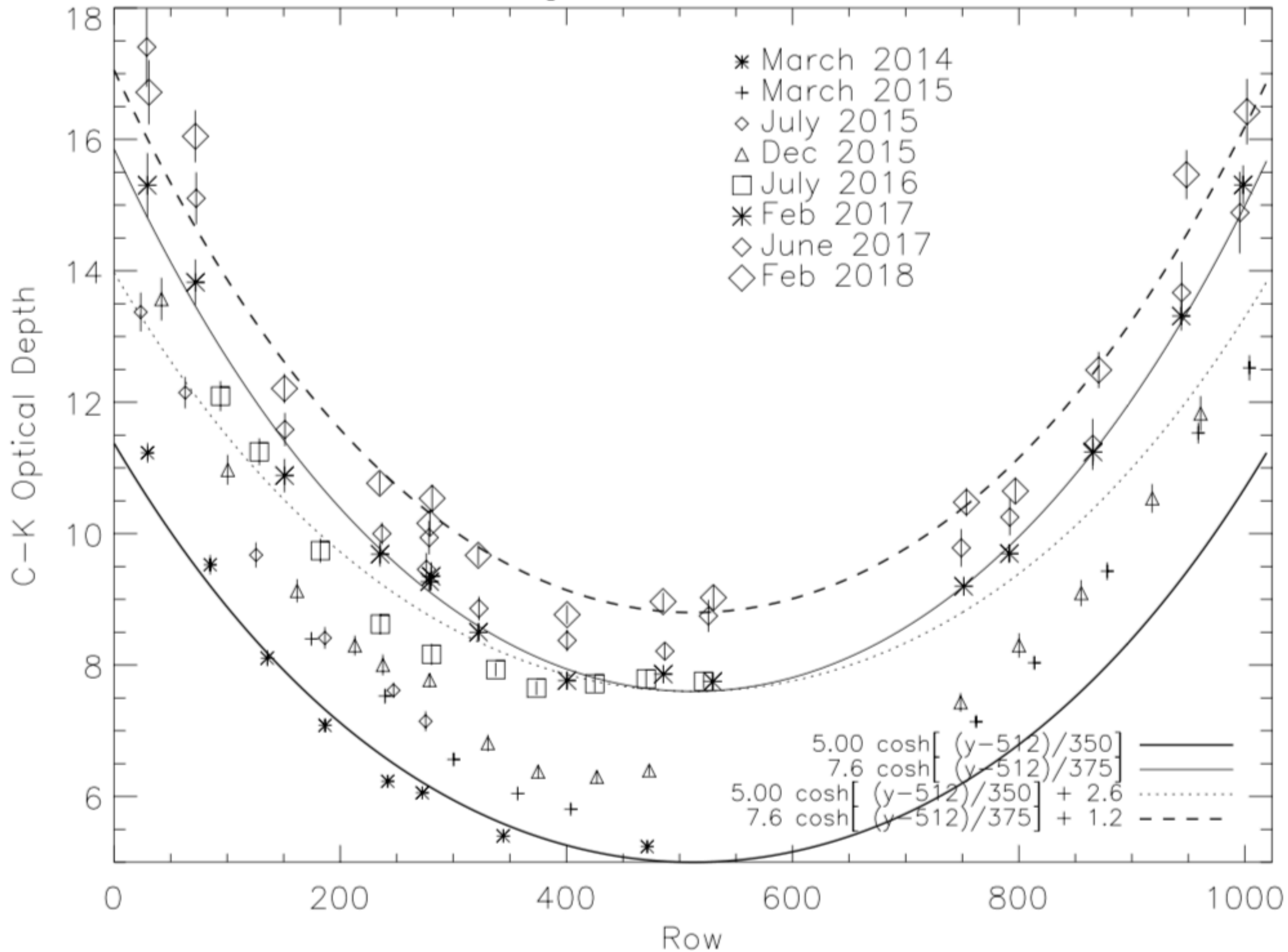




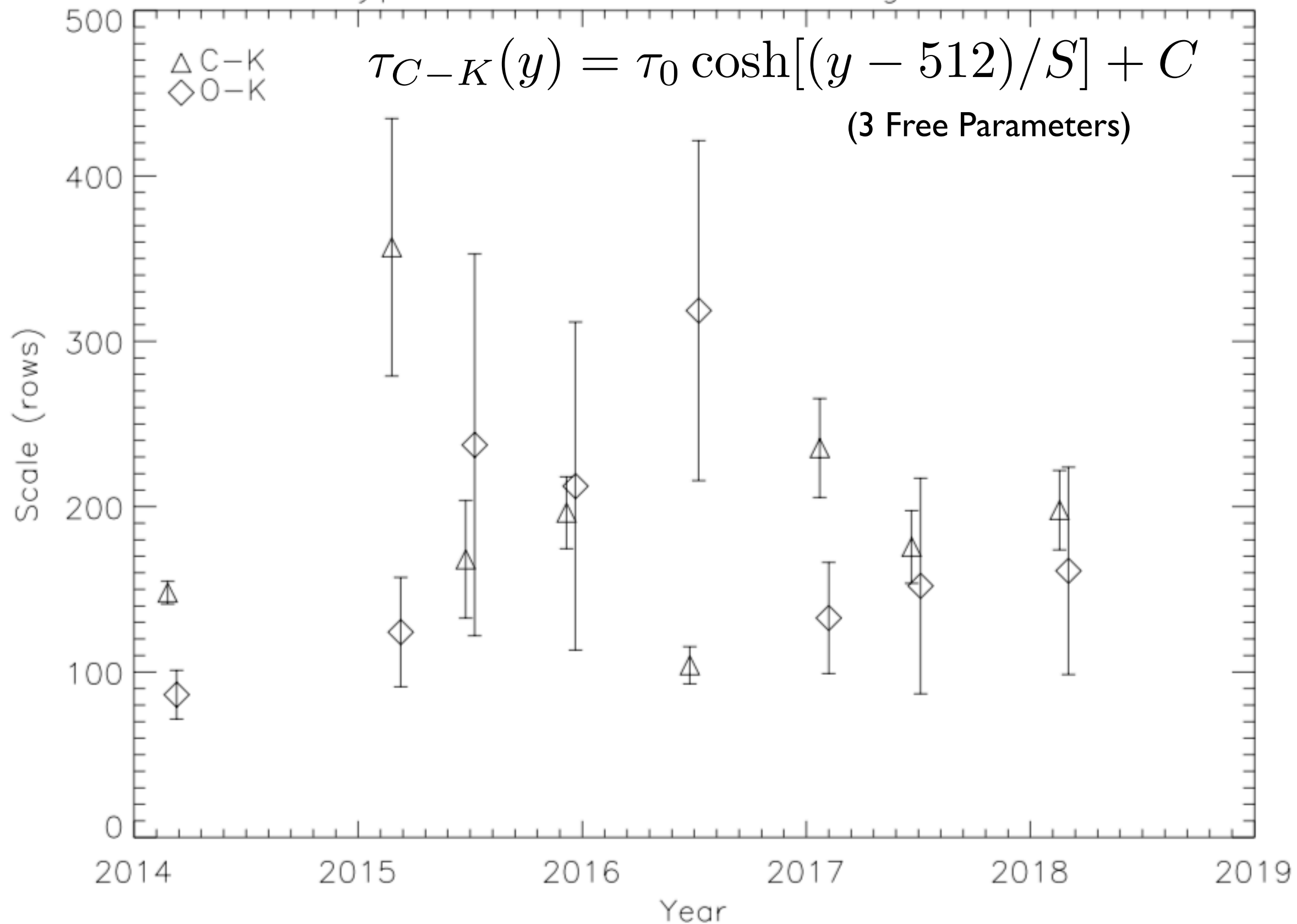
