

Contamination Working Group: Status & Plans

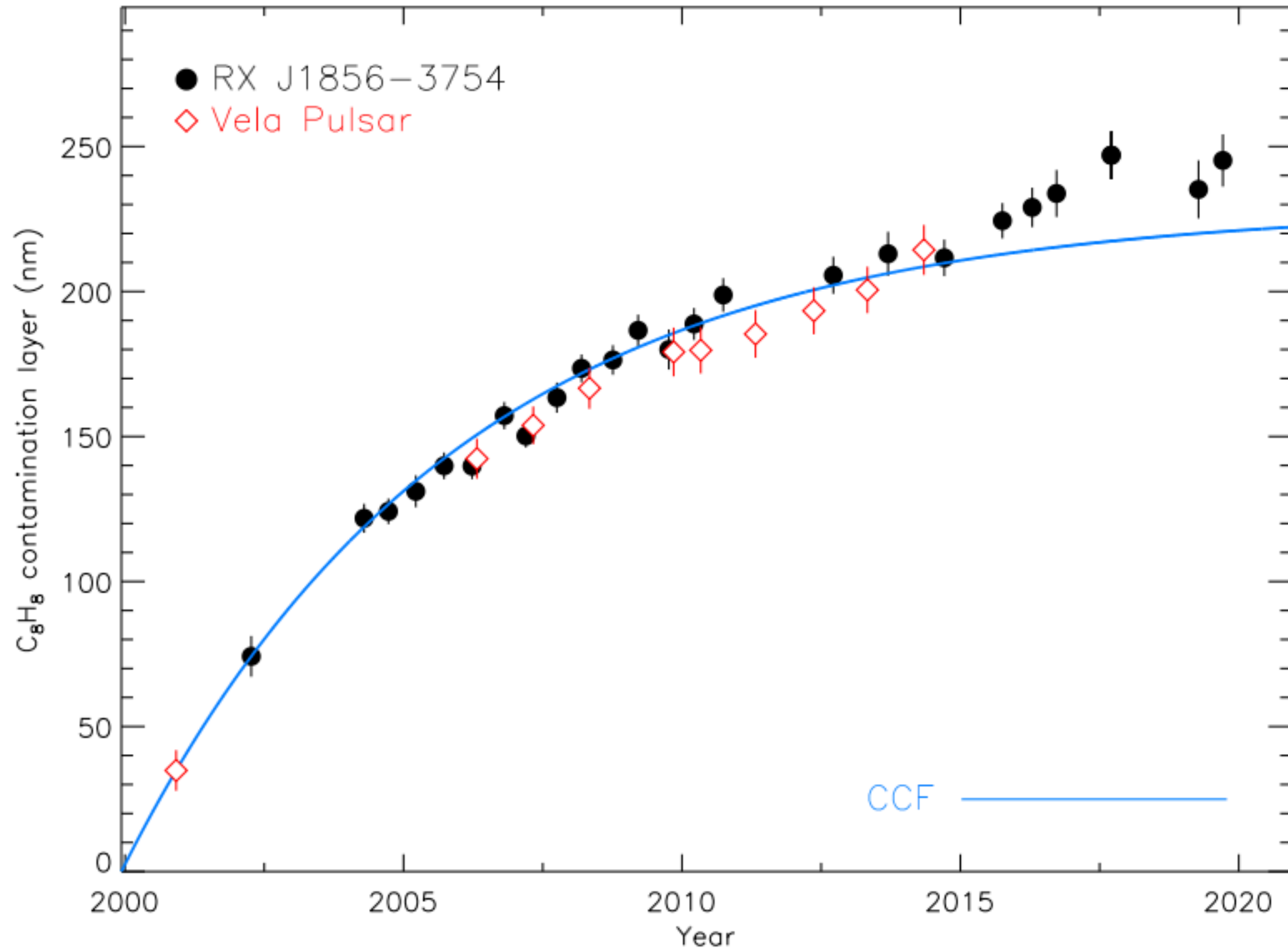
Herman L. Marshall
May 17, 2021

Status

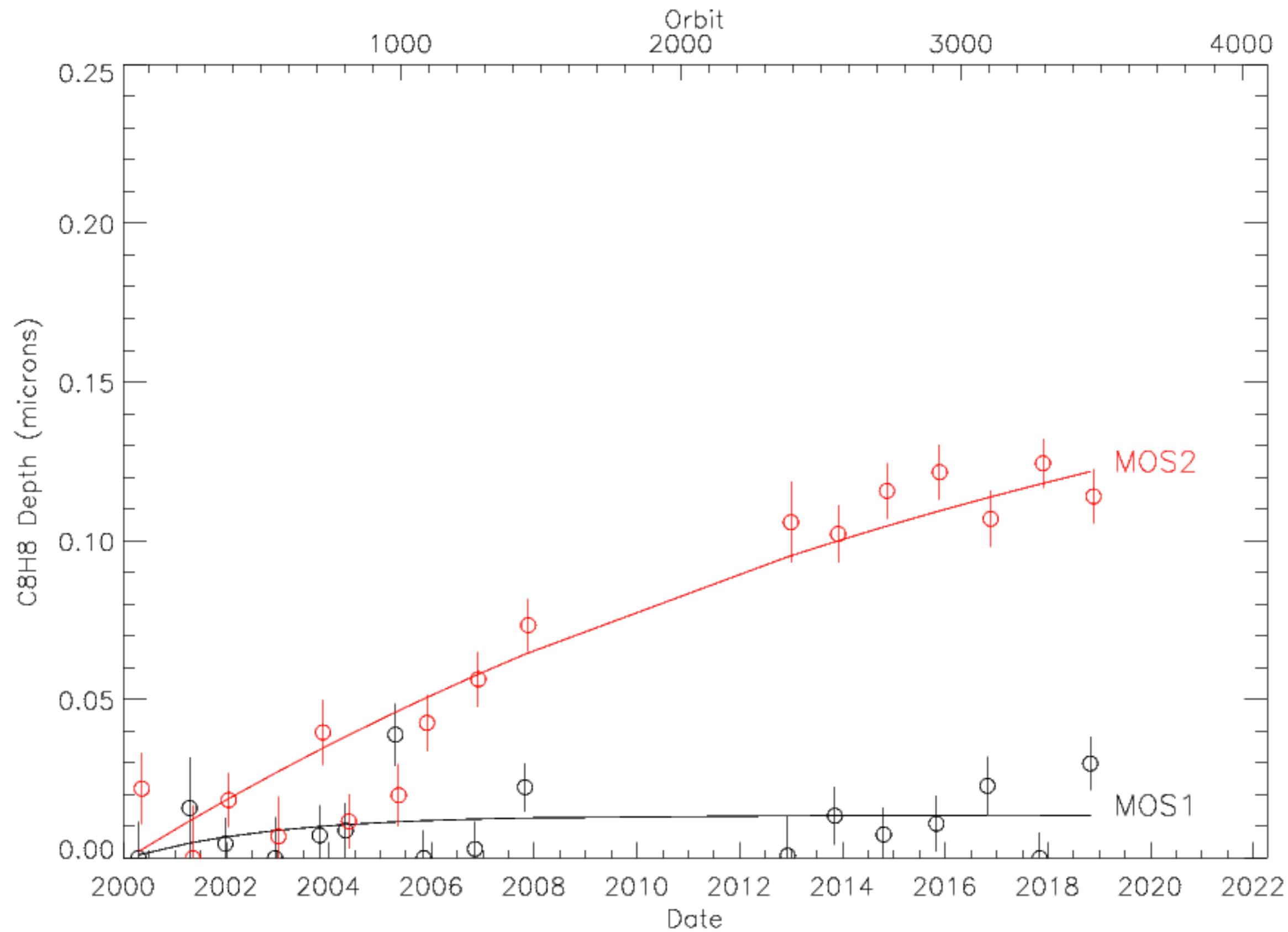
- Chandra ACIS: contamination is still growing
- XMM: no signs on pn, MOS and RGS are mildly growing
- Swift, NICER, eROSITA, etc.: no signs of contamination

