Status of the ACIS Bakeout

CXC SOT & FOT, ACIS Instrument Team and MSFC Project Science

Contributors to the Bakeout Effort

The``ACIS Contamination Working Group'' has been studying the ACIS contamination issue for the last two years. This presentation is a summary of that work. Those contributing directly to this presentation:

CXC: P. Plucinsky, A. Vikhilin, H. Marshall, N. Schulz, R. Edgar, D. Schwartz, S. Wolk, H. Tananbaum, J. DePasquale, S. Virani, D. Dewey, L. David

MIT: M. Bautz, C. Grant, W. Mayer, R. Goeke, P. Ford, B. LaMarr, G Prigozhin, S. Kissel, E. Boughan

PSU: G. Garmire, L. Townsley, G. Chartas, D. Sanwal, M. Teter, G. Pavlov

MSFC: S. O'Dell, D. Swartz, M. Weisskopf, A. Tennant, R. Elsner

NGST: M. Mach, P. Knollenberg, D. Shropshire, L. McKendrick, R. Logan, R. Giordano, T. Trinh, K. Chen, K. Henderson, F. Cottrell, J. Lamb, D. McGregor, H. Tran, D. Lindemann, L. Harper, L. Ryan, A. Tao

LMA: N. Tice **McMaster University: A. Hitchcock**

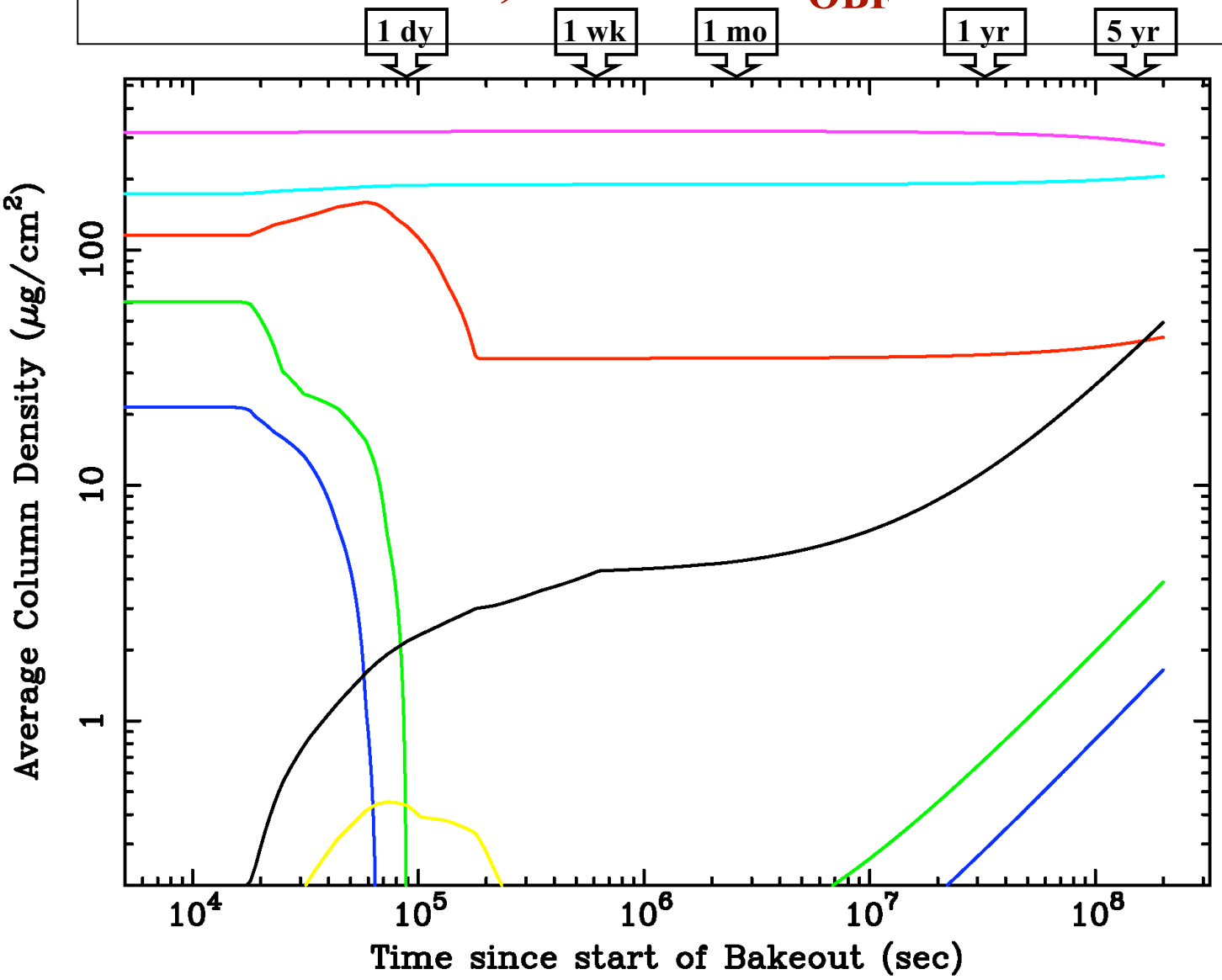
Many others have contributed directly or indirectly.

