

Preliminary comparison of (Internal) Event Driven and (External) Space Weather Driven Background Approaches

Details:

- The event-driven approach uses Ron Remillard's "3C50_RGv5" background library. The background is derived by matching library entries with observed event rates in (1) the off-band (15-17 keV; IBG), (2) a region in PI-PI_RATIO space selected to capture the non-focused background (HREJ), (3) the slow chain noise band (<0.2 keV; NZ).

In my implementation the matching is done on 120s intervals, and then an exposure-weighted sum of library spectra computed.

- The space-weather-driven approach uses Mike Corcoran's implementation of Keith Gendreau's procedure ("mkfwork"). The background is derived by matching library entries with values derived from a KP-enhanced mkf file for a specified GTI (that may correspond a given event file) of (1) KP NOAA space weather index, (2) COR_SAX, and (3) SUN_ANGLE.

In my implementation, the mkfwork script is applied "as-is" except for adding a wrapper to create a standard fits spectrum from the output table.

- Both libraries are derived from the RXTE BKGD fields.
- The mkfwork approach corrects for deadtime, the 3C50_RGv5 does not.

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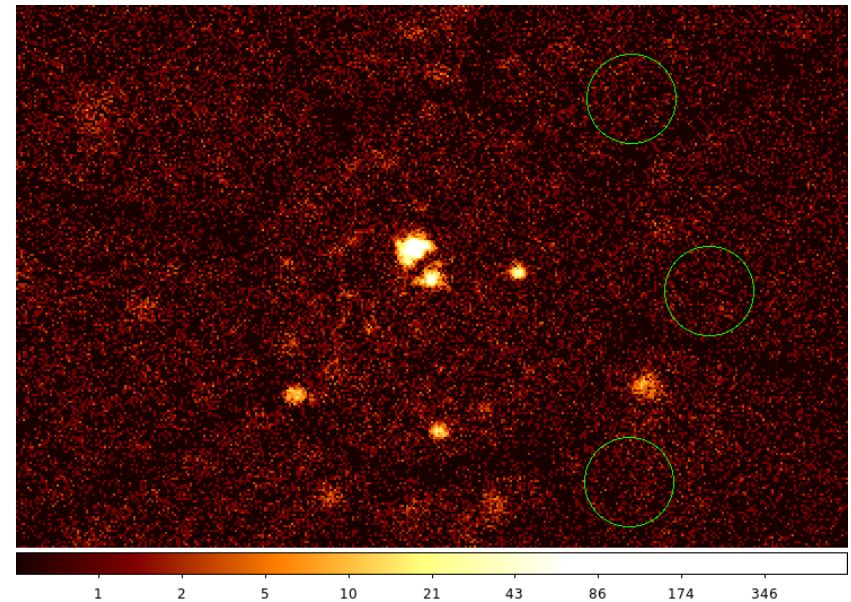
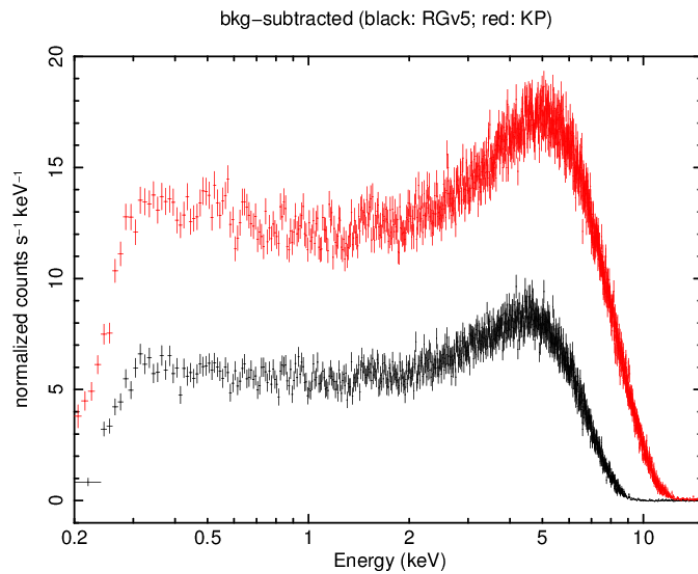
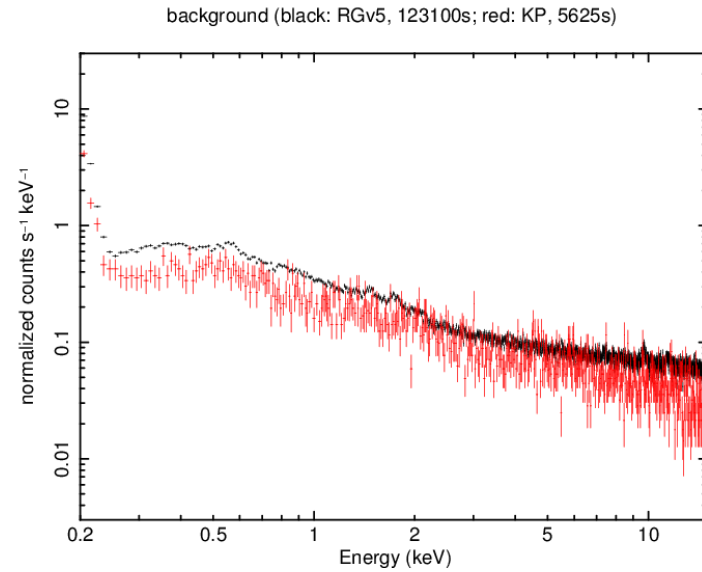
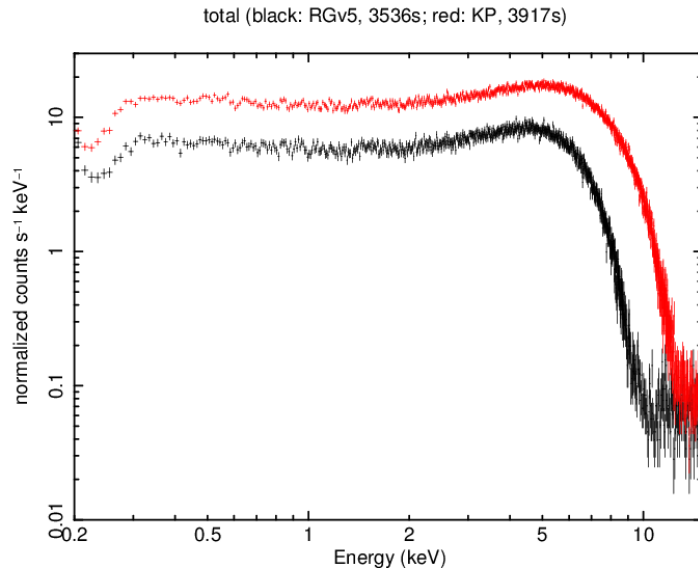
Details:

