ACIS background

Maxim Markevitch, 2001 June 29

• Temporal behavior:
quiescent rates declined until Sep 2000, now constant

• Blank field quiescent datasets:
done for 3 intervals between Aug 1999 – Sep 2000;
Sep 2000 – June 2001 coming soon
(will include datasets for VF mode)

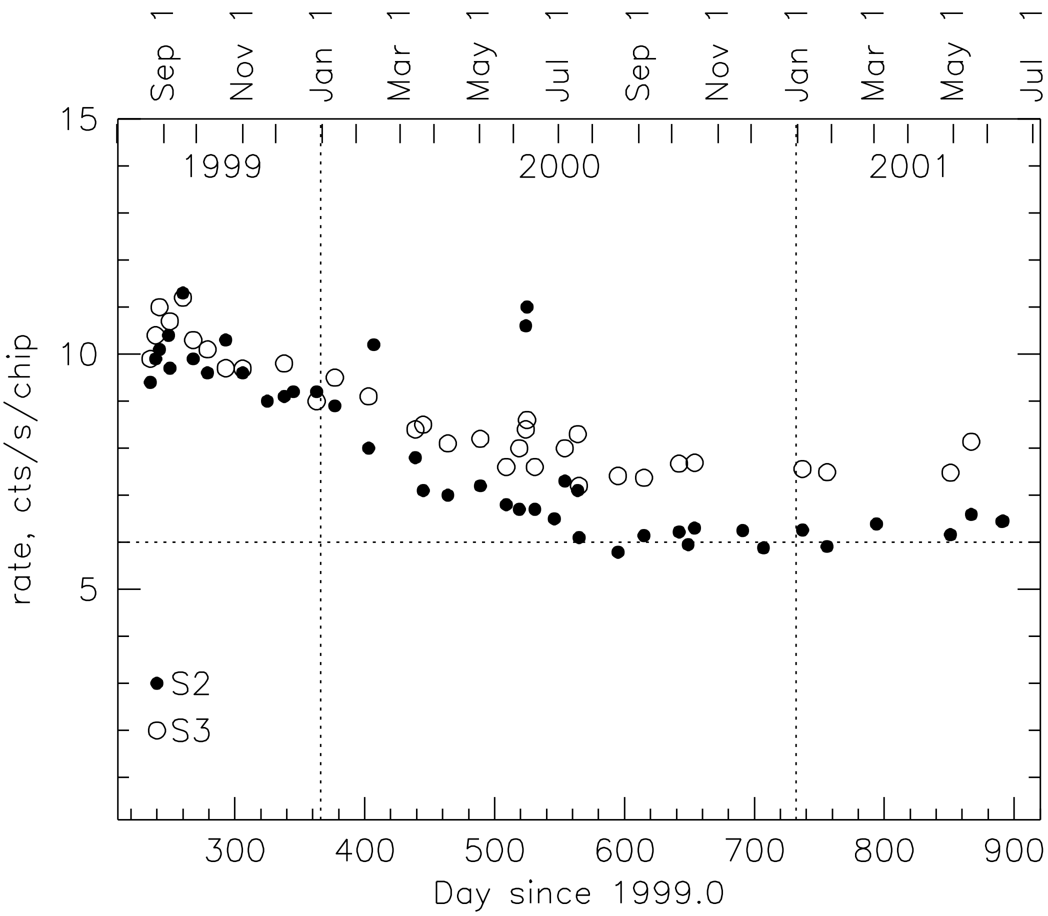
• VF mode improves background rejection
(using Vikhlinin's filter)

• Moderate flares in FI chips, not obvious from the lightcurve, can pose significant analysis problems