# Relating O-K to C-K



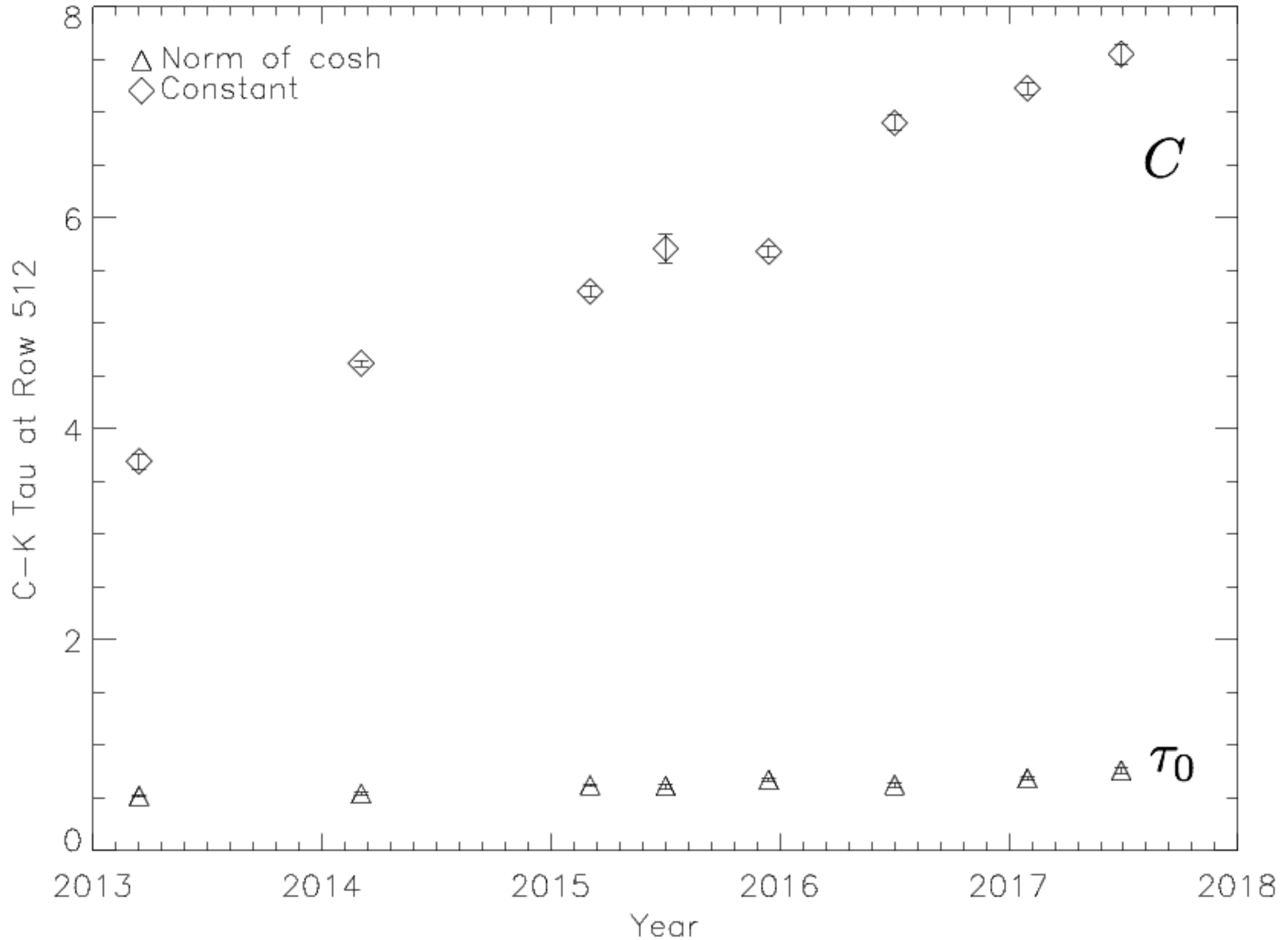
# Big Dither 2014–8