In the following, keep in mind that

- (1) In this document I use “source” spectrum to refer to the total spectrum extracted from the cleaned event file.
- (2) The source spectra in my implementation of 3C50_RGv5 are derived from event files additionally screened for times when IBG or HREJ fall outside of the library. Only the standard screening is applied to the mkfwork source spectra. In both cases I am omitting detectors 14 and 34.
- (3) The 3C50_RGv5 model imposes a “soft landing” by re-scaling the spectra to the ratio of IBG in the source to IBG in the library background (only the shapes of the library spectra are used). There is no renormalization in the mkfwork procedure.
- (4) The mkfwork procedure includes interpolation, my 3C50_RGv5 procedure does not.

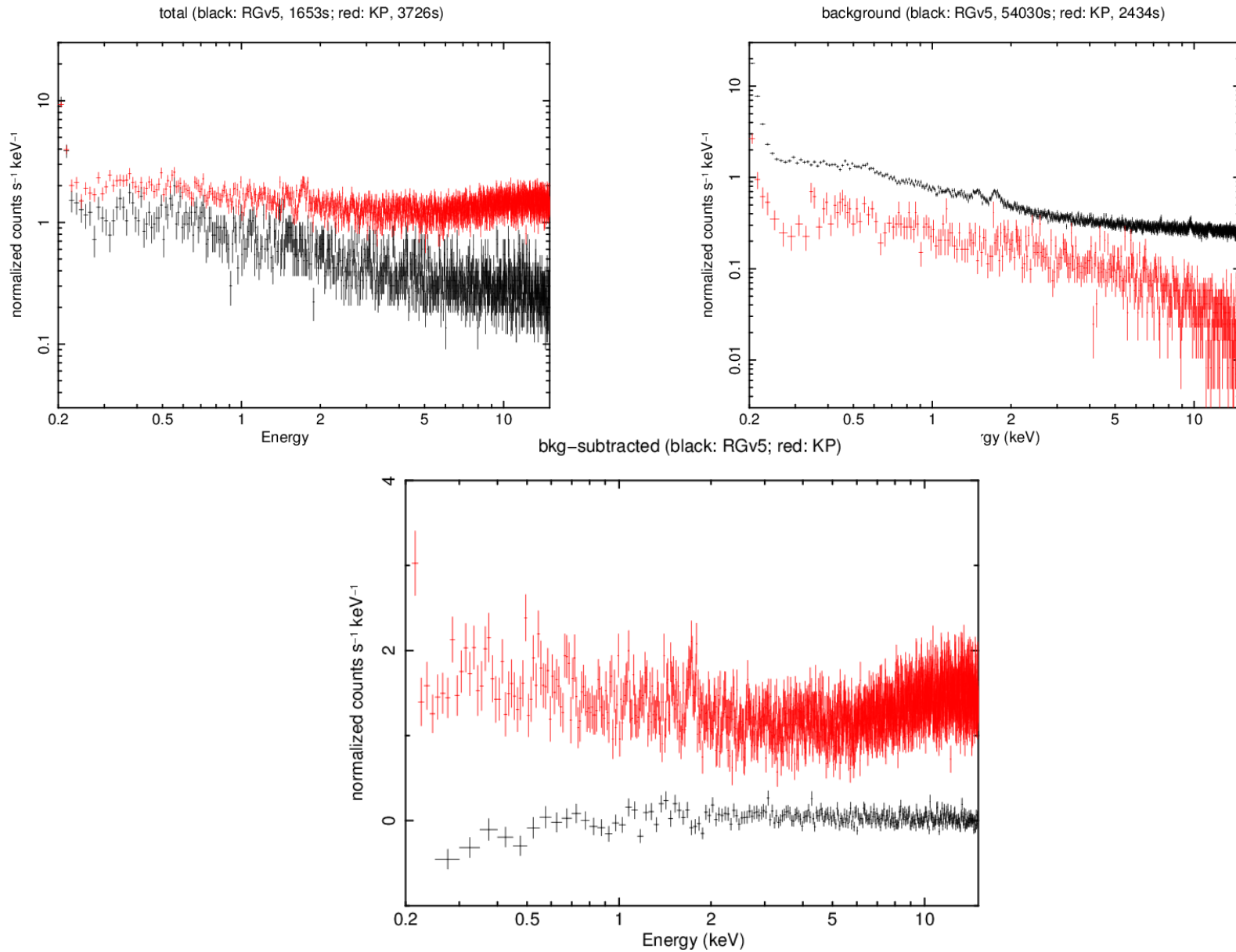
J0437_bkring_3

sequences where source spectra are different: obsid = 1060130104



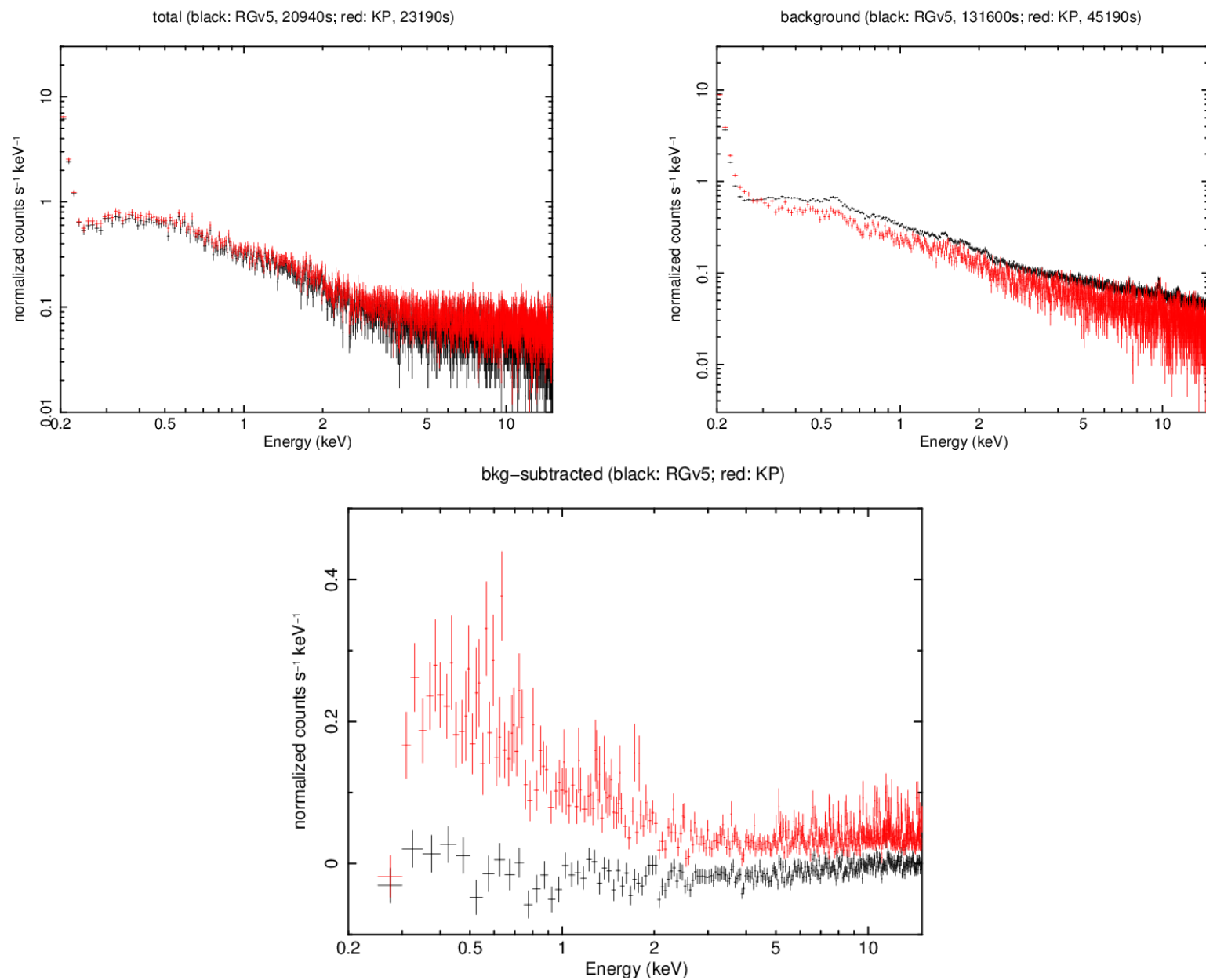
J0437_bkring_3

sequences where source spectra are different: obsid = 1060130110



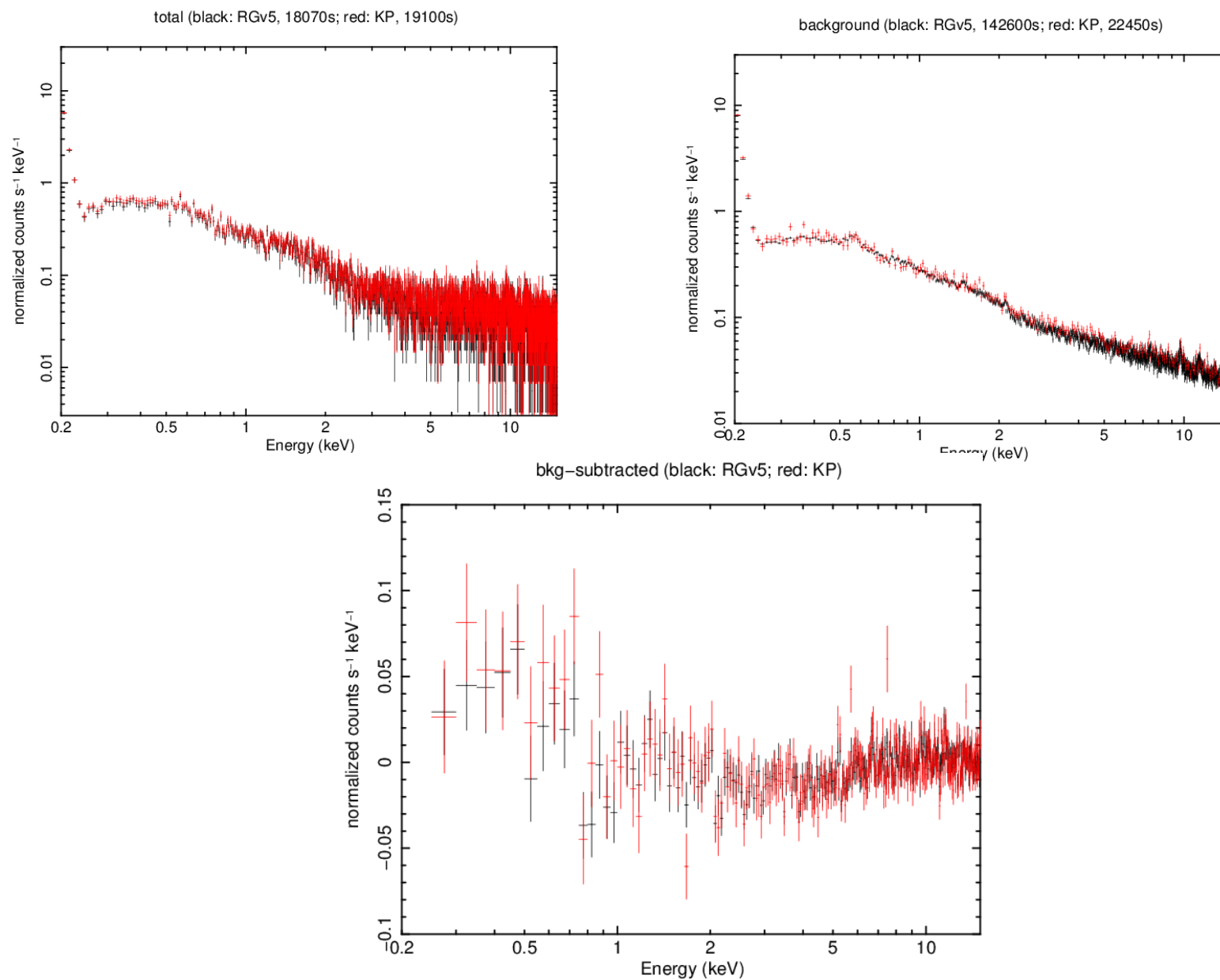
J0437_bkring_3

sequences where source spectra are similar: obsid = 1060130101-103, 105-108, 111-112