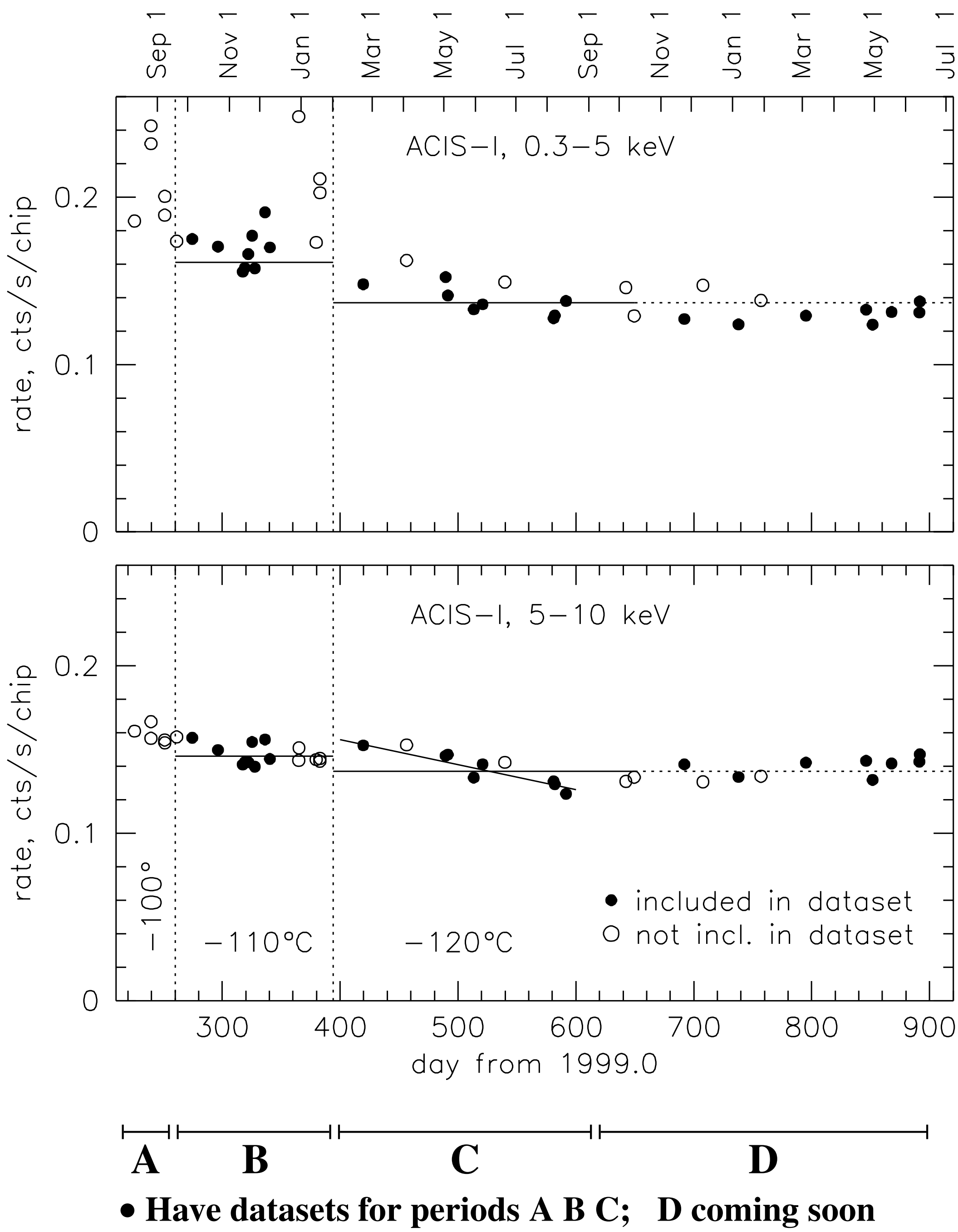
• Will observe dark Moon in July – Oct 2001 (100 ks) to separate soft particle and sky components

See asc.harvard.edu/cal , "ACIS", "ACIS Background" and links therein

Total quiescent rate (all grades, energies)