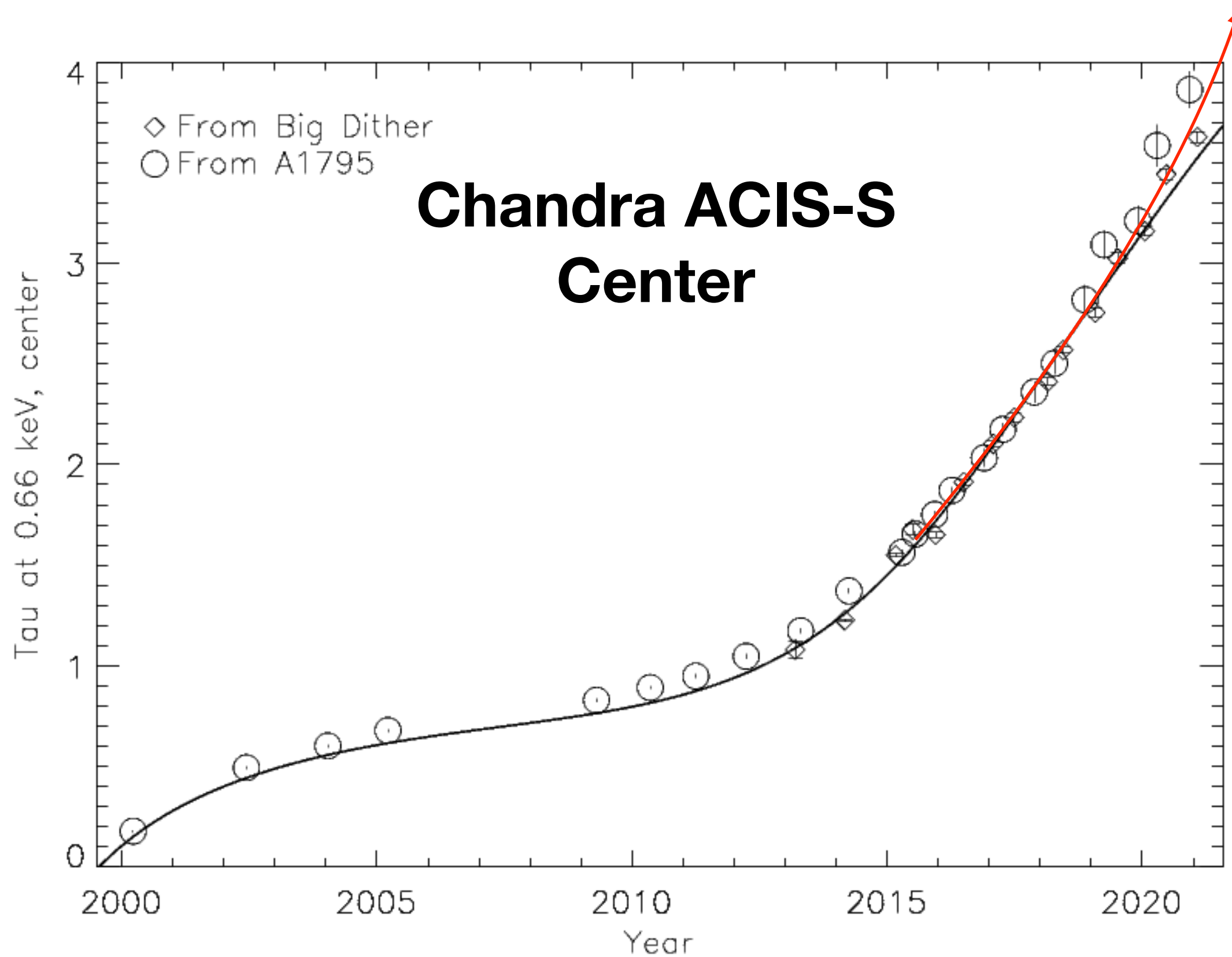
XMM RGS

- Excess since 2015 may not be due to hydrocarbons

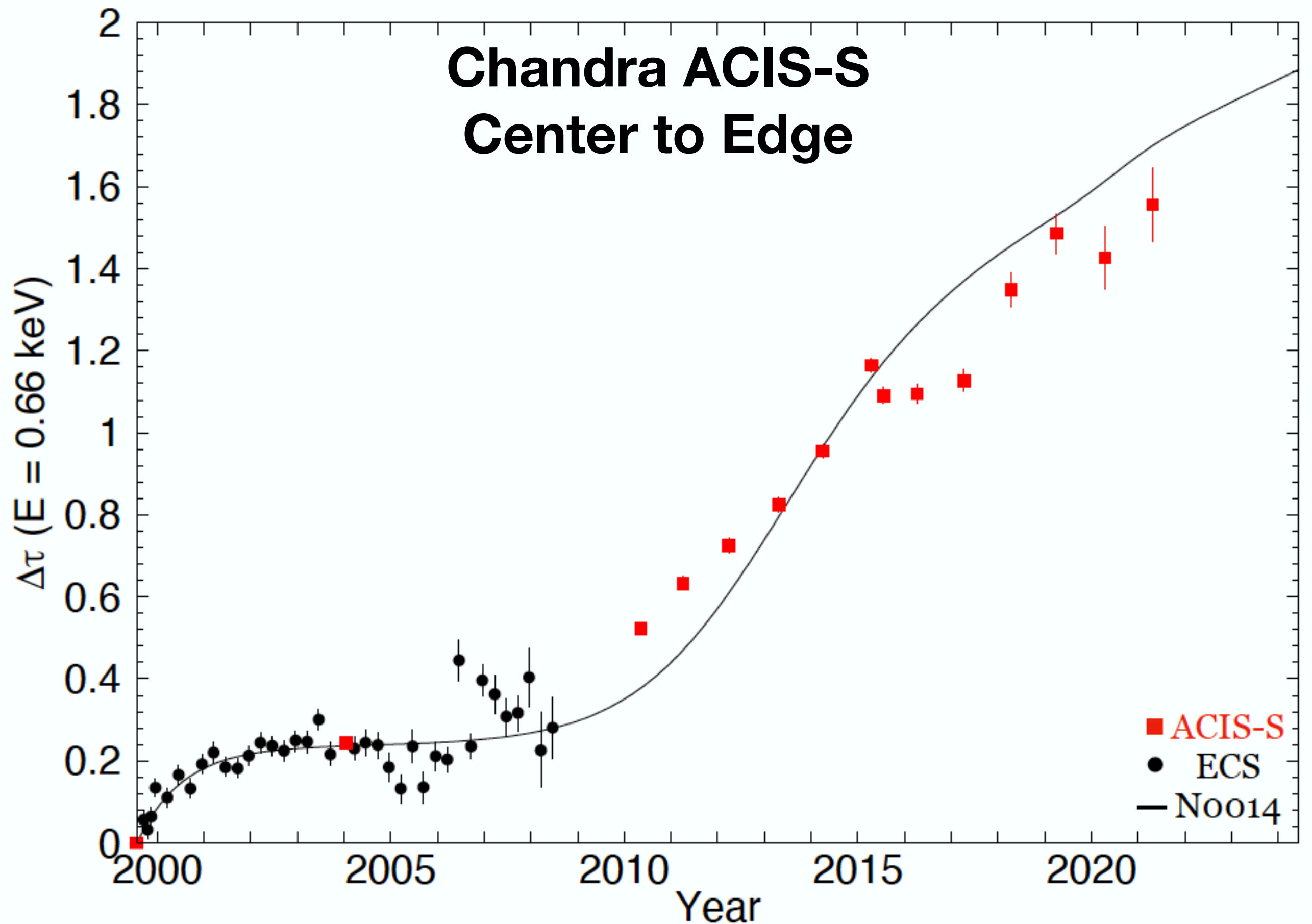


XMM MOS



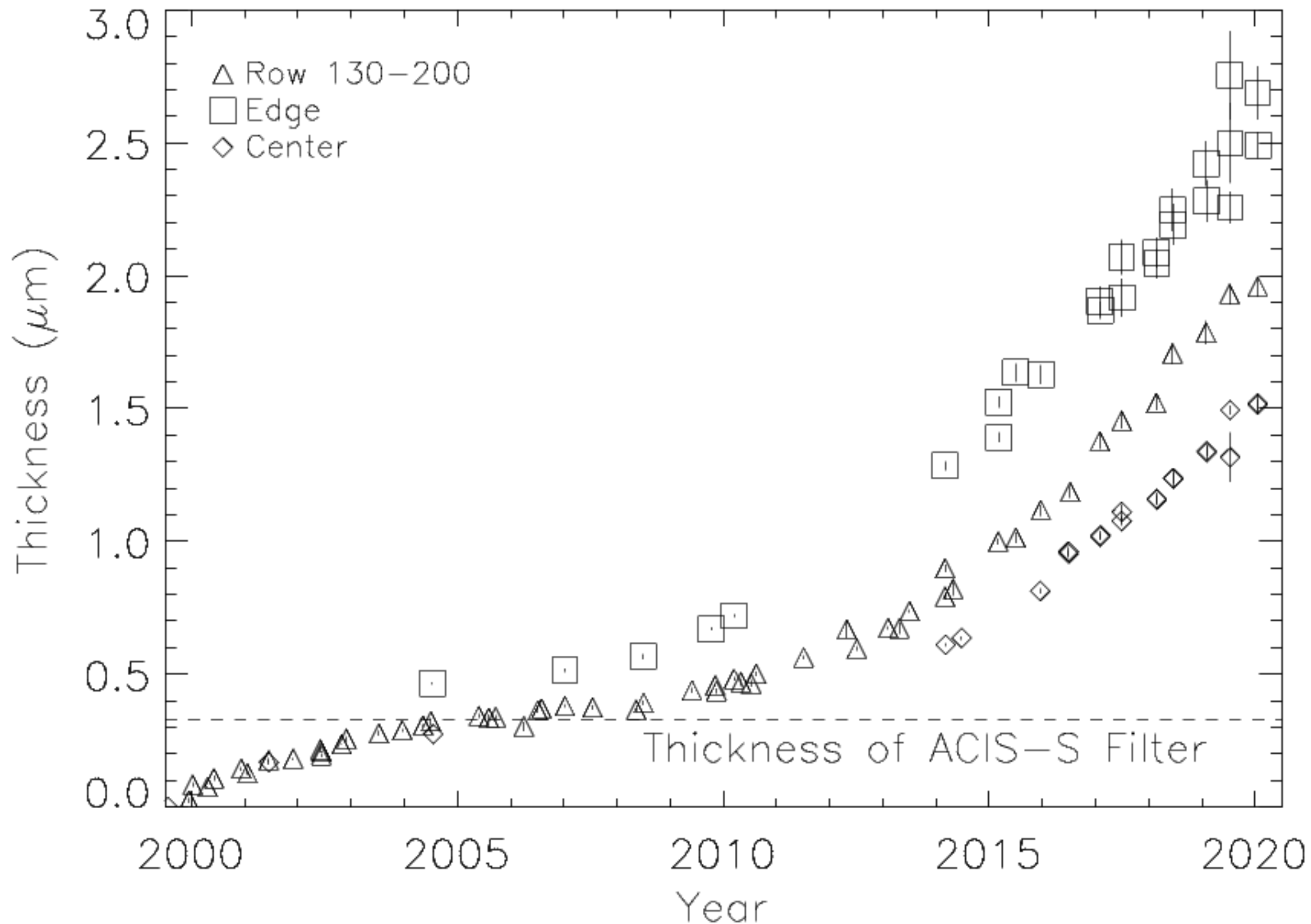


Chandra ACIS-S Center to Edge



ACIS Contamination

- ACIS contamination: x10 thicker than on MOS or RGS



Mitigation Methods

- Basic plan: model after XMM pn, Swift, Hitomi
- eROSITA
 - 6 days of outgassing for each component at +80C
 - no direct venting but minimal space around filters
 - mirrors heated to +20C
- XRISM
 - Xtend: like Hitomi, filter at +30C, 20 cm from CCDs
 - Resolve: 5 filter stages on shells at different Ts, bakeout
- Athena
