Change in Status Alert - May 2, 2008

Users are advised that ASTER SWIR data acquired in late April and early May 2008 exhibit anomalous saturation of values and anomalous striping. Cloud cover assessment and TIR location accuracy have also been affected by the present situation.

Since January 2008, SWIR performance has been stable and data quality has been nominal. On April 23, 2008, the SWIR detector temperature rose precipitously, and SWIR Bands 5-9 saturated.

In an attempt to lower the SWIR detector temperature and improve data quality, the ASTER Team plans to commence another SWIR recycling procedure on May 7, 2008. If successful, stable SWIR performance and nominal data quality will be restored.

The data quality impacts referenced in the April 9, 2008 alert still apply for the periods specified.

Additional advisories will continue to be provided.

ASTER SWIR User Advisory - April 9, 2008

This advisory is written to users of ASTER **SWIR data** to alert them to the fact that some **anomalous saturation of values** has been observed in ASTER Bands 5 through 9 beginning May 2007. In addition, **radiometric offset errors** of up to 10 DN have been observed in these bands for data acquired between September 2007 and January 2008, resulting in noticeable imaging striping for some scenes. These problems are attributed to an increase in ASTER SWIR detector temperature believed to be caused by increased thermal resistance in the SWIR cryocooler. VNIR and TIR bands are unaffected by this problem.

The slow increase in SWIR detector temperature, which gradually reduces the dynamic range of the SWIR bands, did not become a problem until early in 2007, and it did not really affect data quality until the detector temperature exceeded 83ºK. Figure 1 shows the trend in SWIR detector temperature for the past year. Note that the detector