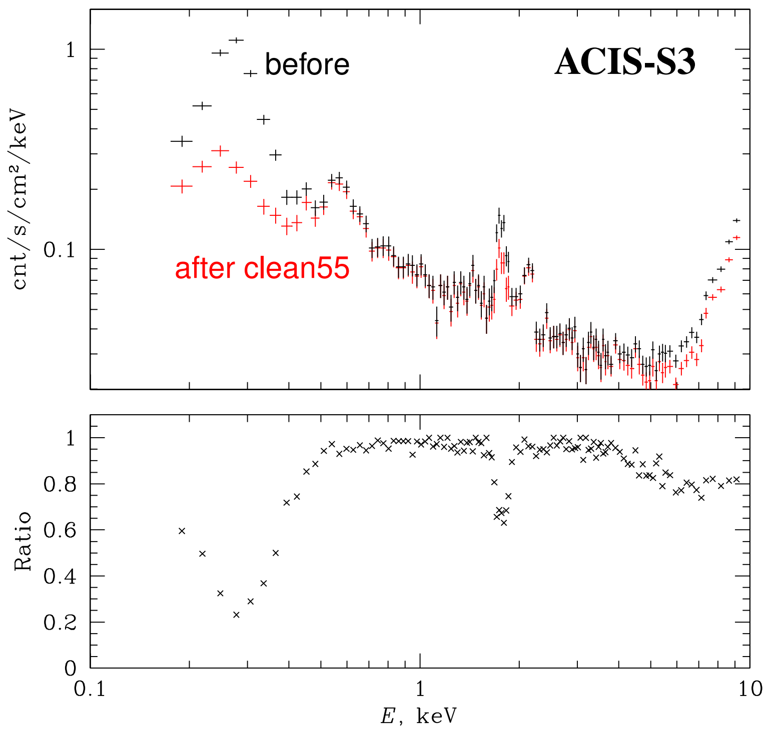
Cleaned quiescent rates (good grades)