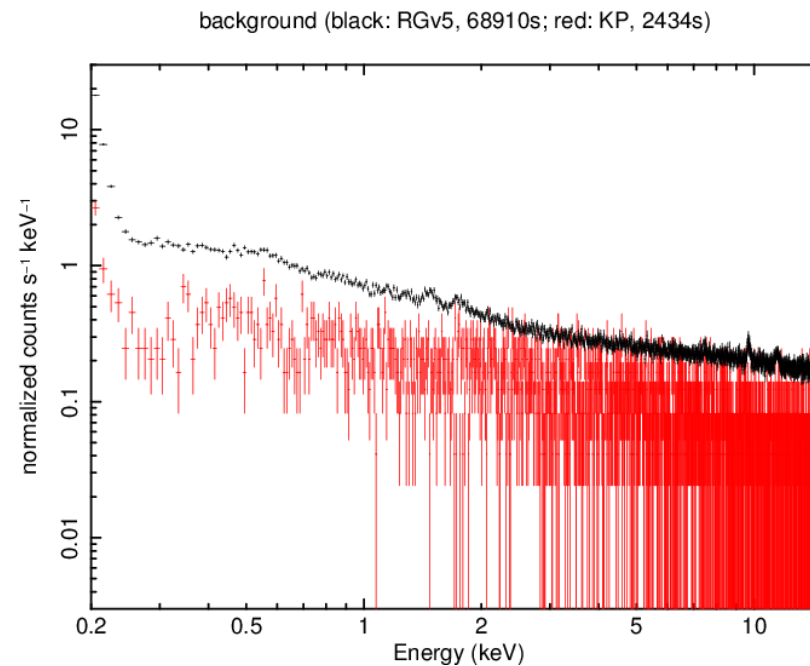
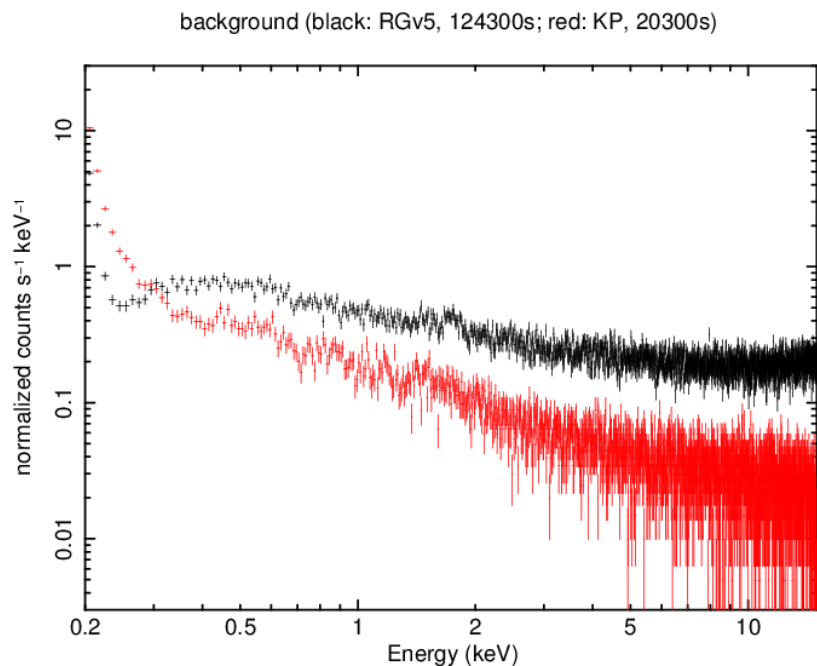
J0437_bkring_3

sequences where src and bkg spectra are similar: obsid = 1060130101-103, 106-108, 112