New Items since Last Cal Workshop Briefing (October 2004)

- **MIT/ACIS team conducted irradiation tests of flight spare CCDs at GSFC in May 2005. MIT/ACIS concluded that the CTI increase from another +30 C Bakeout would *most likely* be smaller than previously believed, ~5%.**
- **MSFC Project Science continued to explore the sensitivity of the simulation results to the parameters (ie: temperatures of the relevant surfaces, volatility of the contaminant, etc.)**
- **The ACIS contamination working group reviewed the new results in summer 05 and decided on July 15, 2005 against recommending a Bakeout. The team felt that the uncertainties were too large to be able to predict the outcome of the Bakeout with any confidence.**
- **The Bakeout is therefore postponed indefinitely.**

Chandra X-Ray Observatory

Docosane, nominal T_{OBF}: Mass column



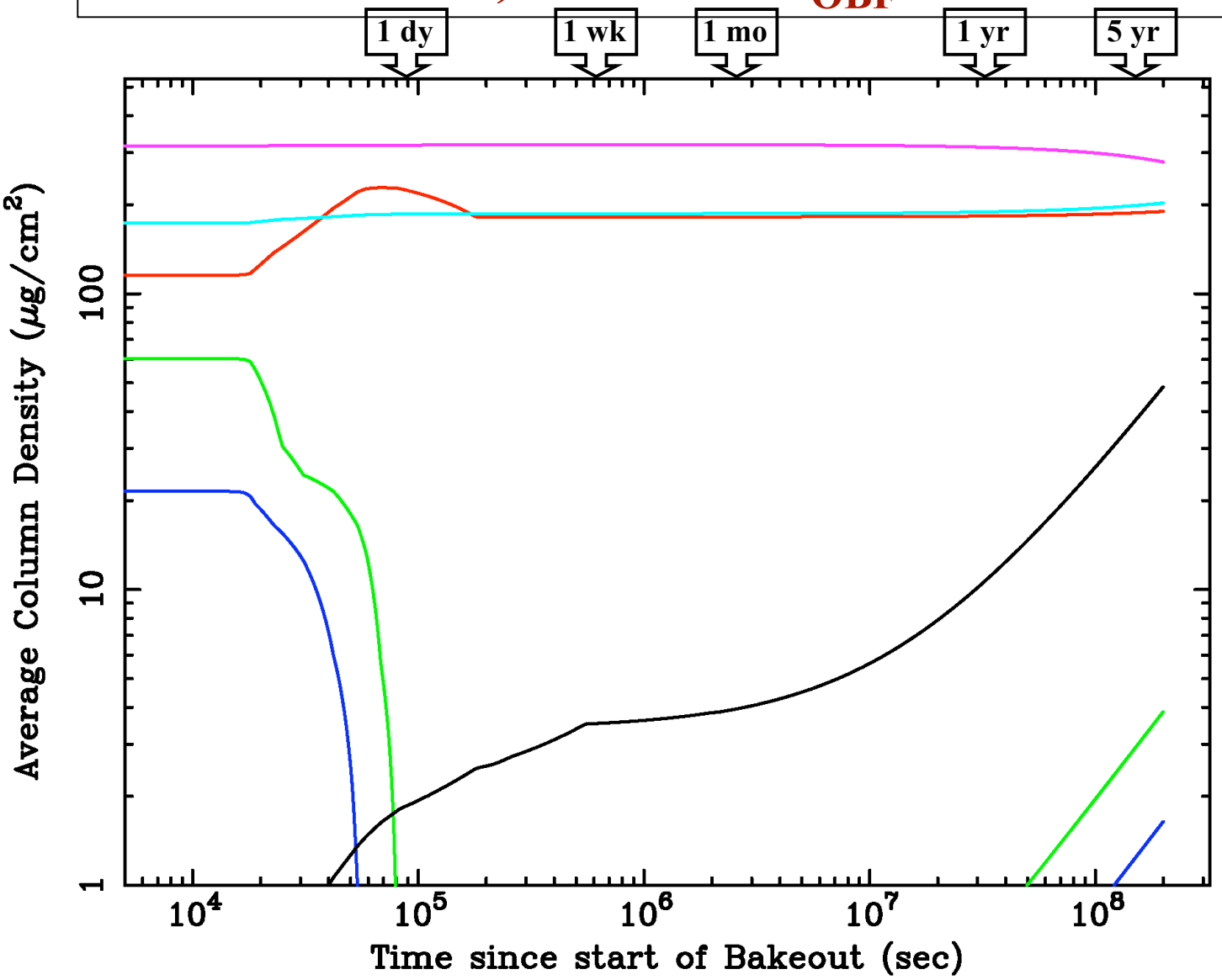
O'Dell & Swartz (MSFC)