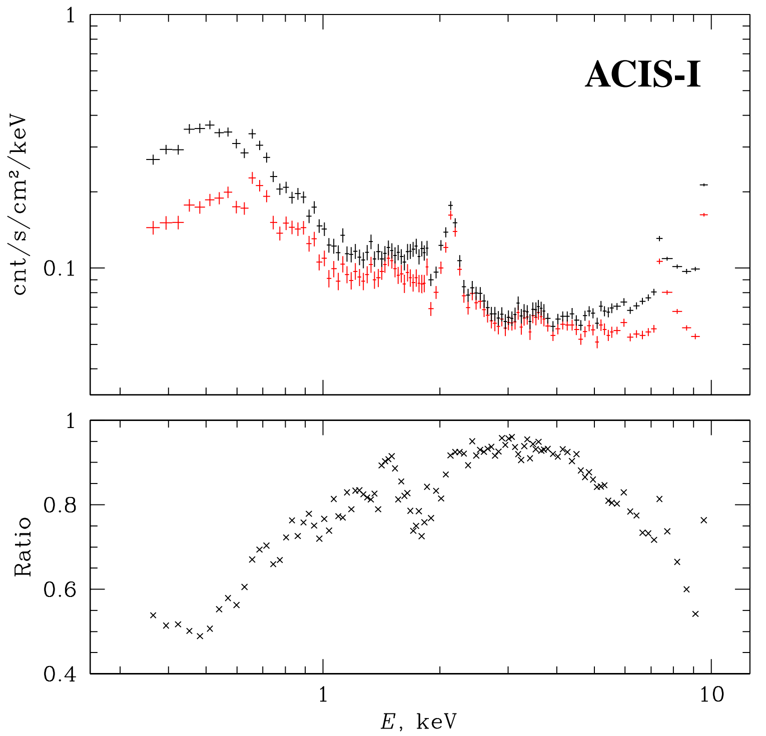


• **Have datasets for periods A B C; D coming soon**

Improved background rejection in VF mode

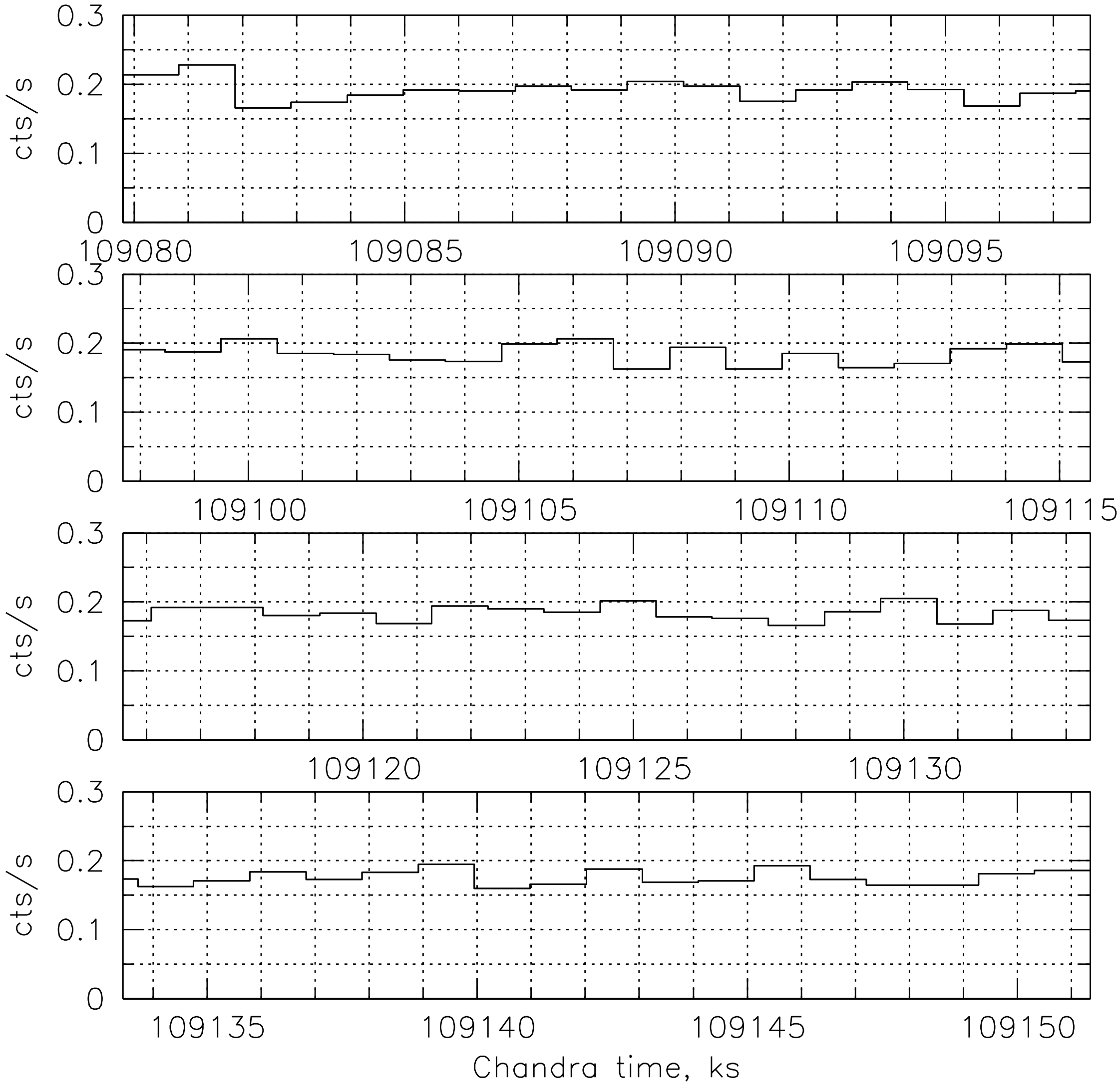
A. Vikhinin's filter clean55: hea–www.harvard.edu/~alexey/vf_bg