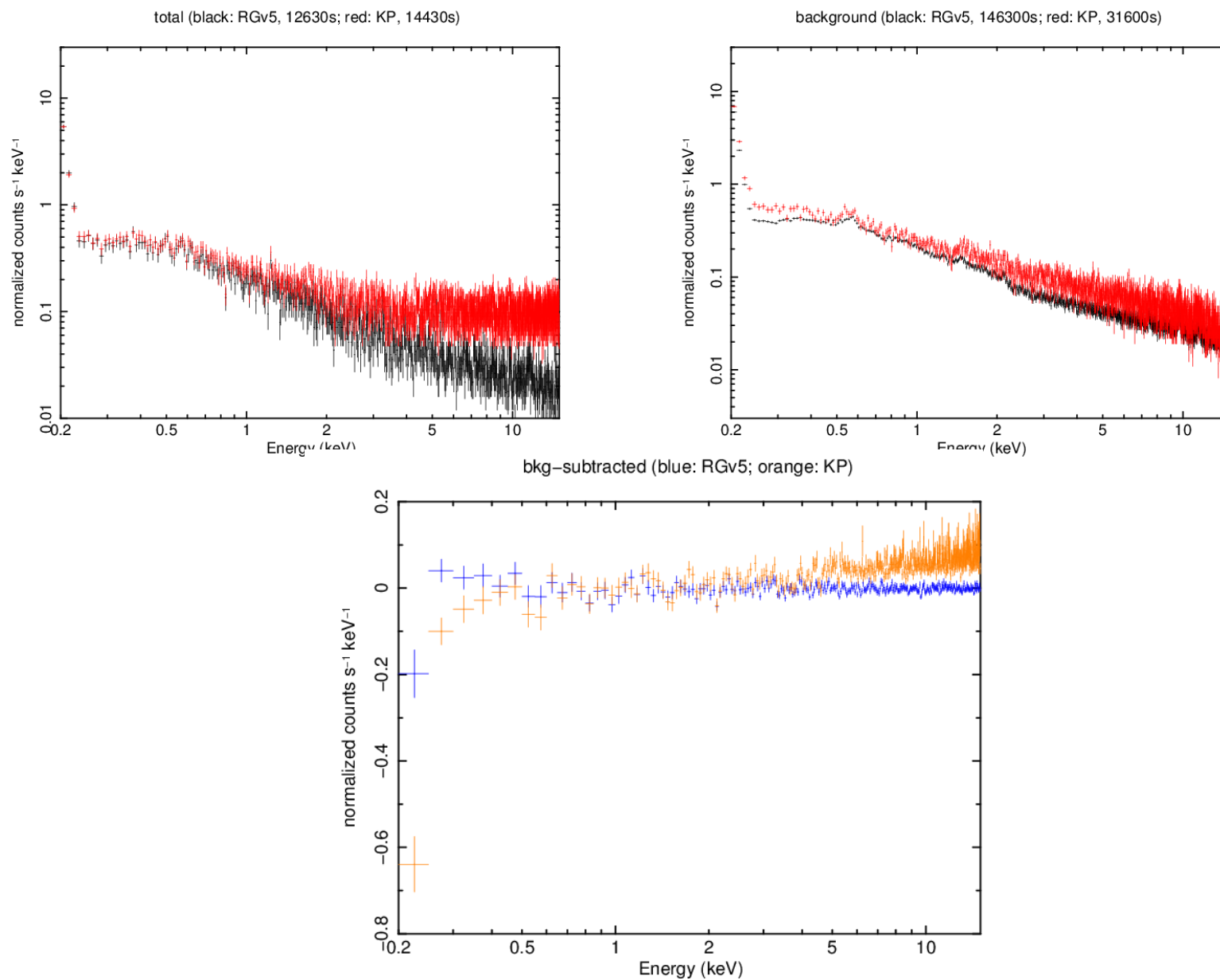
J0437_bkring_3

sequences where bkg spectra are different (but src similar): obsid = 1060130105, 111



J0437_bkring_5

all sequences where bkg spectra are obtained: obsid = 1060150101-105, 107, 109-111



Next Steps

(1) Do J0437_bkring_4 and J0030_bkring0-7.

Done, but not organized.

