Contamination Working Group: Status & Plans

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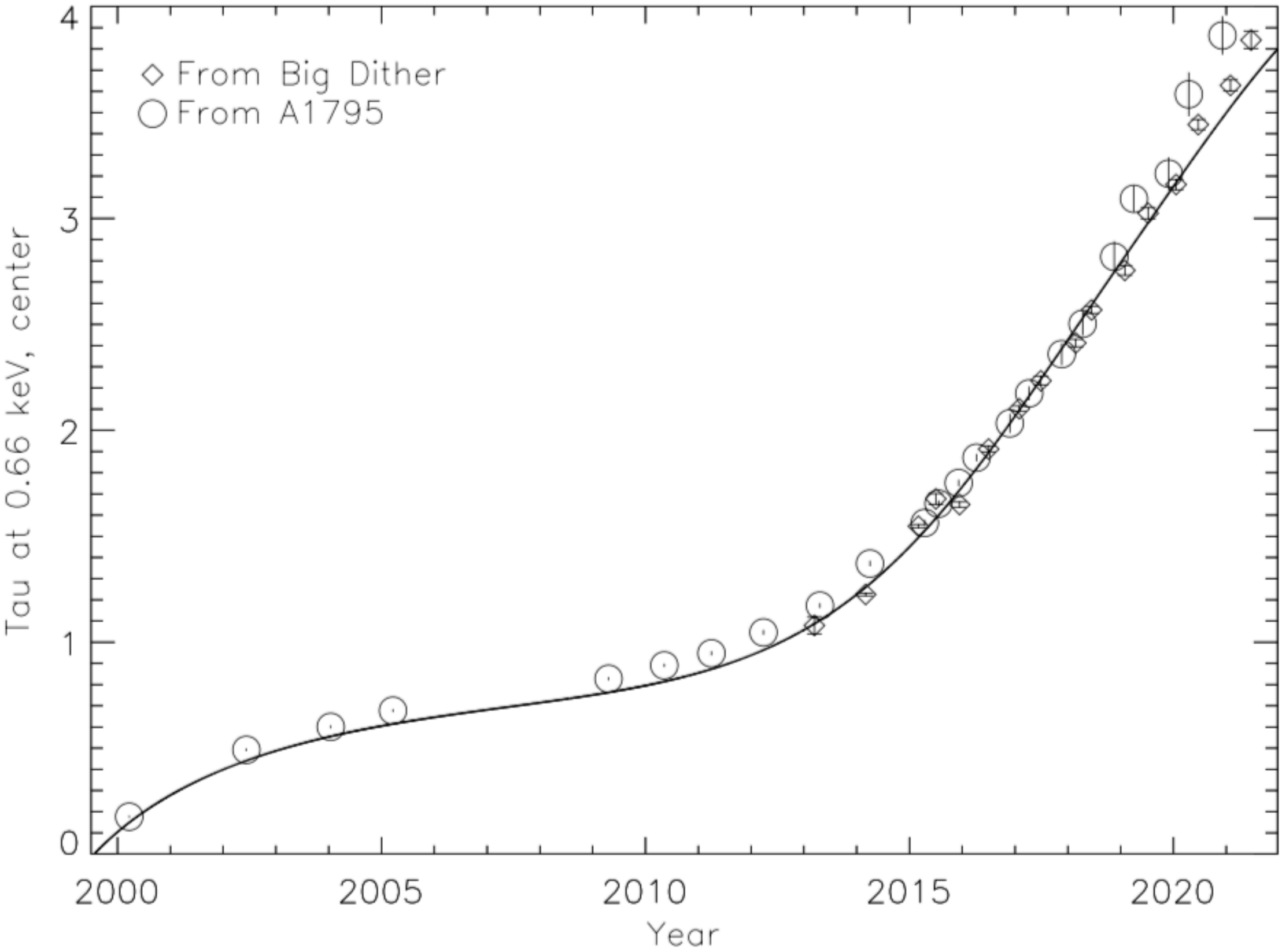
Nov. 8, 2021