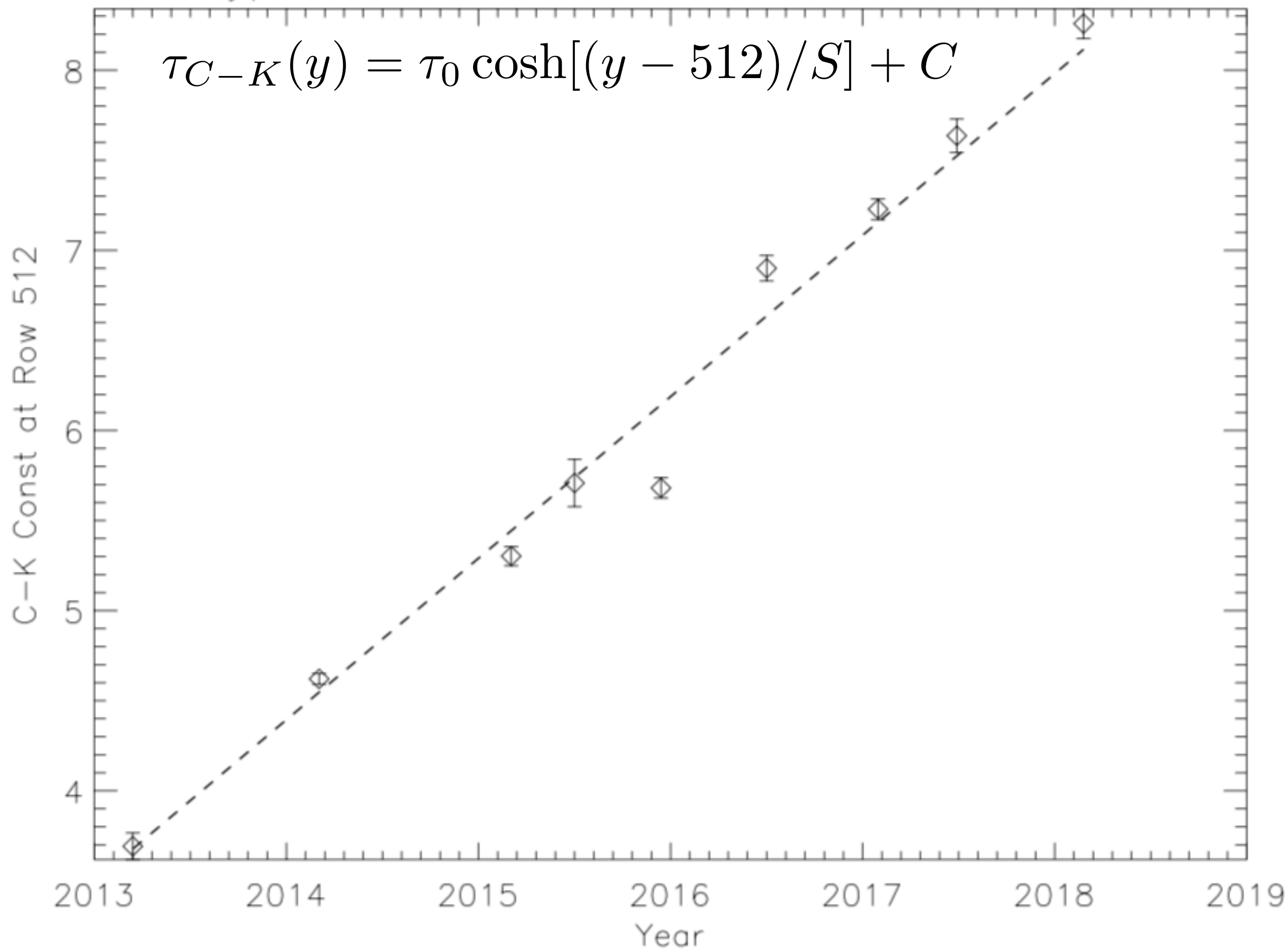
# Hyperbolic Cosine Fits to Big Dithers