$\varepsilon = 0.30$

1: ACIS OBF
2: Camera top
3: ACIS snoot
4: ACIS collimator
5: SIM trans table
6: SIM focus struc
7: OBA stove pipe
8: Optical bench
9: OBA vent

Chandra X-Ray Observatory

Docosane, de-rated T_{OBF}: Mass column



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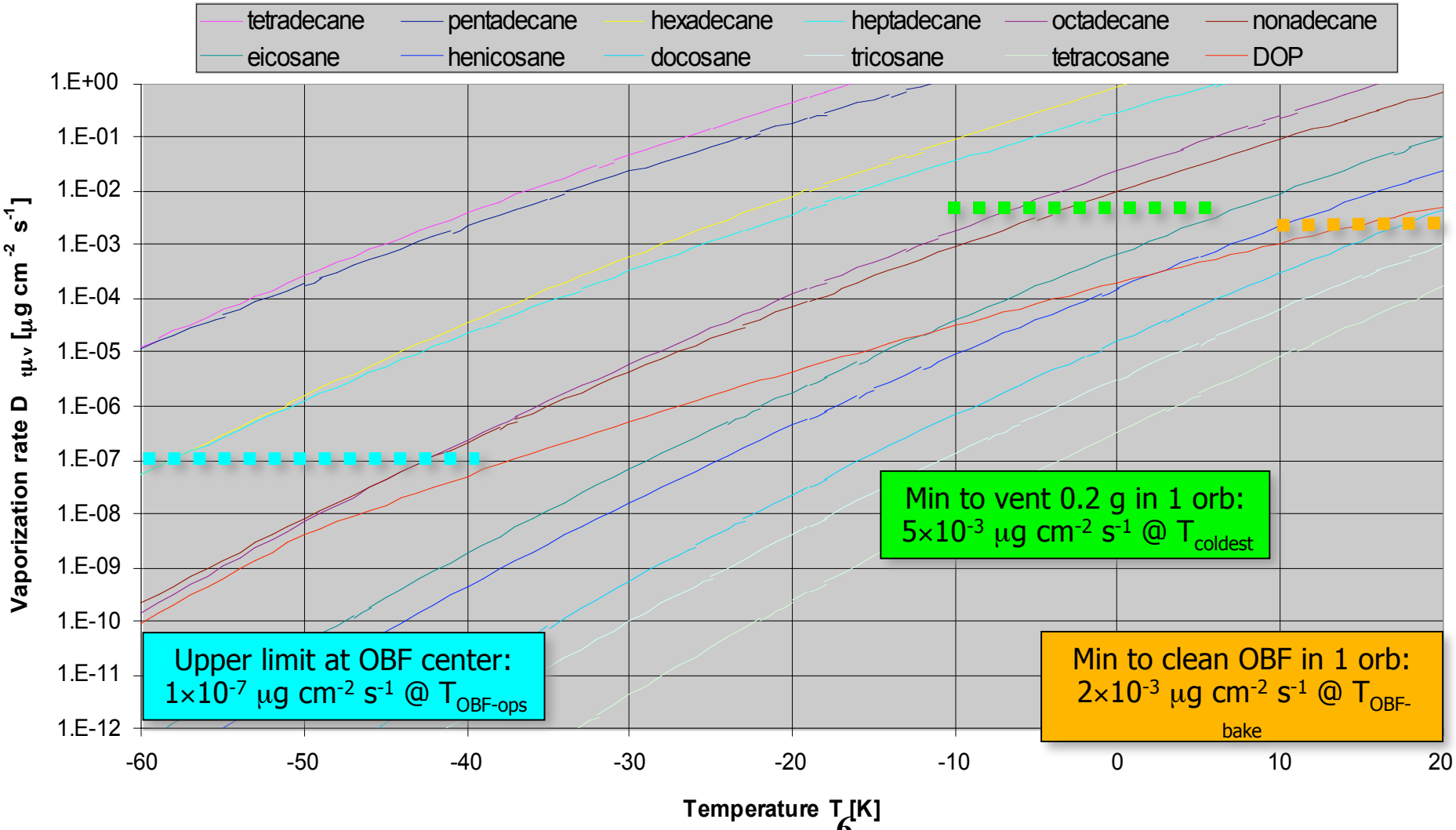
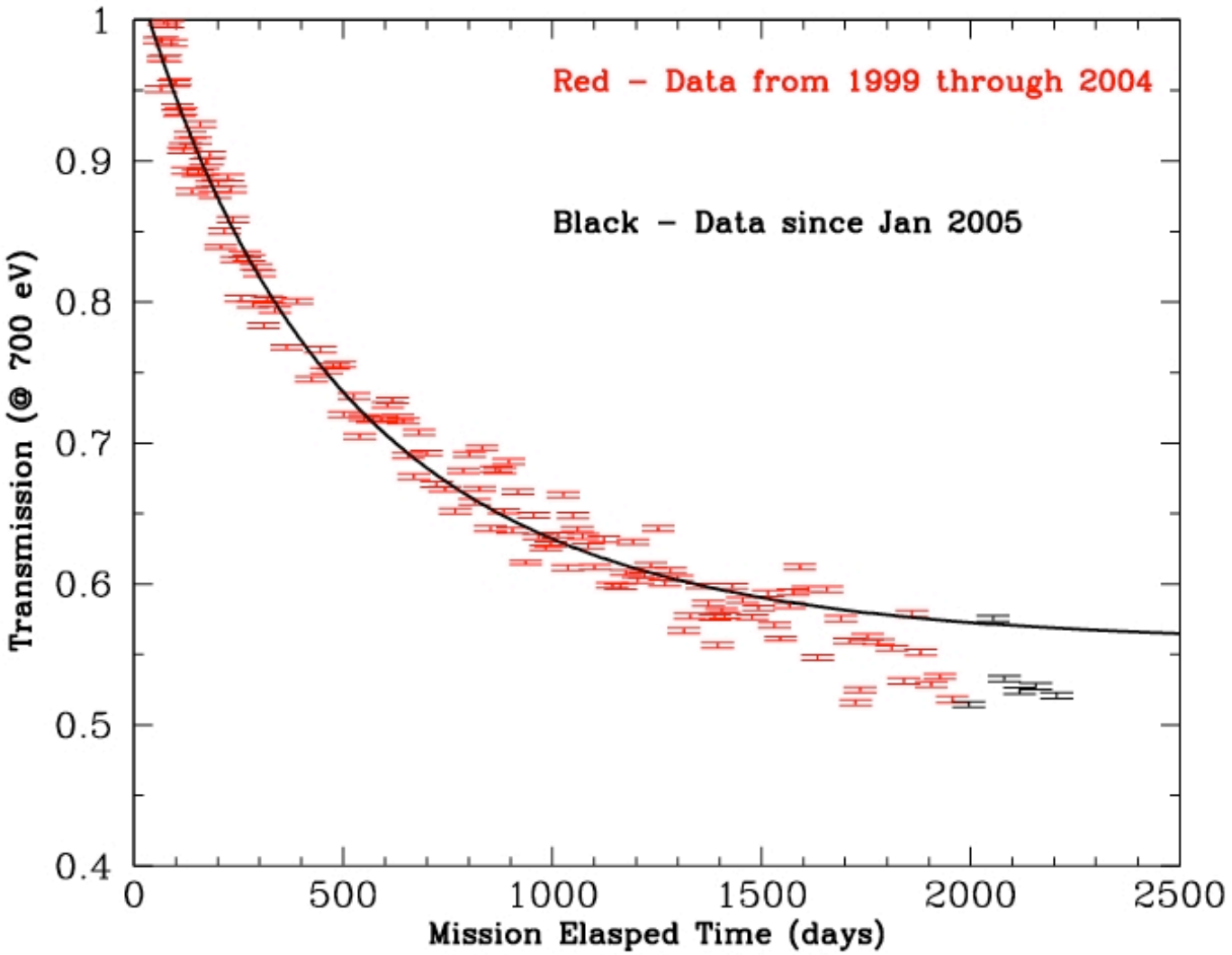
Limits on Vaporization Rates

