

## S15.3 Pipeline Changes

**Important Note: The first reprocessing that implemented these S15.3 changes was actually pipeline S16.**

The S15.3 pipeline processing for the MIPS 24  $\mu\text{m}$  channel includes fixes for long-term problems with the droop and linearity corrections. We have also changed the threshold at which the first difference pixels are substituted for the slope. These changes will most affect high value pixels near or above the "soft saturation" level, which is now around 63 MJy/sr for 30 sec exposures. Observers should note that regions with backgrounds above this level, pipeline processed BCDs will have large areas of their images replaced by 0.5 second first difference image pixels, reducing their effective S/N. This effect is demonstrated in Figure 1). Changes in pixel values from S14 to S15.3 will generally be a few percent at low levels, up to greater than 10% at high levels.

Detailed comparison of the SSC pipeline and MIPS instrument team prototype data reduction package (DAT) showed that the pixel values prior to flattening disagreed in several respects (Figure 2). First, the SSC pipeline appeared to be slightly undersubtracting the droop (an electronic "bias" in the slope which scales with the total photons detected by the array). Second, the SSC pipeline had some linearity issues, especially with respect to the agreement between slope and first difference values near the threshold for pixel replacement. High dynamic range images from the MIPSGAL galactic plane survey were used to highlight the discrepancies at high background levels (hundreds to thousands of MJy/sr in 3 sec exposures). These problems were traced to a subtle error in the implementation of the linearity code in the SSC pipeline. This has now been fixed in S15.3.

The end result of all these changes is that the DAT and SSC pipelines are very close to perfect agreement up through the linearization routines (Figure 2). Discrepancies in pixel values between the SSC and DAT processing through the linearity correction is now less than 1 % in most cases. The SSC is working to implement the AOR-based spotflat used by the DAT in S17 in order to reduce the level of dark spot residual seen in the BCDs.