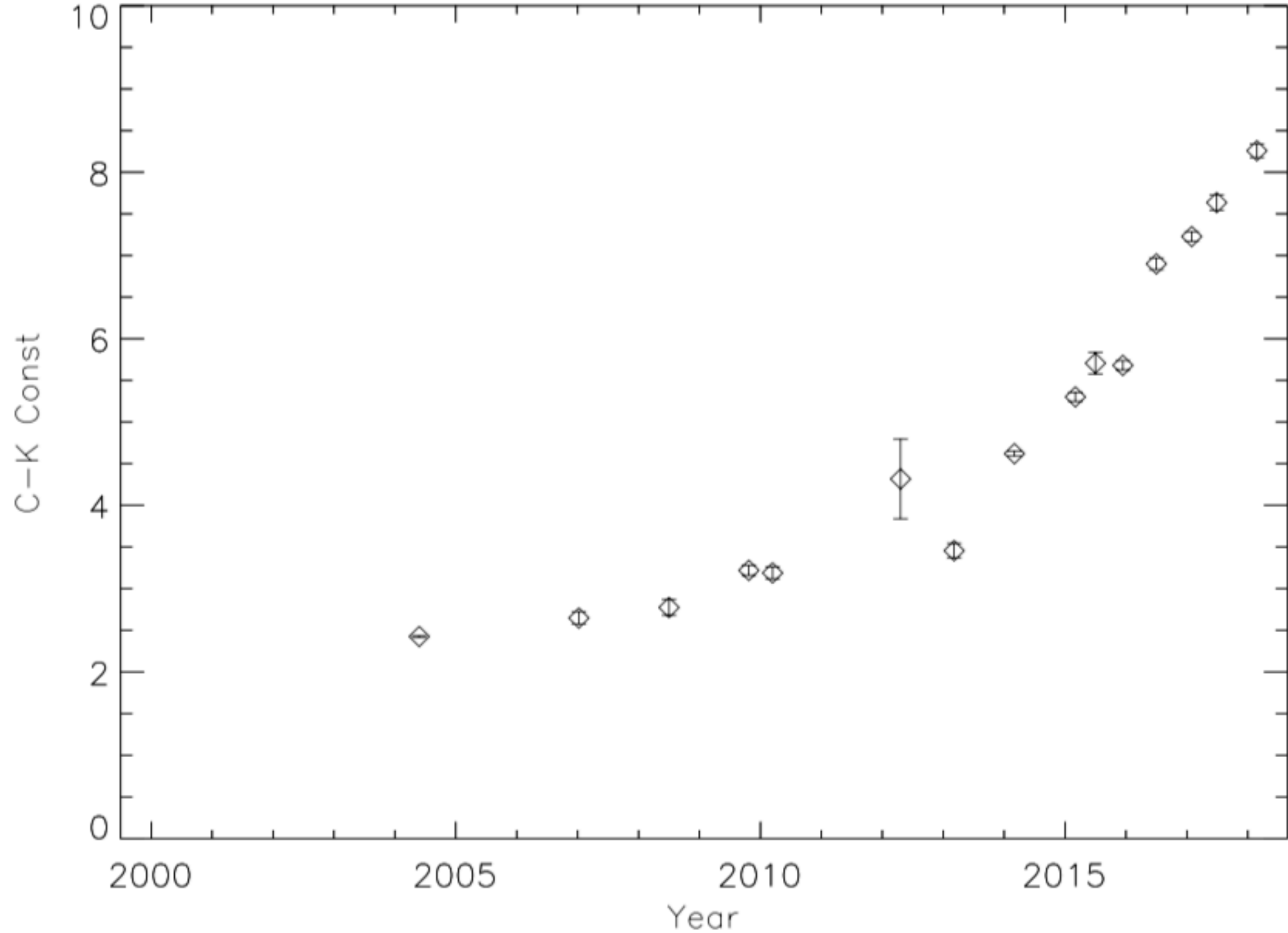
Hyperbolic Cosine + Constant, scale=150 row