Generally better agreement than for J0437 (see next slides).

(2) Deeper look at space weather procedure

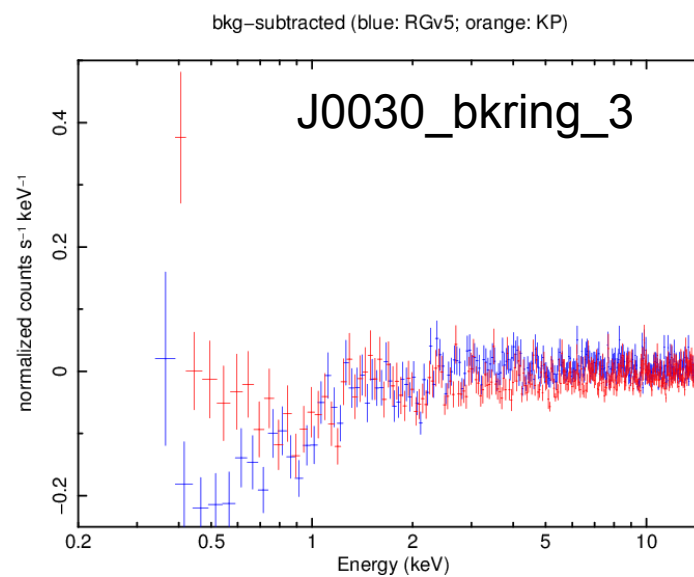
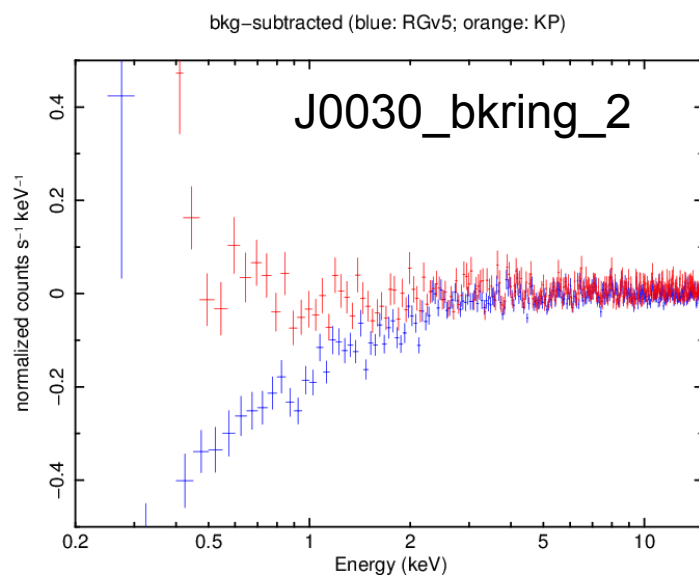
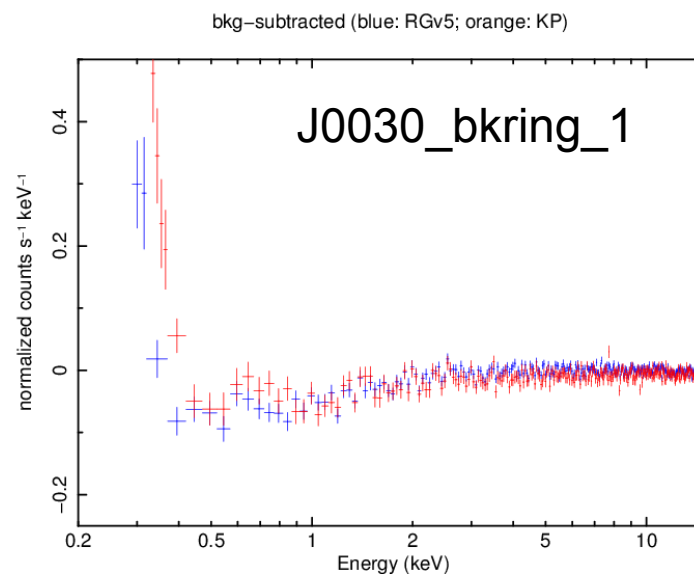
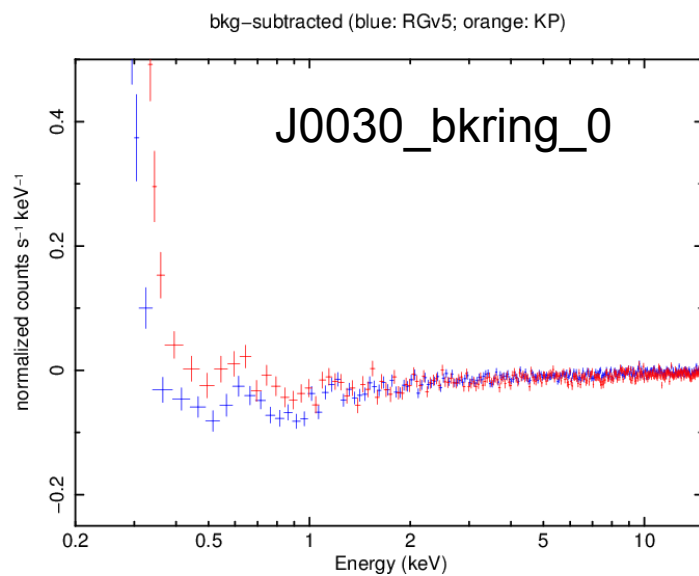
(a) Check event screening in library.