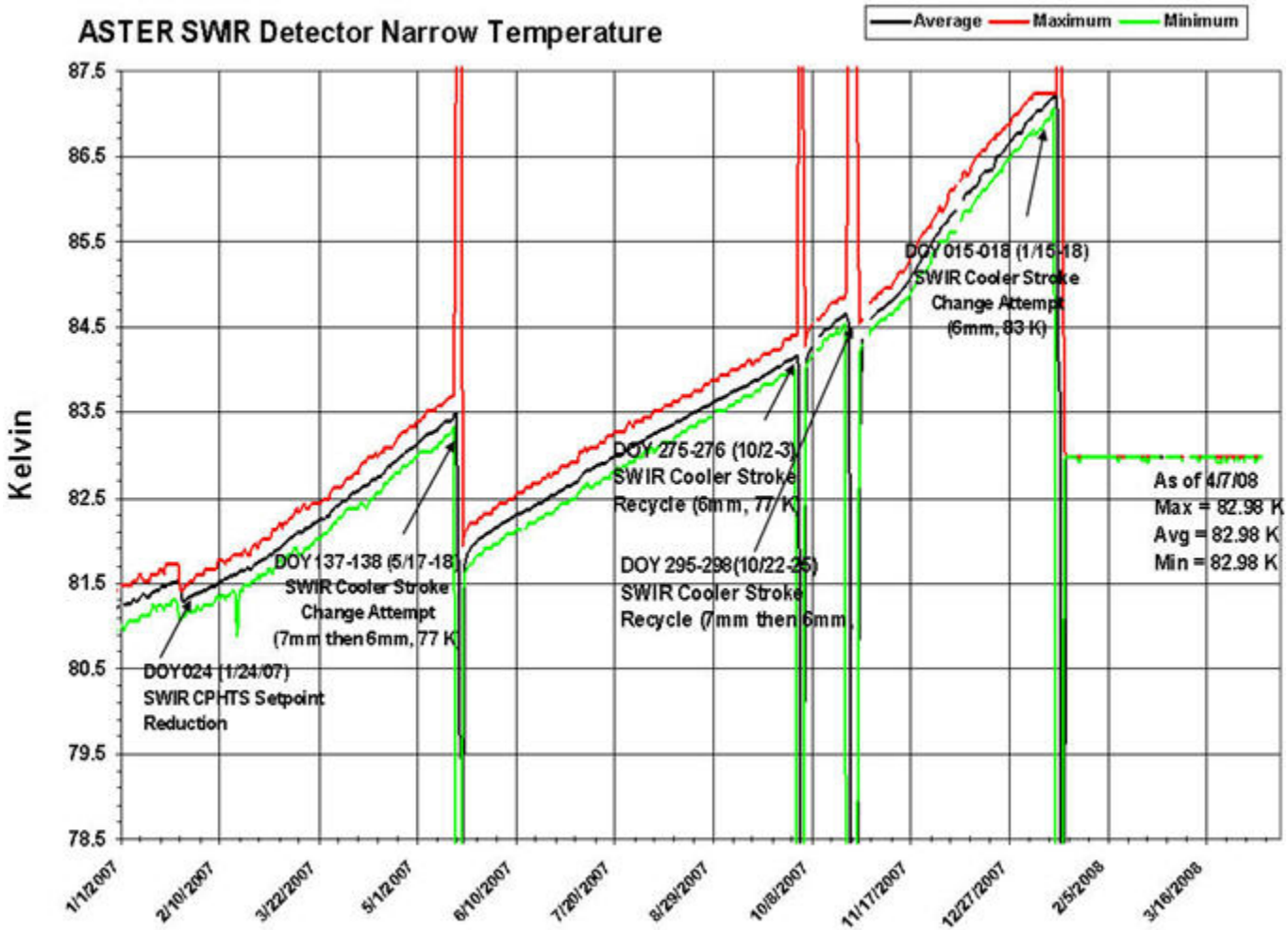


Figure 1. ASTER SWIR detector narrow temperature trend. Maximum (red), average (black), and minimum (green) lines are plotted.

temperature first exceeded 83ºK on about May 1, 2007. Following that date, four attempts have been made to lower the detector temperature by recycling the cryocooler, including increasing the stroke length of the cryocooler piston. The first attempt in May succeeded in reducing the temperature to 82ºK, but the temperature soon began to increase again, exceeding 83ºK in late July. Second and third attempts to reduce the SWIR detector temperature essentially failed in October. However, a fourth attempt in early January succeeded in reducing the SWIR detector temperature to 83ºK. Since that date the SWIR detector temperature has remained stable at 83ºK.

As long as the detector temperature remains at 83ºK, little or no degradation of ASTER SWIR data is expected. However, **users are advised that** for ASTER SWIR data acquired between late **May 2007 and late January 2008**, the

SWIR detector temperature exceeded 83ºK, **except for about six weeks in June and July**. SWIR data acquired during these periods may exhibit **anomalous saturation of values**, particularly at high sun angles and for materials that are highly reflective in the SWIR bands. SWIR data acquired between September 2007 (when the detector temperature first exceeded 84ºK) and January 2008 have **radiometric offset errors that exceed 5 DN**, and the corresponding image data may **exhibit anomalous striping**.

Figure 2 shows an example of SWIR saturation in an extremely bright desert scene acquired over northern Africa in August 2007, when the detector temperature was at about 83.5ºK. Saturation is especially prevalent in Bands 5, 6, and 7. Saturated pixels with DN = 255 are displayed in black. All other colors are unsaturated pixels.