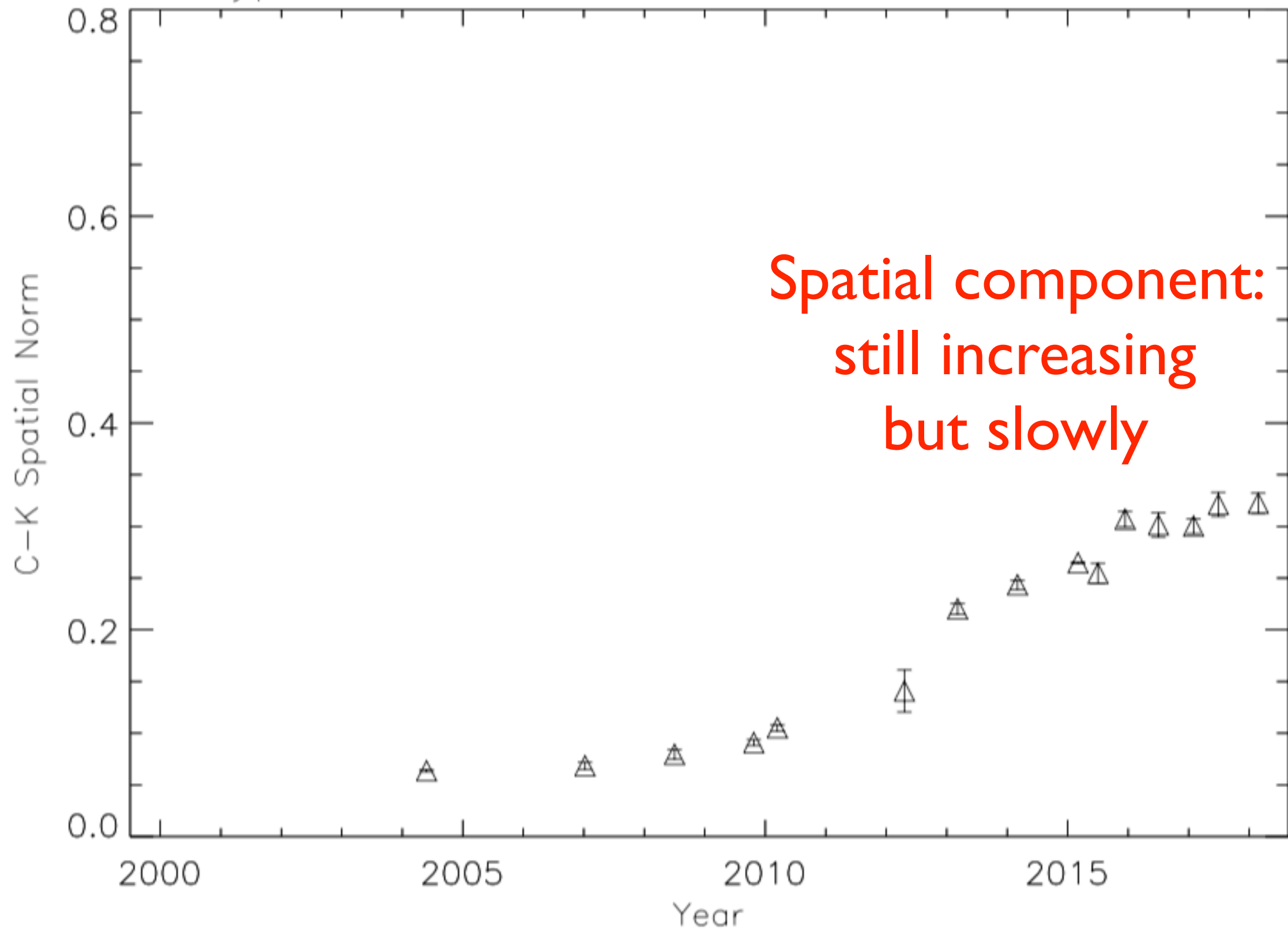
$$\tau_{C-K}(y) = \tau_0 \cosh[(y - 512)/S] + C$$