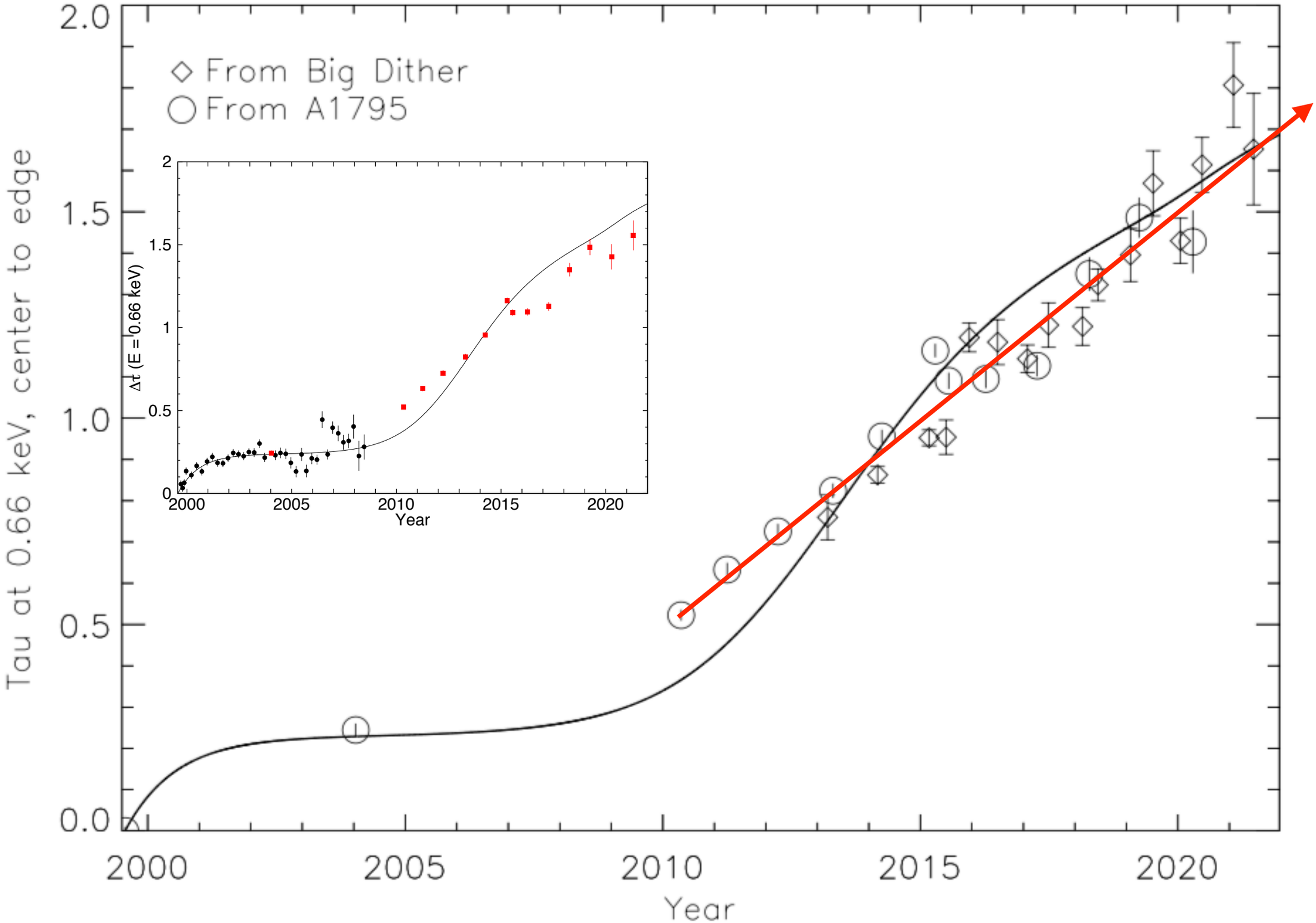
Status

- Previous WG meeting (May 2021)
  - Chandra ACIS: contamination is still growing
  - XMM: no signs on pn, MOS and RGS growing mildly
  - Swift, NICER, eROSITA, etc.: no signs of contamination
  - Mitigation methods: see XMM pn, Swift, eROSITA, Hitomi
- Latest WG meeting (Nov. 2021)
  - Chandra ACIS (HLM): contamination is still growing, model is OK
  - eROSITA (F. Haberl)
    - RX J1856 still doesn't vary
      - extra edge required at C-K
      - edge depth ~0.2 O.D., unvarying
    - RX J2143 has more complex model, edge not at C-K
  - Athena plans (A. von Kienlin)

