adapt_merge

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Abstract

This task adaptively smooths background subtracted and exposure corrected **mosaicked** images.

1 Instruments/Modes

Instrument	Mode
EPIC	Imaging

2 Use

pipeline processing	no
interactive analysis	yes

3 Description

adapt_merge adaptively smooths background subtracted and exposure corrected mosaicked images. For each unmasked pixel, the program will average neighboring pixels within a circle of increasing radius until a selected number of weighted counts from the count image is reached. The original pixel is then given the weighted average surface brightness for the pixels within the circle. Multiple pixel binning and binning of multiple bands can also be selected.

Warning and requirements: *adapt_merge* is part of the package *esas*, integrated into SAS, but is limited to work within the *esas* data reduction scheme. This is specially true wrt structure and names of the input files. In particular, *adapt_merge* assumes that all tasks to create images from the individual observations have been run as well as the the task *merge_comp_xmm* which mosaics the different components.

4 Parameters

This section documents the parameters recognized by this task (if any).

Parameter	Mand	Type	Default	Constraints

smoothingcounts	yes	int	100	

The number of counts to accumulate for the smoothing

thresholdmasking	yes	real	0.02	

The scale factor for excluding regions from the smoothing based on a mask image. In the default mode the average exposure is calculated and then any pixel with exposure less than fraction*average value is excluded.

elowlist	yes	int	400 750	

Low energy for successive bands in eV

ehighlist	yes	int	750 1250	

High energy for successive bands in eV

binning	yes	int	1	

Binning control, number of pixels (in both dimensions) to be binned.

withpartcontrol	yes	bool	yes	

Particle background control, "yes" to subtract the model particle background image.

withsoftcontrol	yes	bool	no	

Soft proton background control, "yes" to subtract the soft proton background image.

withswcxcontrol	yes	bool	no	

Solar wind charge exchange background control, "yes" to subtract the SWCX background image.

withoffsetbkgcontrol	yes	bool	yes	

Offset background control, "yes" to subtract the offset background image. This is a feature currently under development and is not yet functional.

withmaskcontrol	yes	bool	yes	

Mask control, "yes" for using a mask image (pixel with 1 in image will be included, pixel with 0 will be excluded).

mask	yes	dataset	mask.fit	

Mask image file name.

fill	yes	int	1	

Number of passes to fill in empty pixels. If a zero pixel has three or more non-zero neighbors, the pixel will be the average value of those neighbors.

clobber	no	boolean	yes	T/F

Clobber existing files?

5 Input Files

The mosaicked images (count, exposure, QPB, and SP images) produced by *merge_comp_xmm*, following the particular nomenclature used in the esas package, eg.: *obj-im-350-800.fits* for a mosaicked image with the first band in that spectral range.

6 Output Files

- `adapt-`*elow*`-`*ehigh*`.fits` – The smoothed image for the selected energy band (*elow* and *ehigh*) of the selected region in sky coordinates.
- `size-`*elow*`-`*ehigh*`.fits` – The smoothing scale factor image for the selected energy band (*elow* and *ehigh*) of the selected region in sky coordinates. The smoothing uses a conical scaling of the count values and the scale factor is the FWHM.
- `size-`*elow*`-`*ehigh*`.qdp` – A QDP plot file of the smoothing scale factor histogram of the data for the selected energy band (*elow* and *ehigh*) of the selected region.
- `radial-filt-`*elow*`-`*ehigh*`.qdp` – A QDP plot file of the radial profile of the data for the selected energy band (*elow* and *ehigh*) of the selected region.

7 Algorithm

adapt_merge creates adaptively smoothed background subtracted and exposure corrected mosaicked images. For each unmasked pixel, the program will average neighboring pixels within a circle of increasing radius until a selected number of counts from the count image is reached. The original pixel is then given the average surface brightness for the pixels within the circle.

8 Comments

References