Hyperbolic Cosine + Constant, scale = 150 row

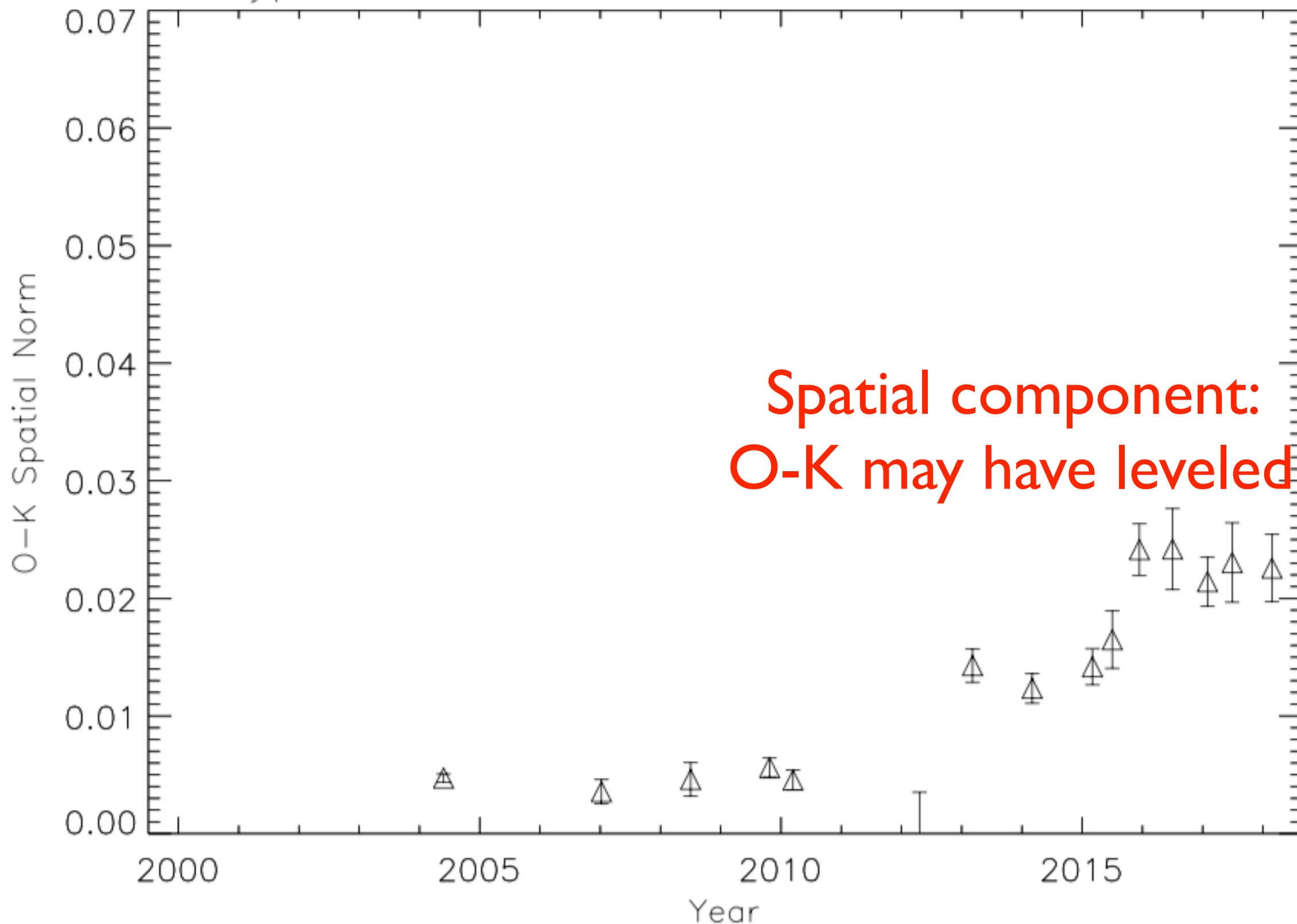


Hyperbolic Cosine + Constant, scale = 120 row

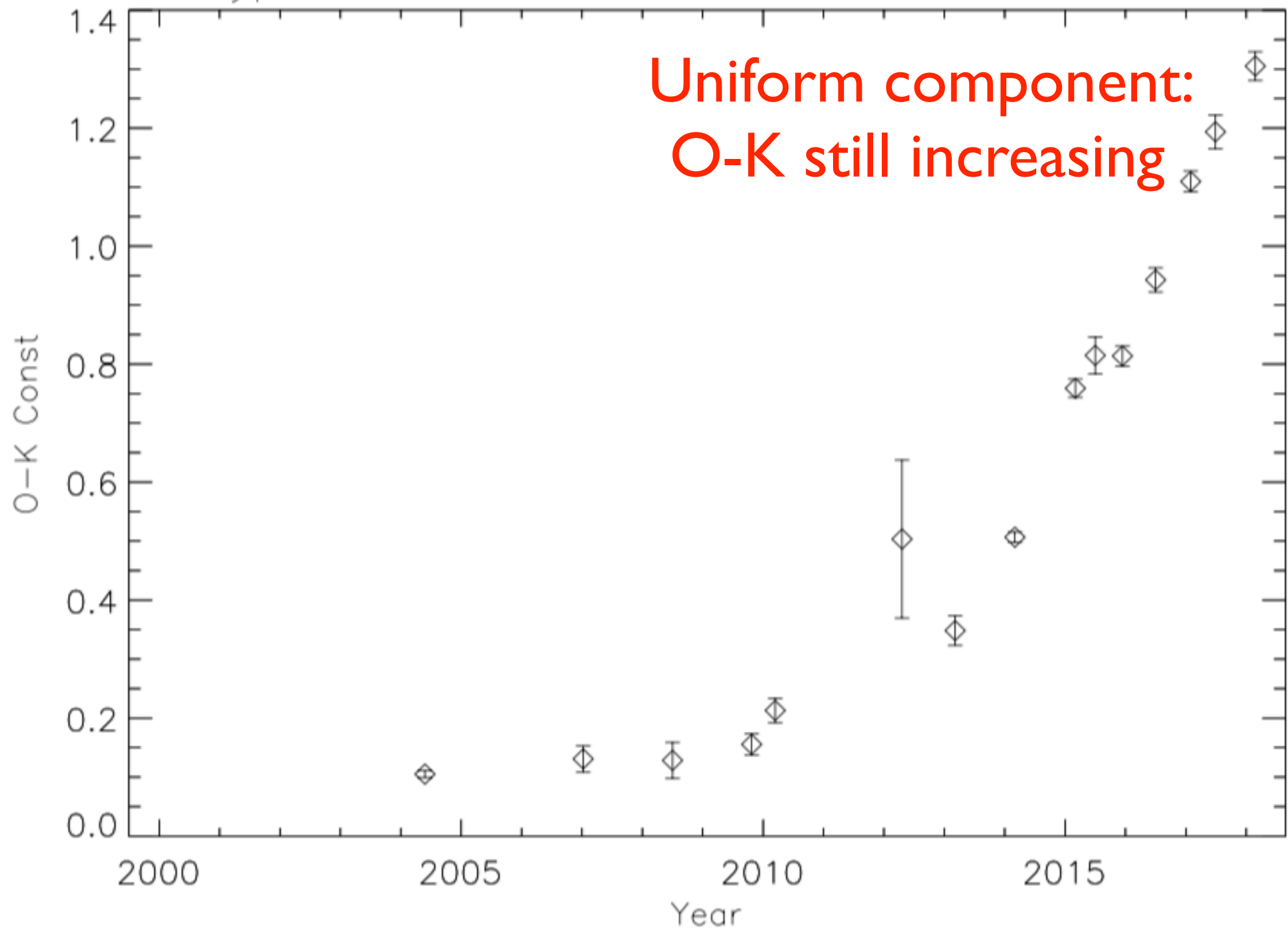




Hyperbolic Cosine + Constant, scale = 120 row

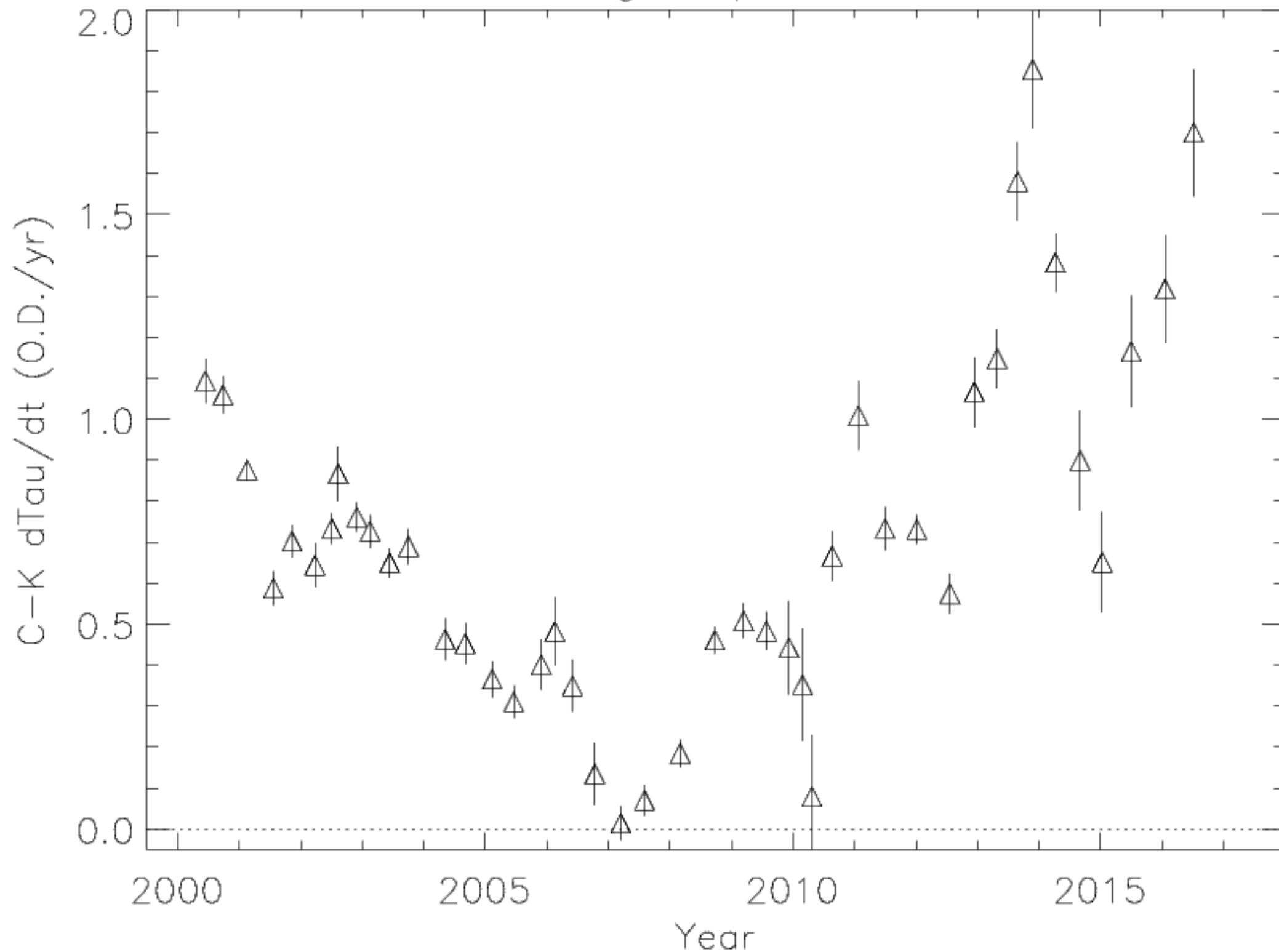