- **Use VF mode whenever possible**

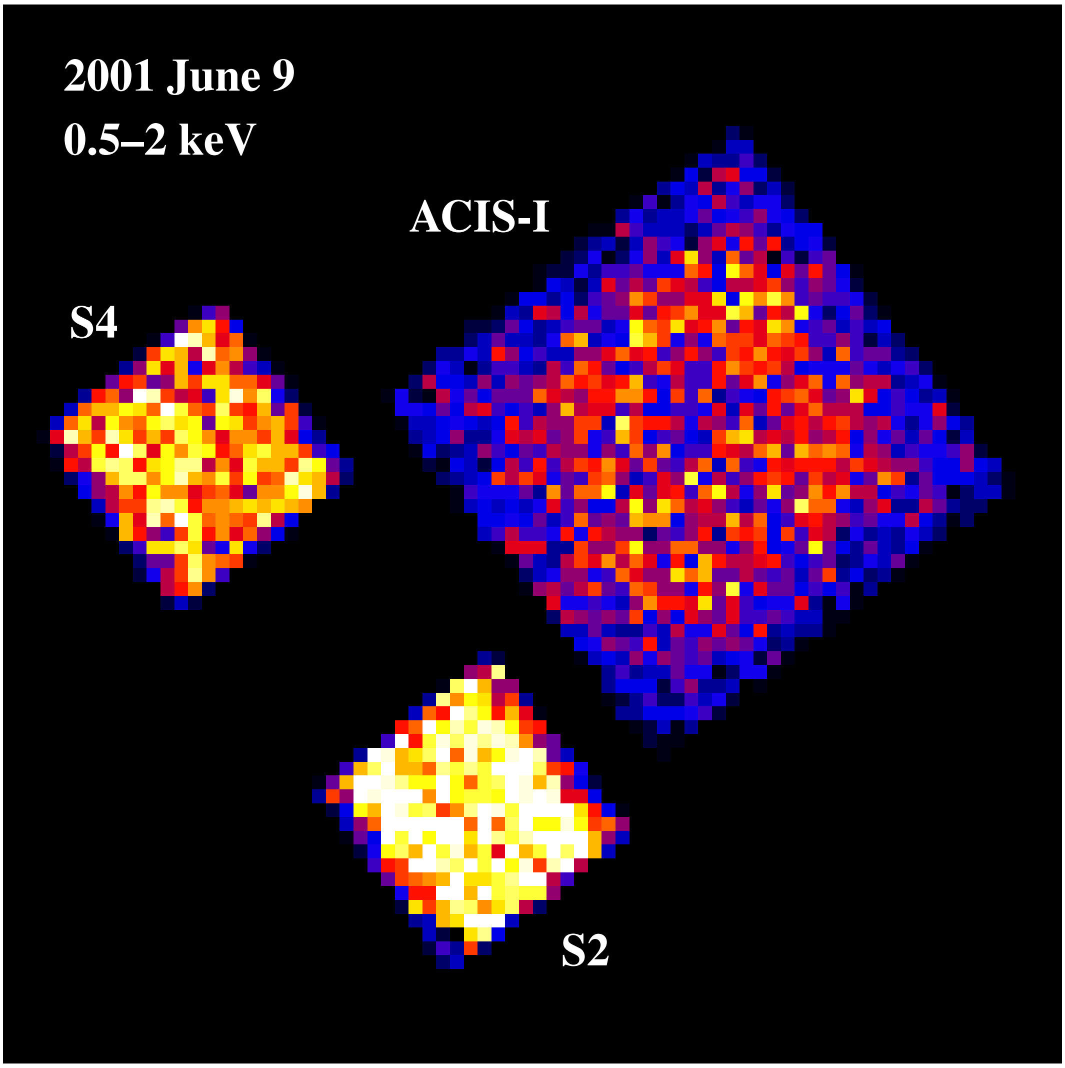
A moderate non-obvious flare in FI (5–10 keV, S2)