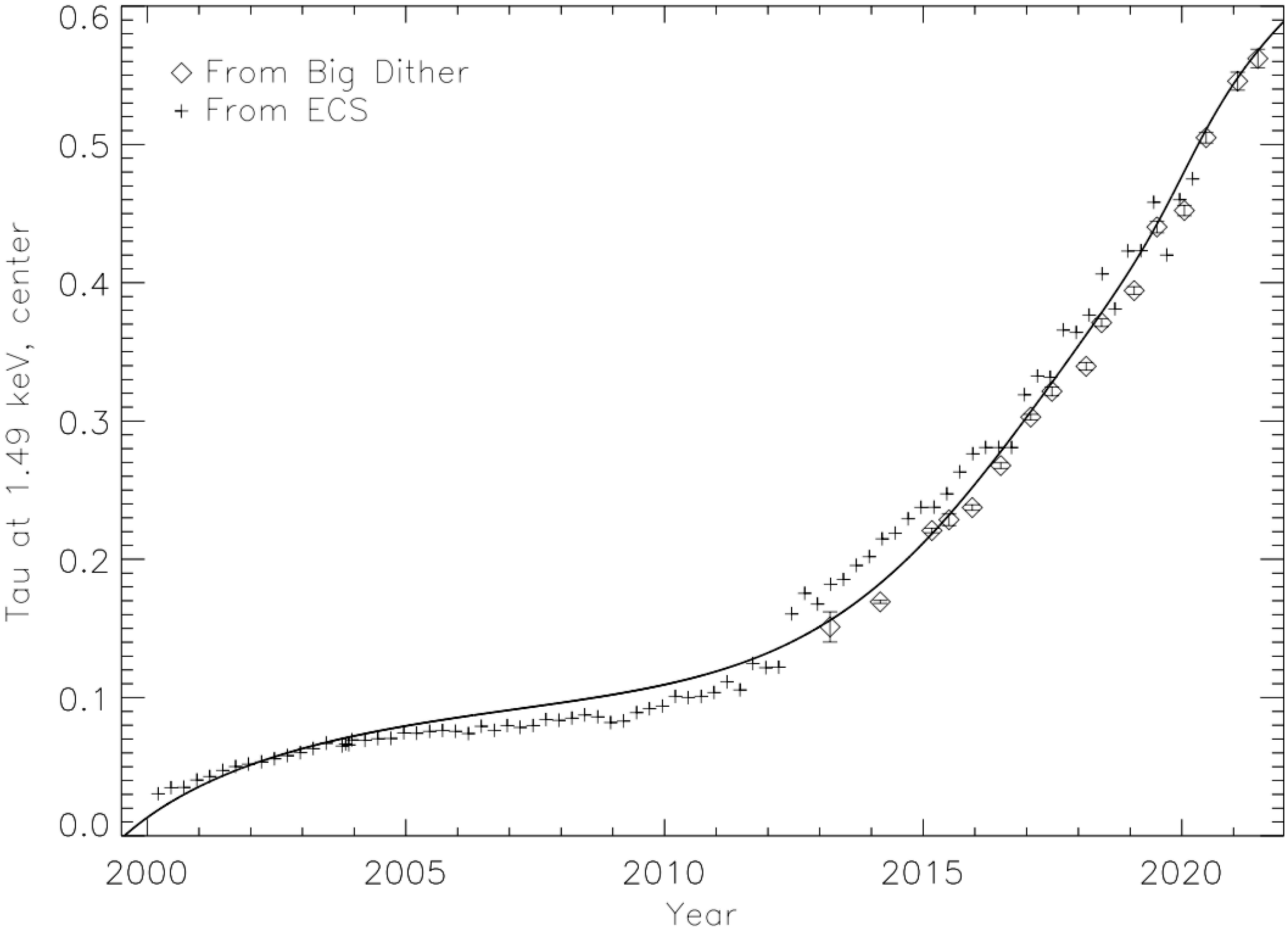
Chandra ACIS-S



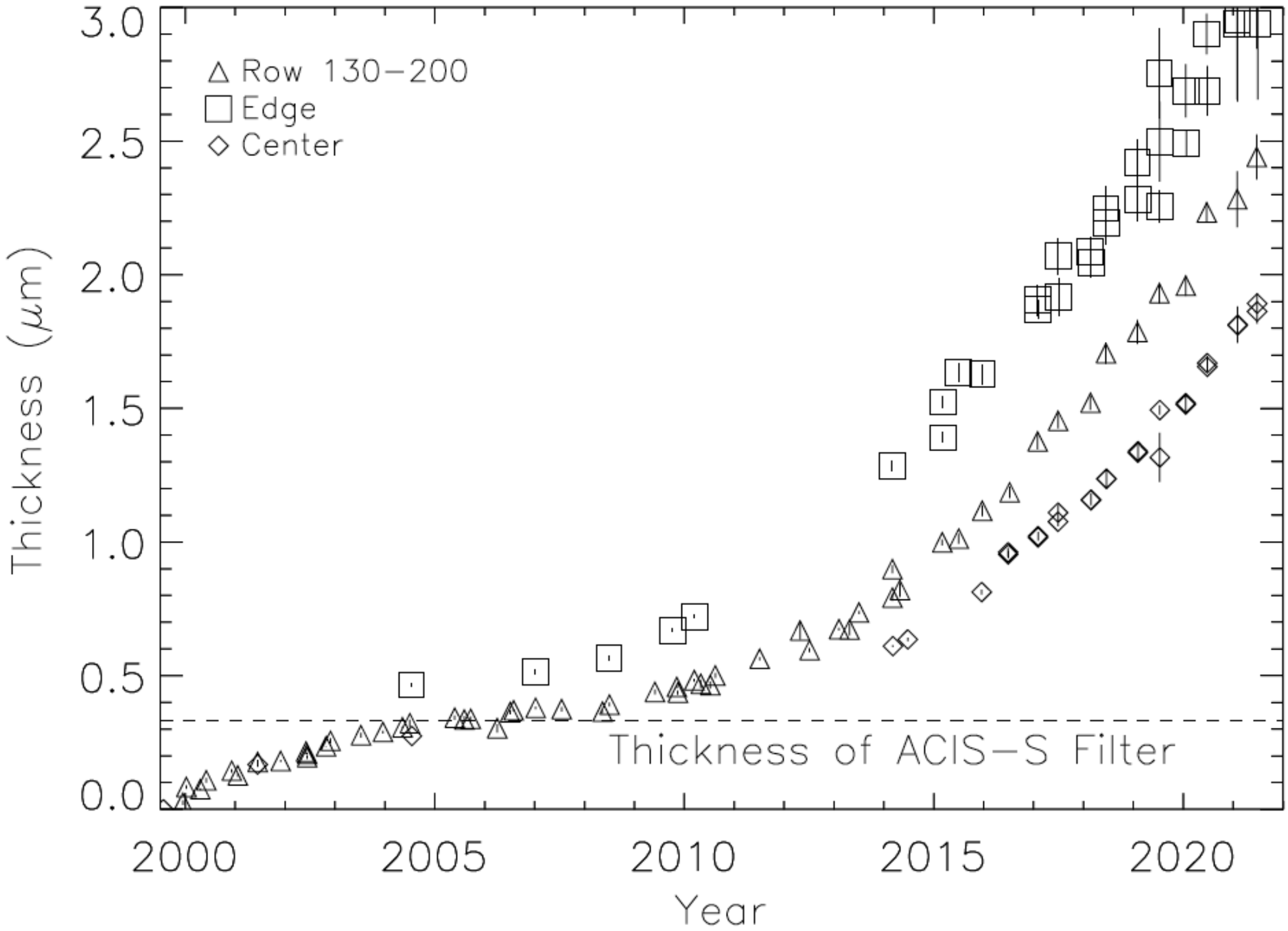