(b) Am I applying it in the optimal way?

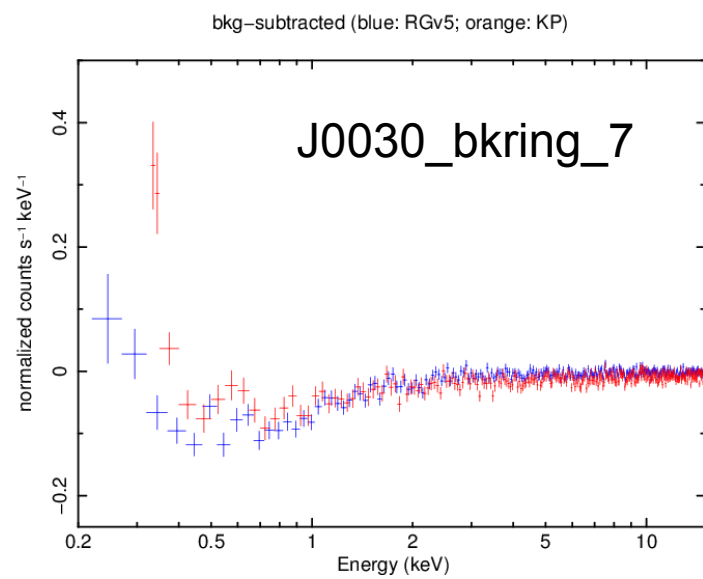
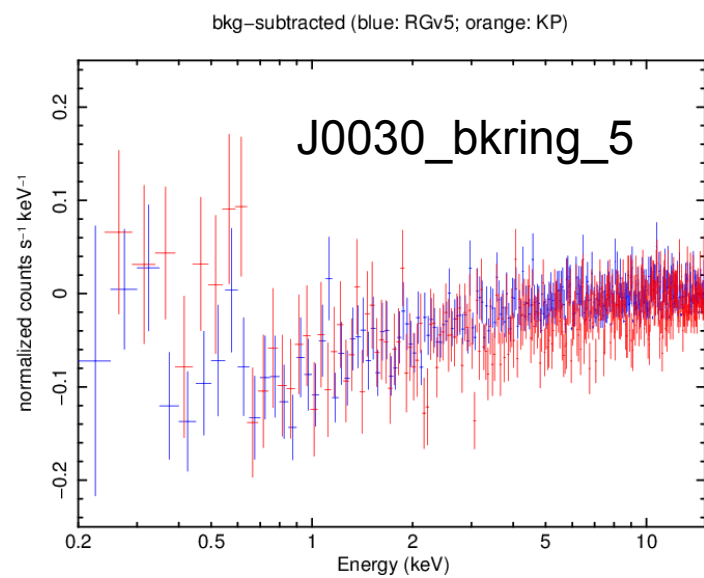
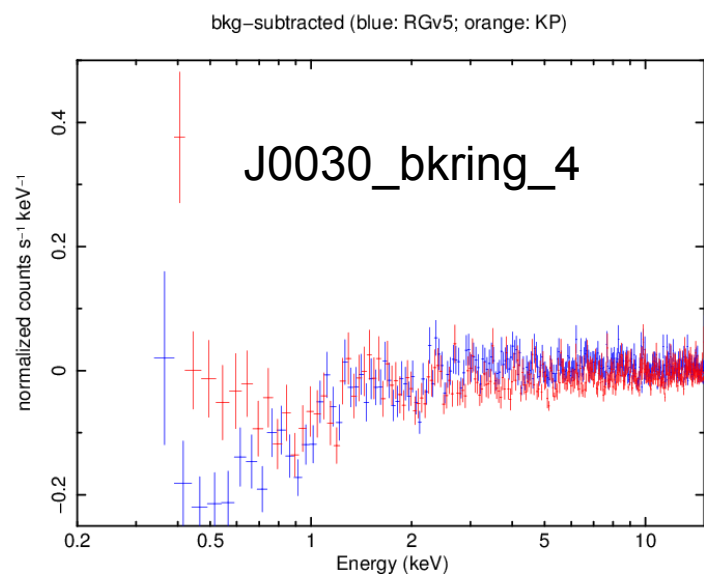
(c) Is there something that characterizes the agreement/disagreement in the two methods?