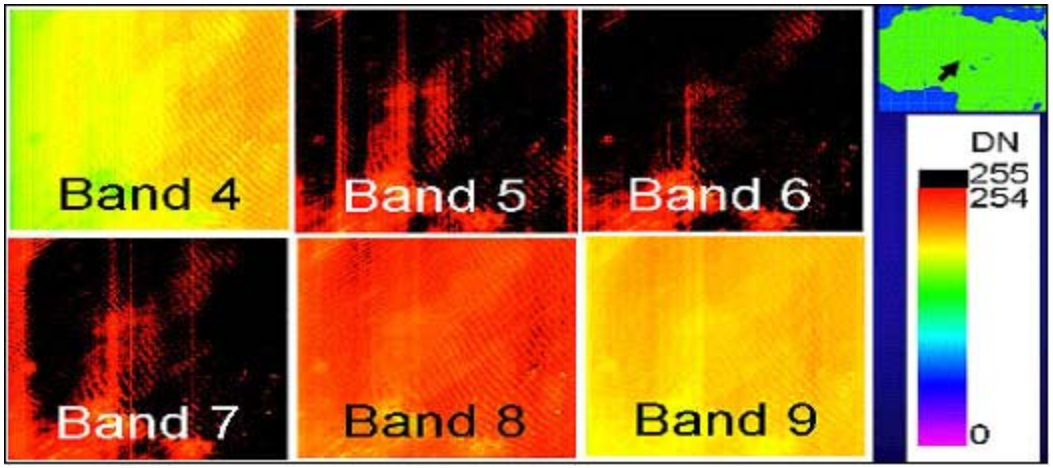
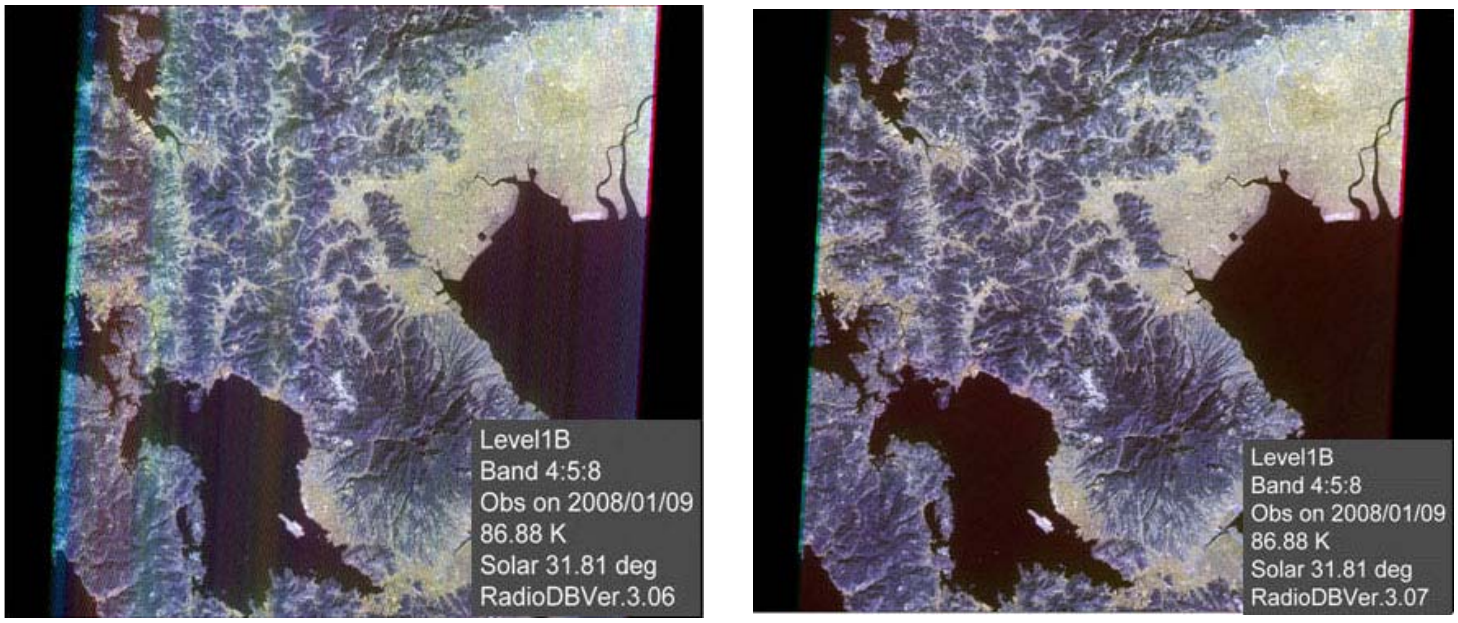


Figure 2. SWIR saturation example. August 24, 2007 Africa observation. Pixels with DN = 255 are colored black.

Figure 3A shows an example of image striping that results from the radiometric offset error described above. While it is not possible to apply any correction to reverse the image saturation anomalies in the SWIR, it is possible to correct the radiometric offset errors and eliminate the anomalous image striping. Figure 3B shows the effects of applying updated radiometric correction coefficients to the SWIR data collected when the detector temperature exceeded 84ºK.

ASTER GDS has initiated a 6-month effort to reprocess ASTER data collected between September 2007 and January 2008, when the detector temperature exceeded 84ºK. The LPDAAC will sequentially replace existing data acquired during this period with data newly corrected for radiometric offset and with anomalous striping removed as they are received from ASTER GDS.



A. B.

Figure 3. Image (A) with striping, which results from radiometric offset errors in SWIR data caused by increasing detector temperature compared with the same image (B) with striping removed by application of updated radiometric correction coefficients. Striping does not become readily apparent in current data until detector temperatures exceed 84ºK. Reprocessing of data acquired when detector temperatures exceeded 84ºK will result in an archive of SWIR data optimally corrected for radiometric offset errors.

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