

LUCY L'LORRI Data Review

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1. Datasets overview

- PDS version: PDS4
- 4 sets from the high res cam L'LORRI.

lucy.llorri:data_dinkinesh_raw::1.0

lucy.llorri:data_dinkinesh_partially_processed::1.0

lucy.llorri:calibration::2.0

lucy.llorri:document::2.0

- Mission phases:

the Lucy Mission Dinkinesh Encounter

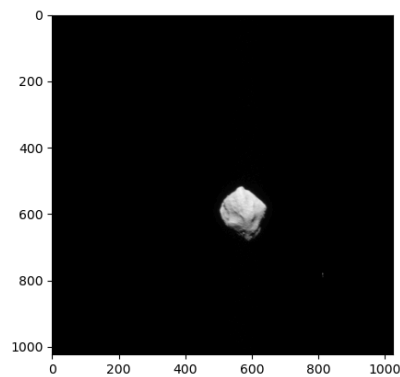
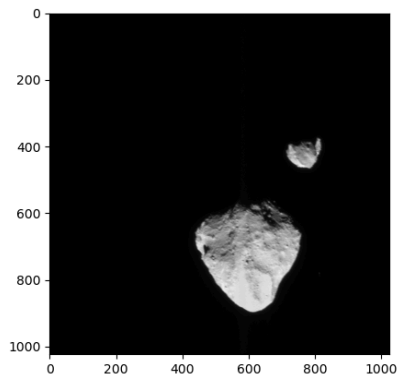
- Datasets comparison:

2449 uncalibrated images

2449 partially calibrated images

(Partially: not radiometrically calibrated, but corrected by removing instrument artifacts)

- Summary:



Data set in good shape, no obvious problem. Only a few small issues.

Filename: /lorri/data_dinkinesh_raw/lor_0747013512_03958_00001_4x4_eng_03.fit

No.	Name	Ver	Type	Cards	Dimensions	Format
0	PRIMARY	1	PrimaryHDU	313	(258, 256)	int16
1	HISTOGRAM	1	ImageHDU	10	(32,)	int32
2	IMAGE HEADER	1	ImageHDU	9	(84,)	uint8
3	IMAGE DESCRIPTOR	1	ImageHDU	10	(84,)	uint8

Filename:

/lorri/data_dinkinesh_partially_processed/lor_0747013512_03958_00001_4x4_sci_03.fit

No.	Name	Ver	Type	Cards	Dimensions	Format
0	PRIMARY	1	PrimaryHDU	348	(256, 256)	float32
1	LLORRI ERROR IMAGE	1	ImageHDU	10	(256, 256)	float32
2	LLORRI QUALITY FLAG IMAGE	1	ImageHDU	12	(256, 256)	int16 (rescales to uint16)

2. Review process

- Use astropy fits.open and test all fits
- Test files with pds4_tools: Read all .fit and label files and save as png to check image content (**all can be read correctly**)

- Check consistency between levels with tools:

Diff Files 23.1 and Beyond Compare 4.4.1

- Check the headers and compare the labels between sets

#fits keys to collect

keys = ['NAXIS1', 'NAXIS2', 'EXPTIME', 'OBSID', 'STRTSCLK', 'STOPSCCLK', 'CCDT1', 'EXPMODE', 'TARGETID', 'CFORMAT', 'BSRAMID', 'BSDCMID']

Some are missing 'CCDT1'

- Check error array and quality array, test if all are 0-arrays. **No problem found**

- Compare labels and sis file
- Compare documents
- Collect aspect data from all images,

3. Document/Calibration

- Why are the calibration data different compared to the last batch (LUCY DART observation)?
- The collection overview of the calibration is not consistent with the content.

“The calibration products fall into one of three categories, Flat Field files, Bias files, and T Offset files.” **It’s not clear to me,**

- A. What is the Mottola technique? Where is the description? This should be added to sis.pdf**
- B. Did the calibration include using previously reviewed calibration files, T offsets and superbias?**
- C. Dinky flat over Ilorri flat, both or one?**

- In “data_dinkinesh_partially_processed”:
Collection_overview.txt copied the raw overview, and needs to be changed accordingly.
- In the “sis.pdf”, the calibrated data processing level is marked as N/A, will this level be available for the main mission phase?
- Many documents’ labels contain this description of the mission and instrument, and need to be updated with appropriate tense and necessary details.