(3) Check handling of NZ component in implementation of 3C50_RGv5

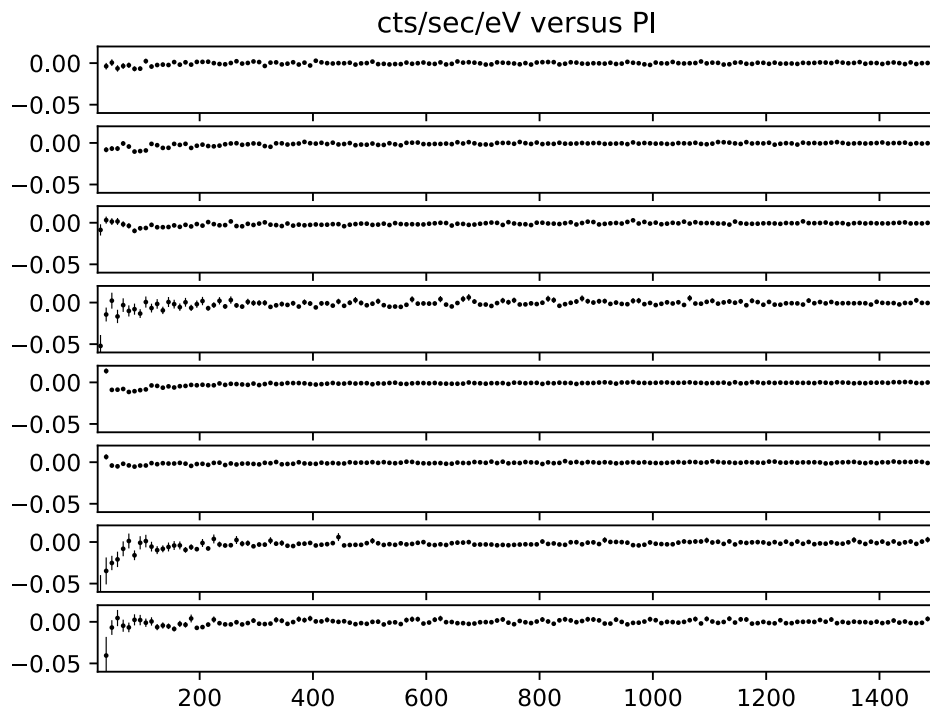
composite spectra



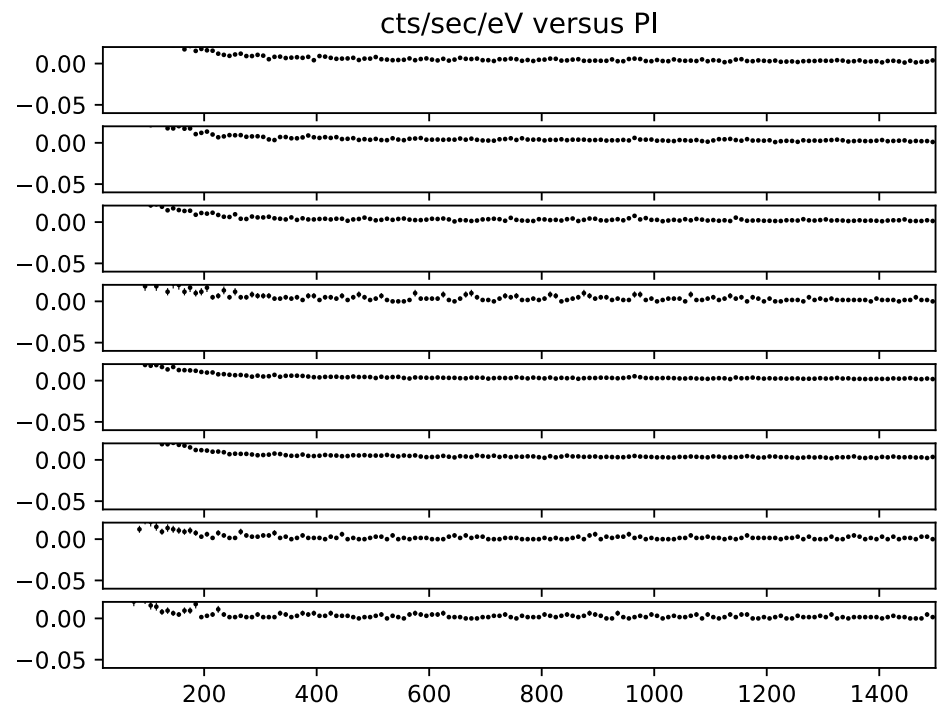
composite spectra



J0030_bkring_0, individual OBSIDs



3C50_RGv5



mkfwork