 - WFI: similar to eROSITA
 - XIFU: similar to Resolve

White Paper Plan

- Agree on outline, elements of white paper
- Place structure on overleaf, distribute link to edit
- Assign/volunteer section leaders
- Review progress monthly
- Target completion by next IACHEC Plenary (Sept. 12-16)
- Write paper 1st, decide on submission to journal 2nd

Outline

1. Intro/Objectives: see next slide
2. Status of X-ray telescope contamination by mission
 1. Chandra — P. Plucinsky, (H. Marshall, A. Bogdan to contribute)
 2. XMM (MOS & RGS) — M. Smith to coordinate
 3. Suzaku — E. Miller
 4. AstroSat — S. Chandra
 5. Swift — A. Beardmore
 6. NICER (C. Markwardt), NuSTAR (K. K. Madsen)
 7. eROSITA — K. Dennerl
 8. MAXI?
 9. HXMT — ?
3. Mitigation/monitoring plans
 1. Athena — V. Burwitz
 2. Arcus — E. Miller
 3. XRISM/Hitomi — E. Miller to coordinate
 4. Einstein Probe —
 5. IXPE — W. Baumgartner
 6. SMILE/SXI — S. Sembay

Intro/Objectives

(from EM's 2019 summary)

- comparison among instruments and missions
 - chemical composition
 - time dependence
 - spatial dependence (micron to cm scales)
 - temperature dependence (where is the coldest surface?)
 - environmental dependence (orbit)
- mitigation for current instruments
 - celestial monitoring targets
 - effects on calibration and science results
 - "bake-out" procedures