1.3× the nominal rate

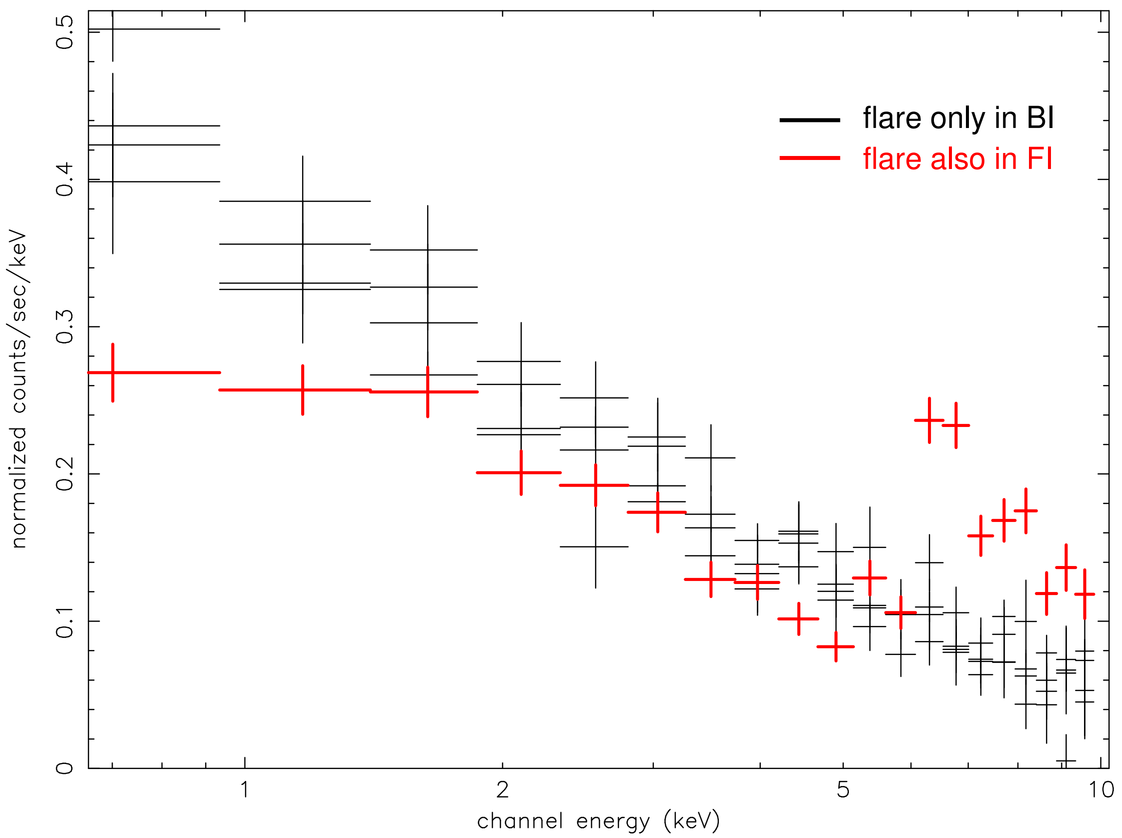
- **Compare your "quiescent" rates with the nominal rates to identify such cases**

Spatial distribution of flare brightness in FI chips



- **Cannot use chip S2 to model flare background in ACIS-I**

Spectra of flares in chip S3



- **Most flares in S3 have similar spectra, but some are very different**

Plate scale

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Done — the upcoming CALDB release will have the correct geometry file.

- **ACIS physical pixel size is corrected**

- **Star cluster data from ACIS and HRC were used to derive in-orbit mirror focal length, consistent among all detectors and simulations:**

10070 ± 3 mm (was 10062 mm)

After reprocessing with the new geometry file, photons will move, but sky pixel sizes (0.492″ for ACIS and 0.1318″ for HRC) will not change.

- **Chip and plate positions and rotations are corrected**

Resulting coordinate accuracy:

Errors are < 1″ in areas normally used for astrometry

- **1″ errors in ACIS chips S0, S1 (compared to 10–20″ PSF radius)**

- **1–2″ errors in ACIS-I chips when ACIS-S is in aimpoint and vice versa**