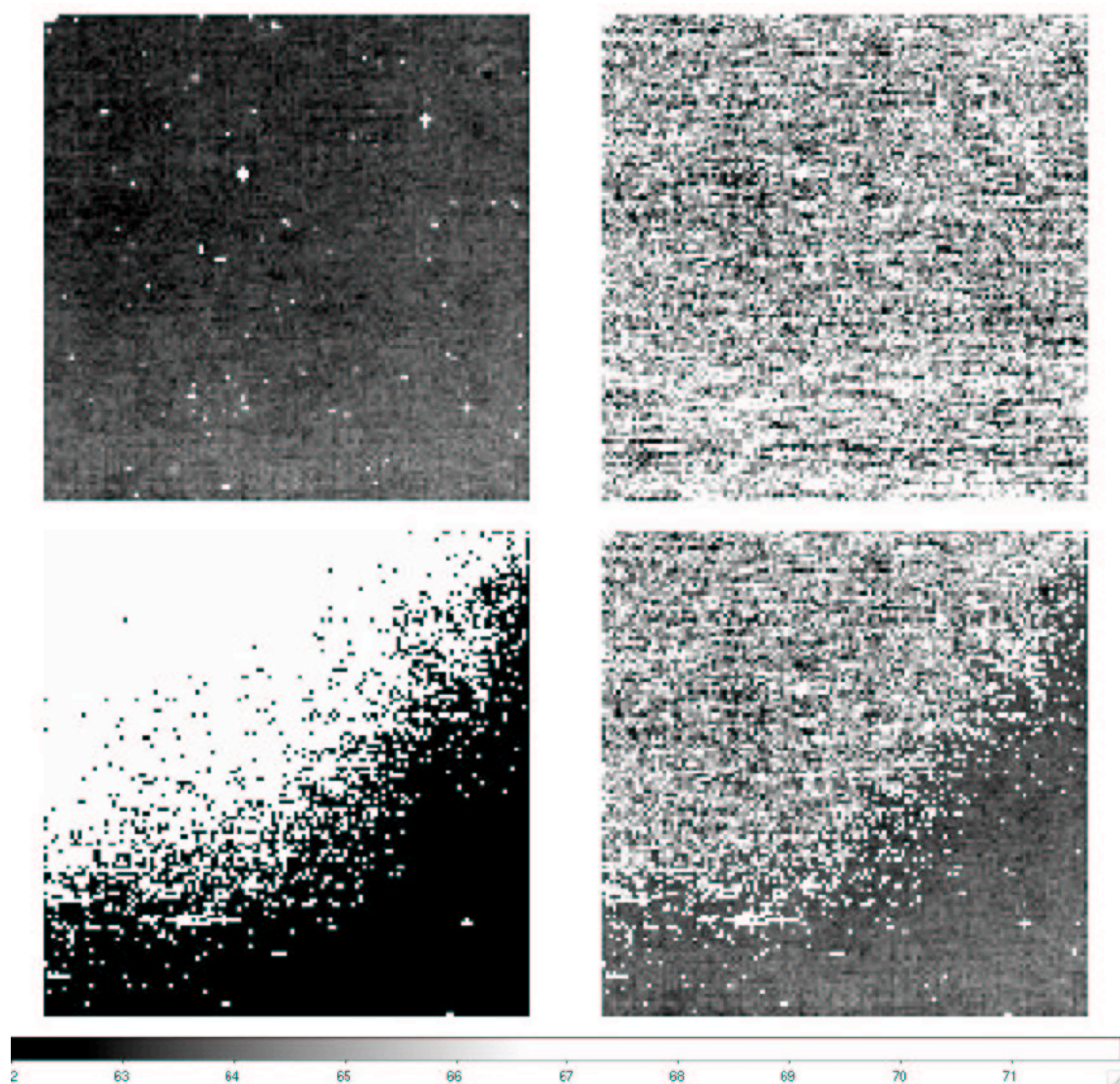


Fig. 1.— These images show a 30 second MIPS-24 BCD taken in a region of high zodiacal background. The grayscale shown is the same for all 4 images and ranges from 62 to 72 MJy/sr and is shown on the grayscale bar at the bottom. Top left- slope image. Top right- difference image; Lower left - mask image (high values indicate pixels that are soft saturated in the slope and which have been replaced with the difference). lower right- final BCD. Note that more than half of the array has been replaced with the difference image effectively making a 0.5 sec exposure.

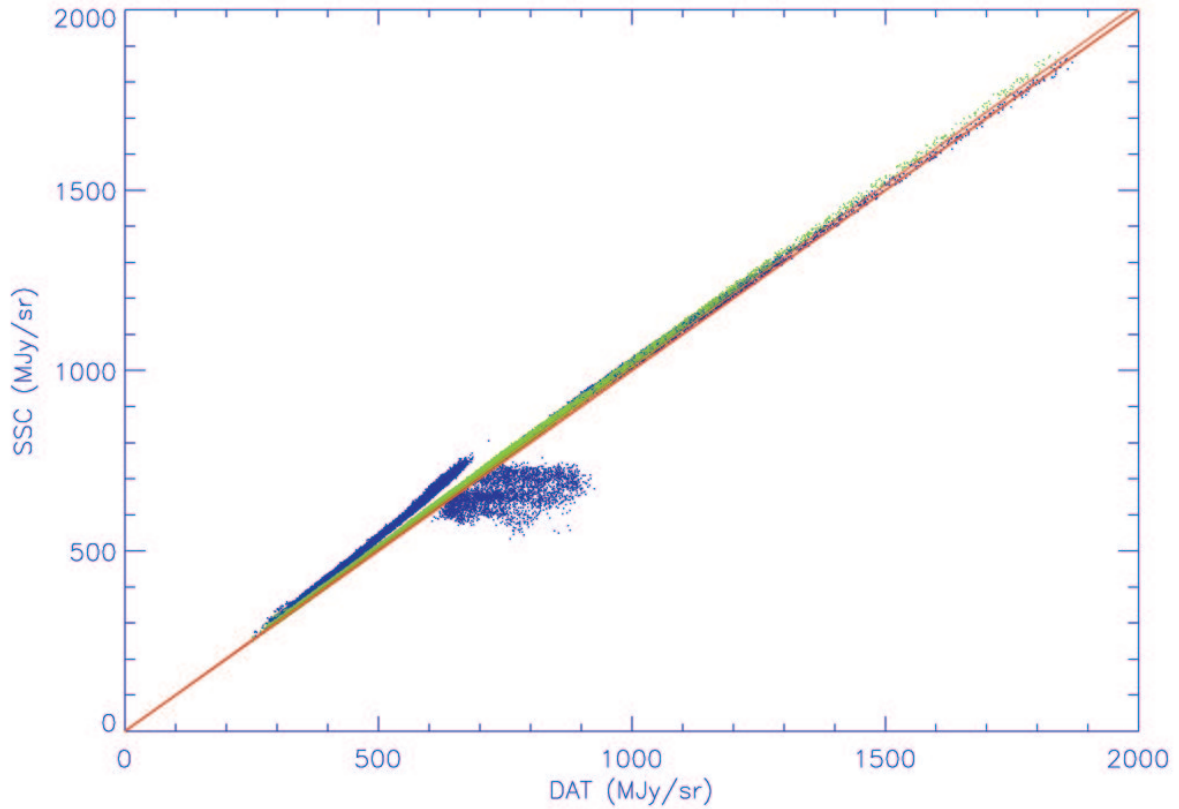


Fig. 2.— Plot of MIPS 24  $\mu\text{m}$  BCD pixel values in the SSC pipeline versus the MIPS instrument team reduction software (DAT). Points from pipeline S14.4 are plotted as blue points, while values from pipeline S15.3 are plotted as green points. Note the discrepancies in S14.4 pixel values, especially around 750 MJy/sr. The straight red line indicate a perfect correspondance in pixel values.