Hyperbolic Cosine + Constant, scale = 150 row



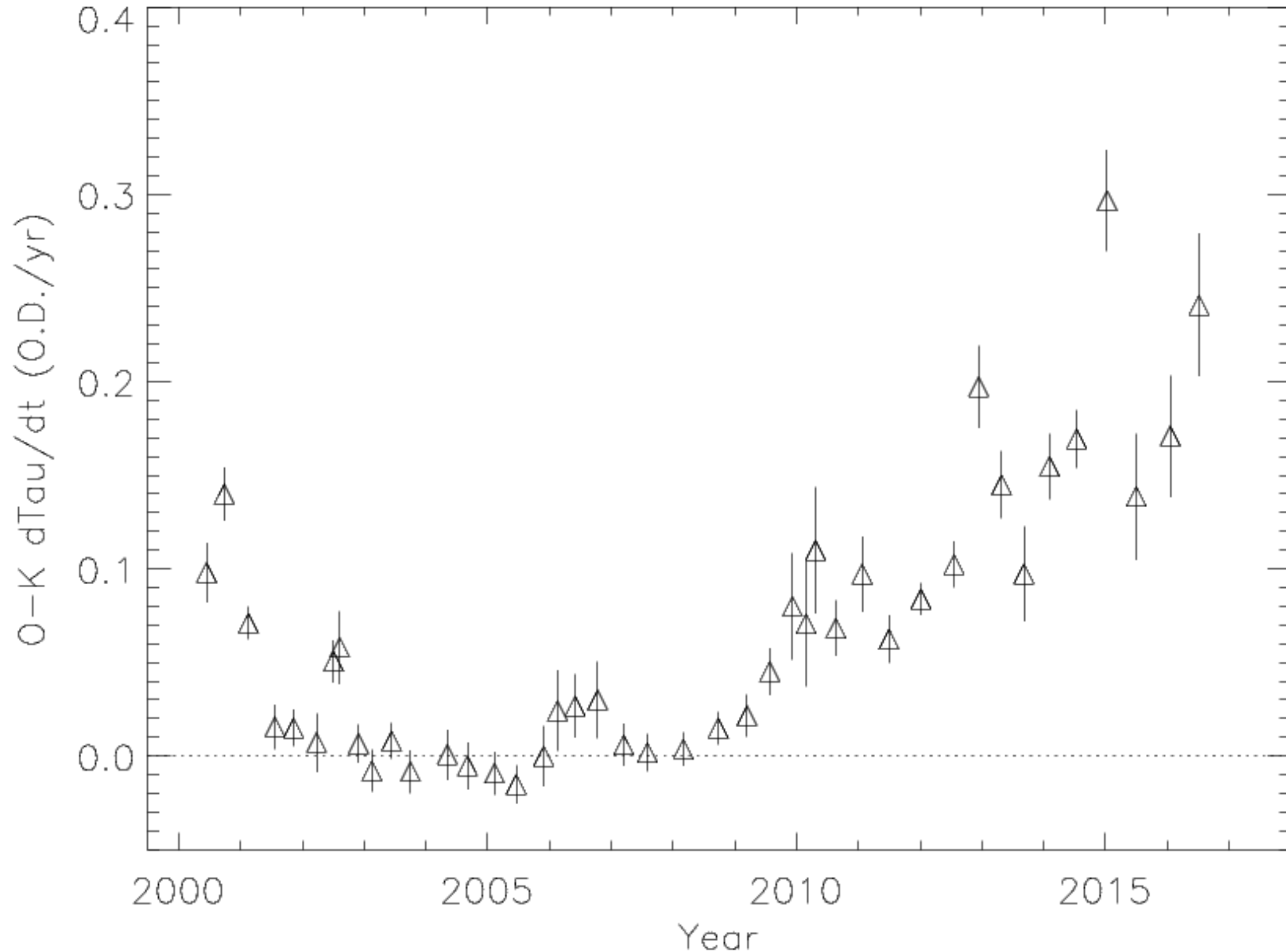
# All data, rows 135-195

Rolling 5-point fits



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Rolling 5-point fits



# Summary

- F/C now unchanging with row or time
  - Early contaminant had lower F/C
- O-K spatial variation scale matches C-K
- Growth times  $T = \tau(2018) / d\tau/dt$ 
  - Uniform: 6-9 yr
  - Spatial = 10-15 yr
  - $T_c = 1.5 T_o$
- O spatial component may have leveled but statistics are poor