

Updates to Sector 21, Data Release 29 Products

The data products for Sector 21 have been updated. The data release notes have been revised to detail these changes, but a separate announcement is provided here to emphasize the important differences.

The updated data products can best be identified by examining the “DATE” keyword, which identifies the date that the file was created. Any data set with a DATE on or after 3/23/20 corresponds to the updated data products. The “PROCVER” keyword can also be used to identify the software version used to create the data file. Any data set with PROCVER of spoc-4.0.26 or later corresponds to the updated data products.

Changes to FFI Collateral Pixels

An issue was identified in the collateral data on the raw and calibrated FFIs (30-minute data) of Sector 21. In the final step of the data processing pipeline, the order of the collateral pixels was scrambled and written to the .FITS file incorrectly. The issue only applies to the second orbit of Sector 21, from approximately TJD 1884.92 to 1897.76. Affected FFIs can be easily identified with visual inspection of the images (columns 1--44, columns 2093--2136, and rows 2058--2078).

Science pixel data from raw and calibrated FFIs are not impacted by this issue, and users of raw or calibrated FFI science pixel data, TESS-cut, or any 2 minute data products (target pixel files, light curve files, planet search, DV products, etc.) are not affected.

Users applying their own bias and smear corrections based on the FFI collateral pixels are affected, or users that analyze the collateral region of raw or calibrated FFIs.

Note that the collateral data internal to the data processing pipeline is stored in a different format than the data products provided to the community. The internal format for the science and collateral data was not impacted by this issue and the pipeline processing of the science calibration proceeded nominally.

Changes to Timestamps

An issue was discovered with the assigned timestamps of the previously released data products. The reported times are too large by 2 seconds. The issue was caused by an off-by-one error in ground system software that identifies the timestamps of individual two second exposures.

This revision of the Sector 21 data products has updated and accurate timestamps. Future data releases will include reprocessed data from Sectors 1 to 19 with corrected timestamps. Until these reprocessed products are available, timestamps from Sectors 1--19 can be corrected by subtracting 2 seconds.

Two other small adjustments were also made to the timestamps. The start times of integrations for every 2 minute and 30 minute cadence were shifted forward by 31 milliseconds, and the end times were shifted forward by 11 milliseconds. These offsets correct for effects in the focal plane electronics that were not accounted for in previous data releases.

Until reprocessed data products for Sectors 1--19 are available, the timestamps of FFIs from previous data releases can be corrected by adding these values to the appropriate start and stop times in the image headers. Two-minute data products report the TJD at mid-exposure, and so should be corrected by adding 21 milliseconds to the timestamps. Note that the correction only applies to the timestamps themselves; the reported exposure times in data product headers and flux values (electrons per second) are correct, as they already account for the 20 millisecond relative offset between start and stop times discussed here.

Changes to Straylight Flags

In this revision of the Sector 21 data products, the Straylight flag (bit 12, value 2048) is disabled for the 2-minute data products. Instead, the "scattered light flag" (bit 13, value 4096) identifies cadences at which individual targets are affected by scattered light. The Straylight flag (bit 13) continues to be marked in the FFIs, and flags times when the Earth/Moon are near the camera FOVs and may interfere with guiding or saturate the detectors. We strongly recommend that users inspect the FFI data before removing images marked with bit 13, because this bit is set based on predictions from mission planning and is known to be conservative with respect to the quality of data usable for analysis.