Chandra ACIS-S



Chandra ACIS-S

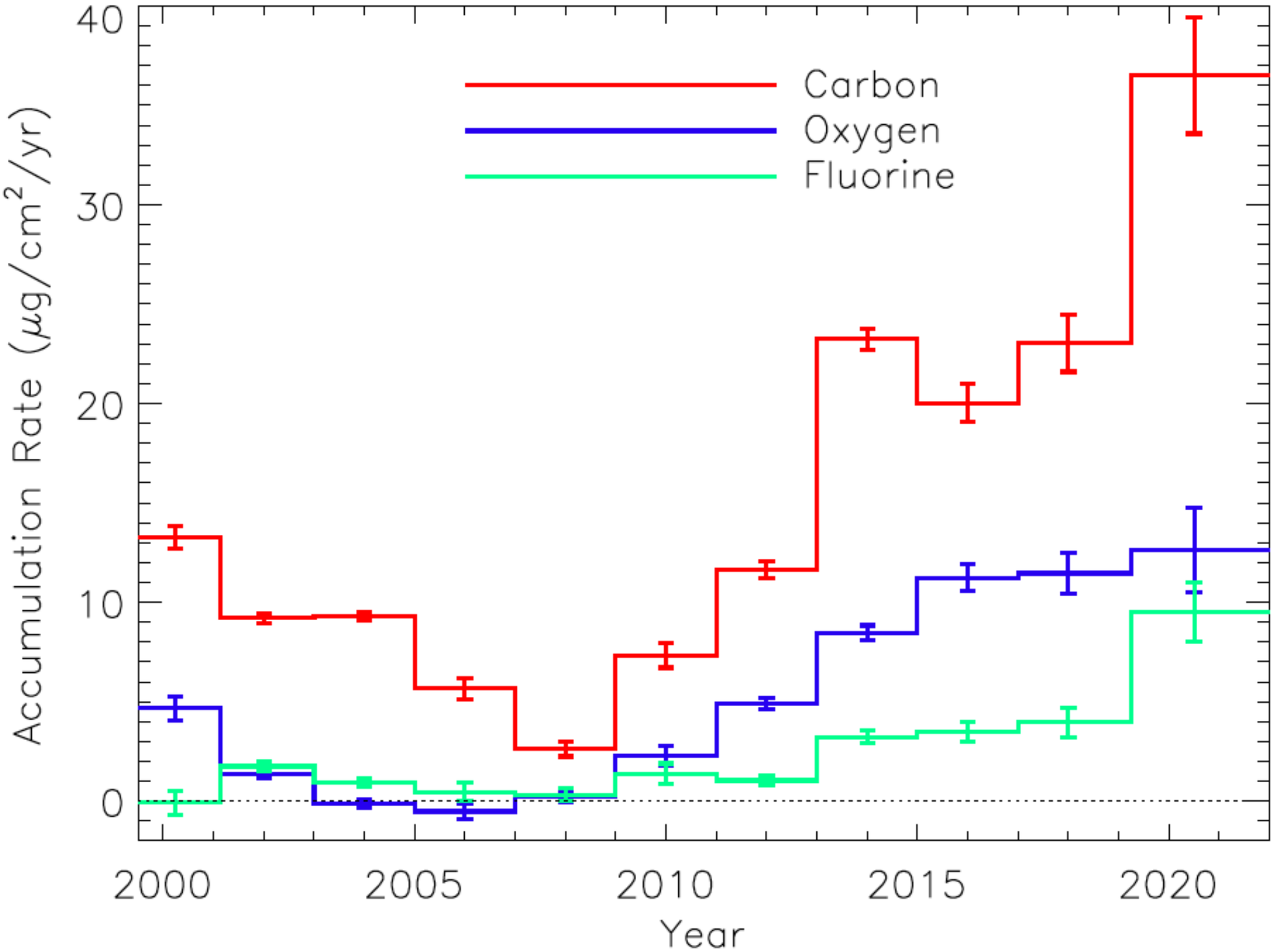


ACIS Contamination