O'Dell & Swartz (MSFC)

Mass vaporization (evaporation or sublimation) rates of some organic compounds



Monitoring the Contaminant:Transmission @ 700eV



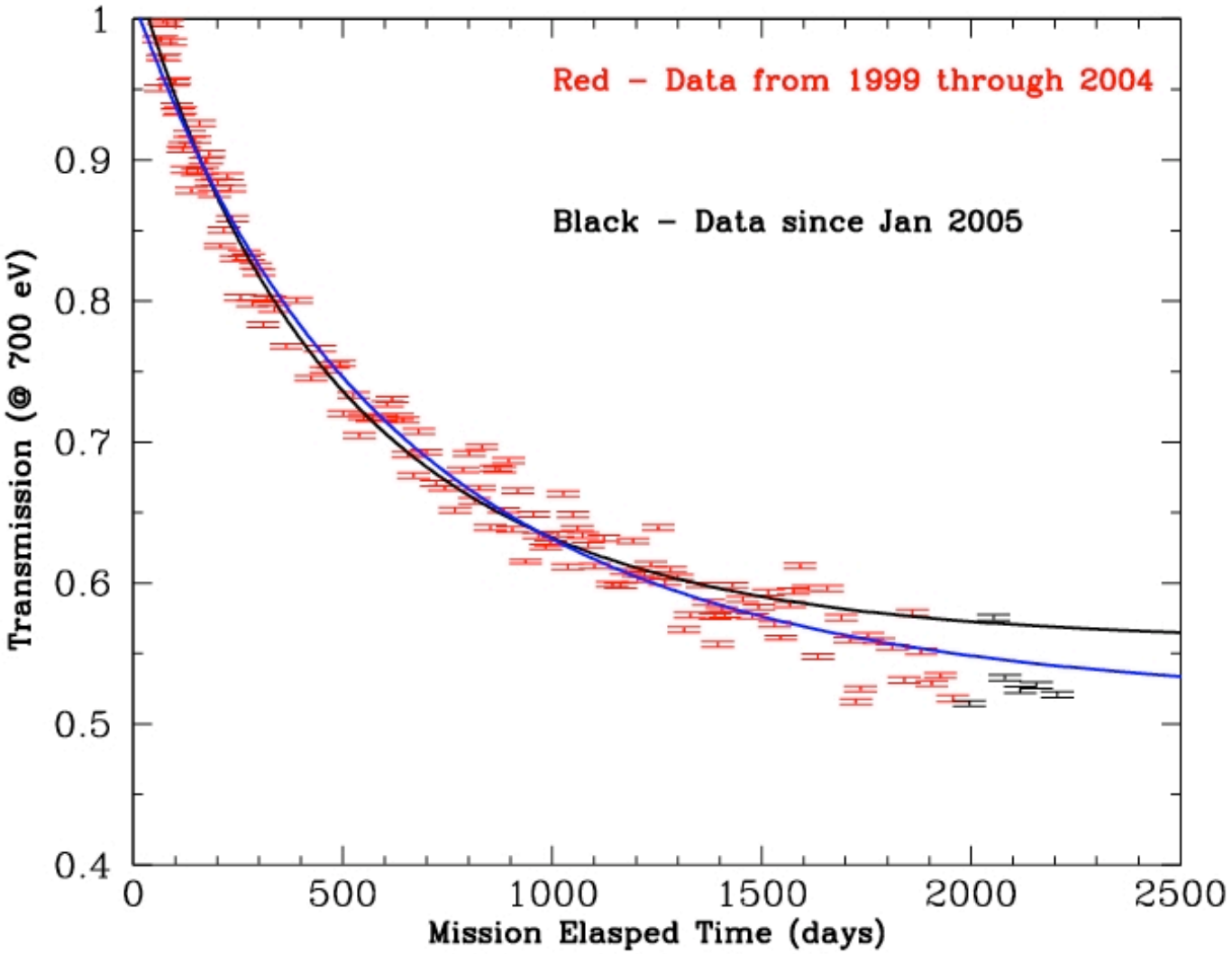
Data

Grant (MIT)

Model 2002

O'Dell & Tennant (MSFC)