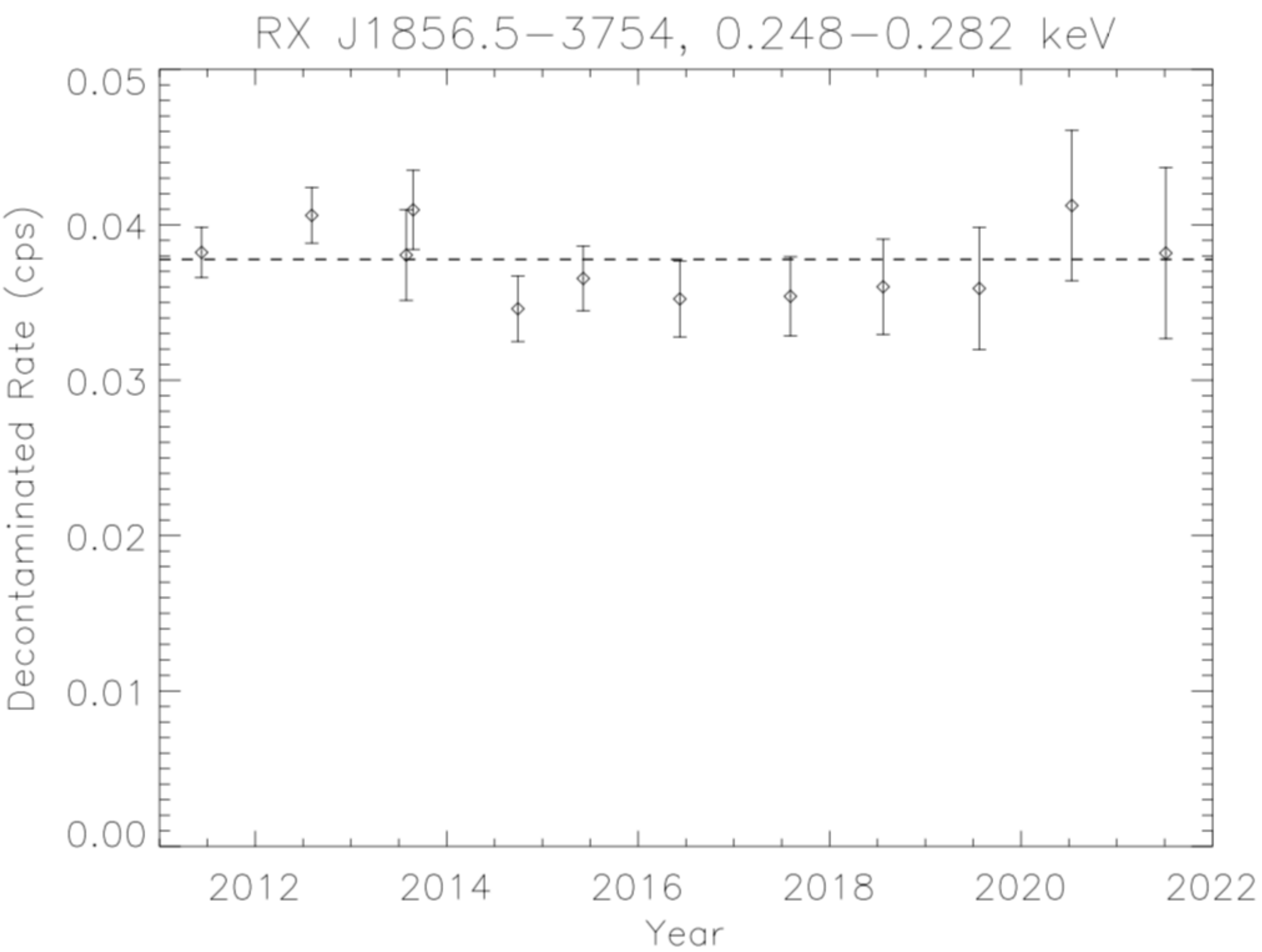


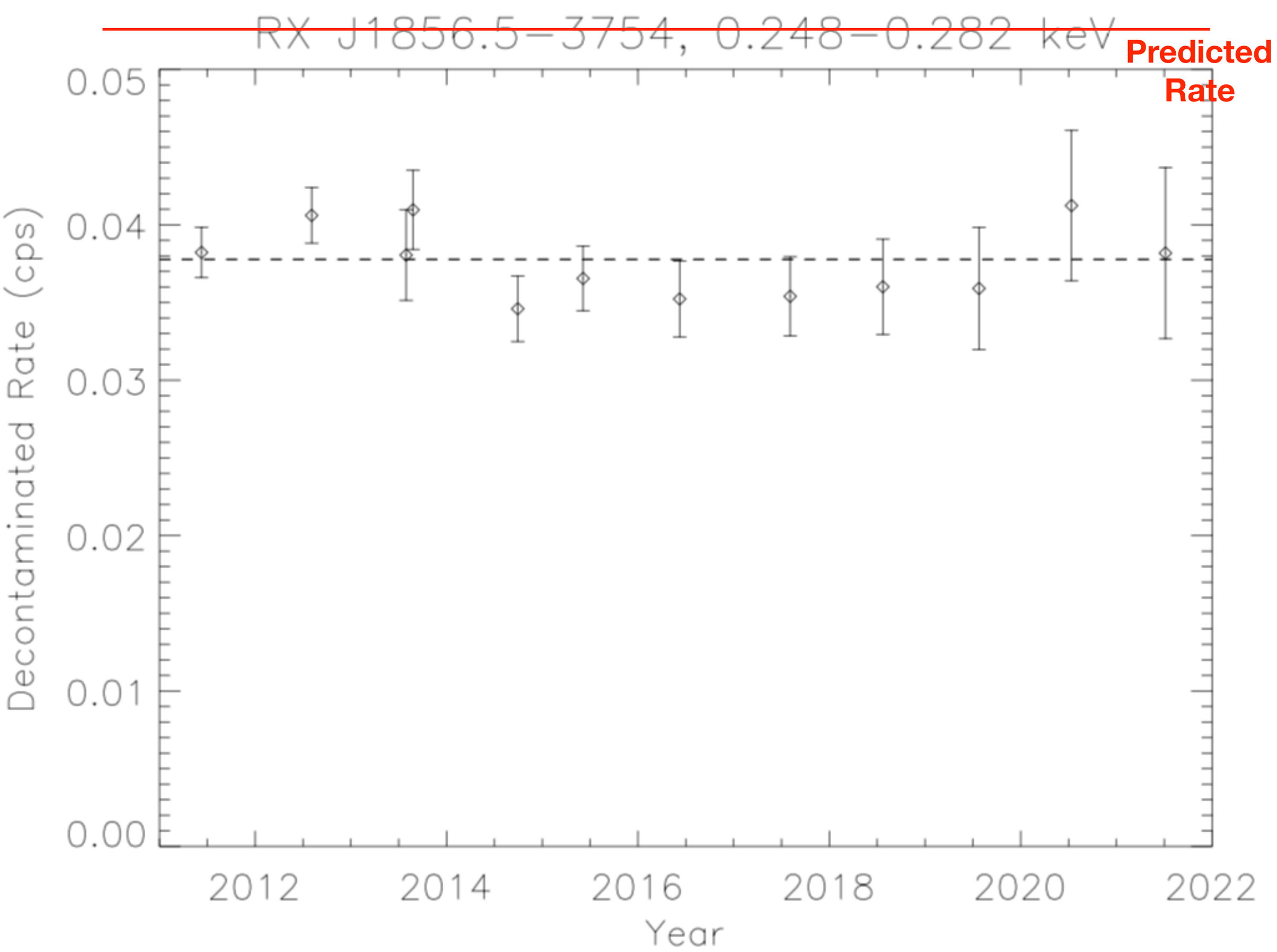
ACIS contamination: x10 thicker than on MOS or RGS

ACIS Contamination



Known composition — but unknown origin


RX J1856.5−3754, 0.248−0.282 keV
Decontaminated Rate (cps)
0.05
0.04
0.03
0.02
0.01
0.00
2012
2014
2016
2018
2020
2022
Year

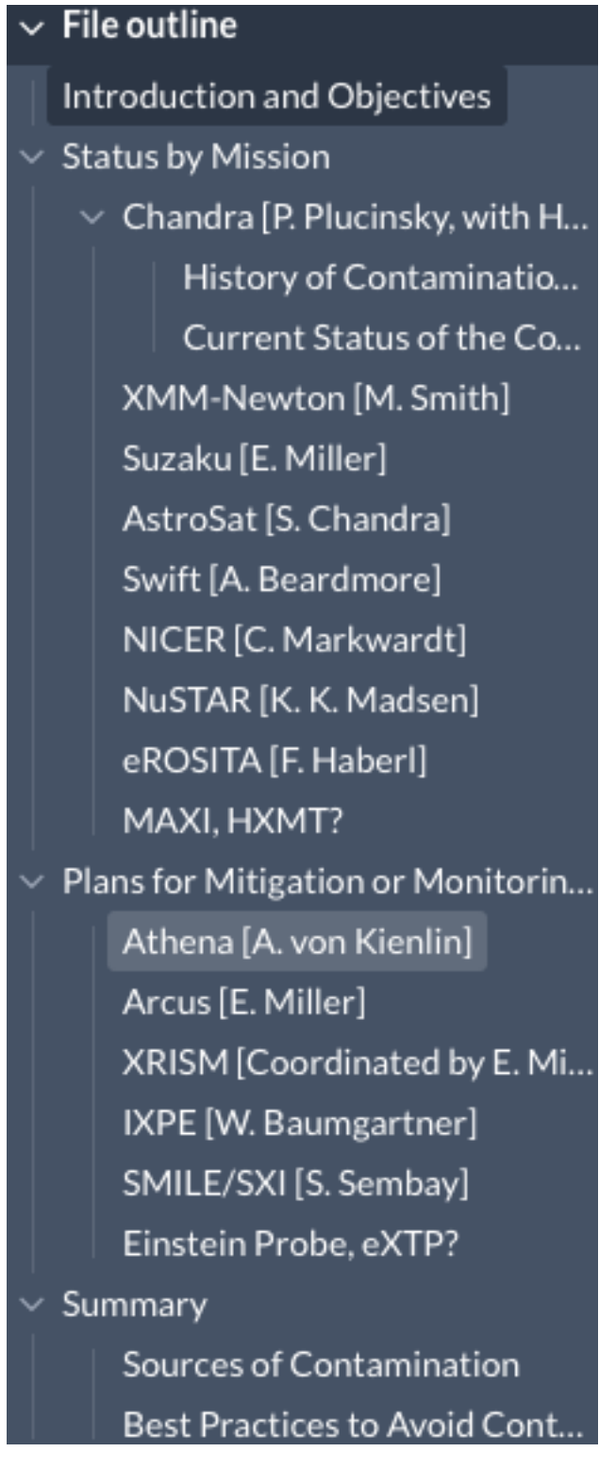

RX J1856.5−3754, 0.248−0.282 keV
Predicted Rate
Decontaminated Rate (cps)
0.05
0.04
0.03
0.02
0.01
0.00
2012
2014
2016
2018
2020
2022
Year

Summary (Chandra ACIS)

- Contaminant deposition rate continues
  - Composition changed after 2010
  - Origin is still unidentified
- Model seems sufficient for another 6 mon
  - No new contaminant model this year
- Al-K from ECS matches Big Dither & model
- RX J1856
  - model gives stable corrected count rate
  - flux is low of prediction by 30% (PHA losses?)

White Paper Plan

- Develop on overleaf, link to edit was distributed
- Review progress monthly
- Target completion by next IACHEC Plenary (May 2022)
- Initiate as white paper, decide on journal later



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Contamination on Detectors in X-ray Telescopes

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Submitted to A Very Good Journal

ABSTRACT

We describe efforts to avoid or eliminate the buildup of molecular contamination on the sensors of X-ray astronomy telescopes. In cases where contamination has been found, we provide an overview of the nature of the contaminant and the methods of characterizing and monitoring the buildup.

Keywords: Astronomical methods, X-ray astronomy, Calibration