Monitoring the Contaminant:Transmission @ 700eV



Data

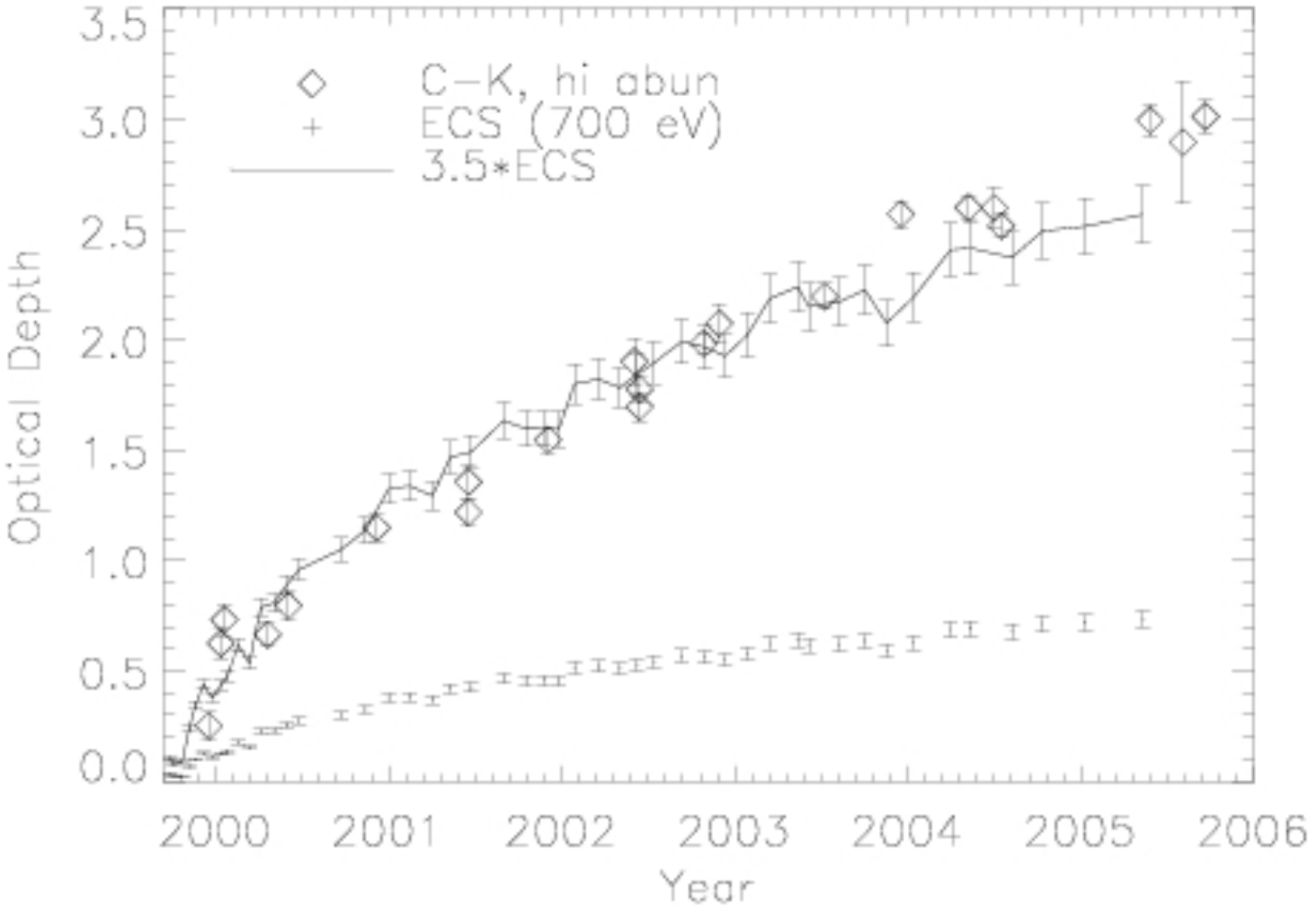
Grant (MIT)

Refit

Model

2005

Monitoring the Contaminant: C-K Optical Depth



Marshall

(MIT)

Summary of Bakeout Effort

- There will not be a Bakeout anytime soon
- We will continue to monitor the contaminant buildup and improve the characterization of the absorption of the contaminant
- MIT/ACIS will analyze CTI measurements at temperatures between -90 C and -120 C to understand the temperature dependence of the CTI better
- Calibration files for the time-dependent and spatial-dependent absorption of the contaminant are available in the CALDB & CIAO, we will continue to assess the accuracy of these corrections and update as necessary