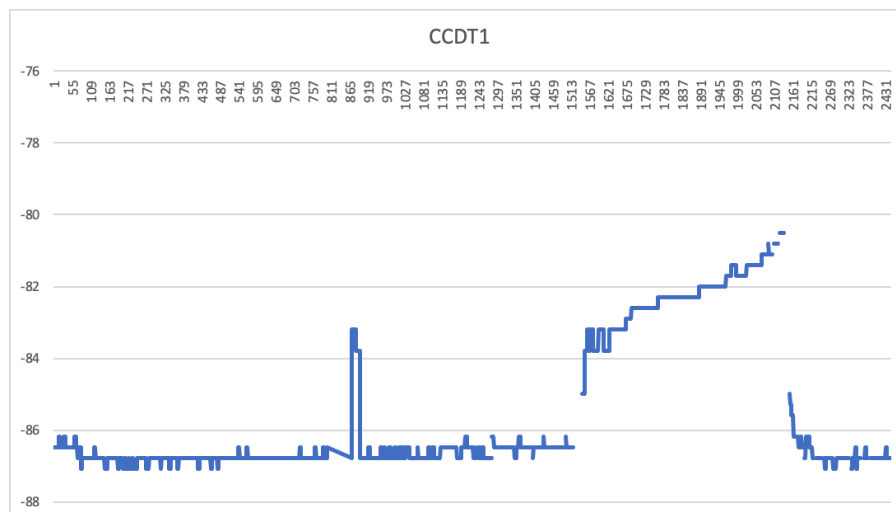
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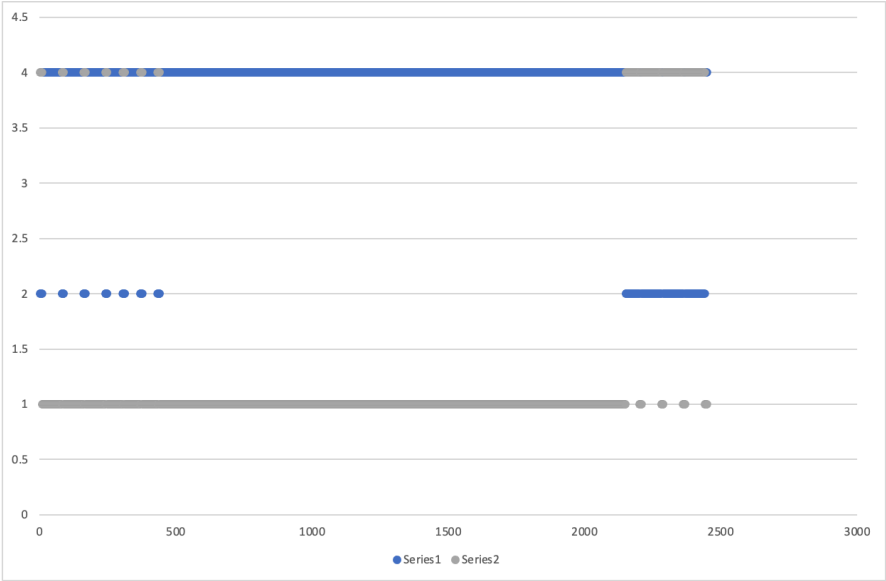
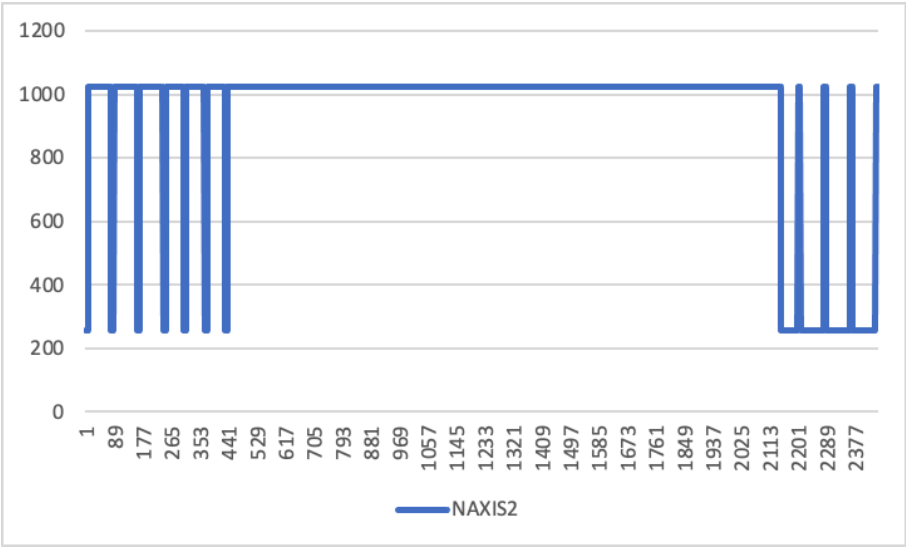
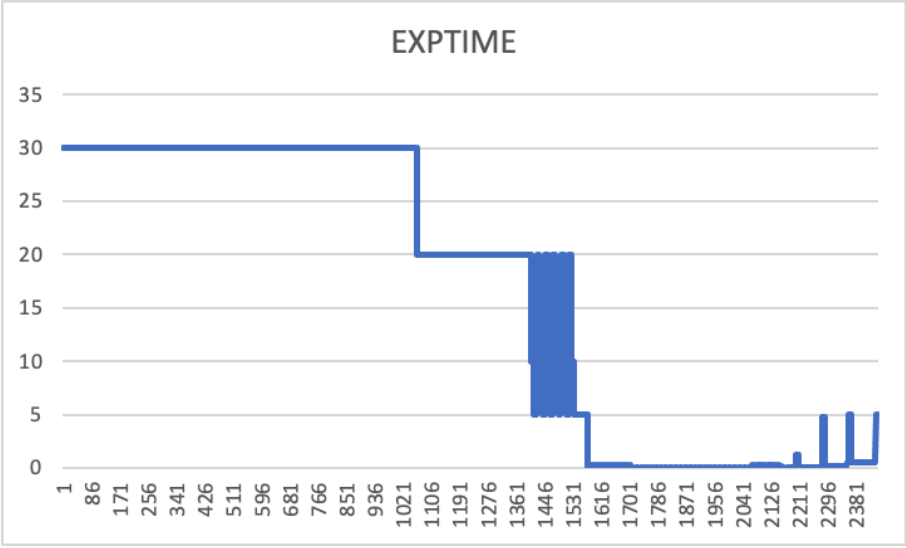
<Observing_System>
  <name>Lucy Spacecraft</name>
  <Observing_System_Component>
    <name>Lucy Spacecraft</name>
    <type>Host</type>
    <description>Lucy is over 14 meters (over 46 feet) from tip to tip, but most of that is the huge solar panels (each over 7 meters (almost 24 feet) in diameter) needed to power the spacecraft as it flies out to the orbit of Jupiter. All of the instruments, and the 2-meter (6.5 ft)-high gain antenna needed to communicate with Earth, will be located on the much smaller spacecraft body. Lucy's instrument pointing platform (IPP) carries four instruments for remote-sensing science, including L'Ralph (MVIC and LEISA), LLORRI, LTES, and the Terminal Tracking Camera (TTCAM).</description>
    <Internal_Reference>
      <lid_reference>urn:nasa:pds:context:instrument_host:spacecraft.lucy</lid_reference>
      <reference_type>is_instrument_host</reference_type>
    </Internal_Reference>
  </Observing_System_Component>
  <Observing_System_Component>
    <name>Lucy Long Range Reconnaissance Imager (L'LORRI)</name>
    <type>Instrument</type>
    <description>The L'LORRI instrument provides the highest-resolution imaging for the Lucy mission. The panchromatic images will address seven of our 17 Level 1 science requirements including searching for satellites, determining the size frequency distribution of craters, stereo imaging, and shape reconstruction. The L'LORRI instrument will also be used for optical navigation to our targets.
  </description>

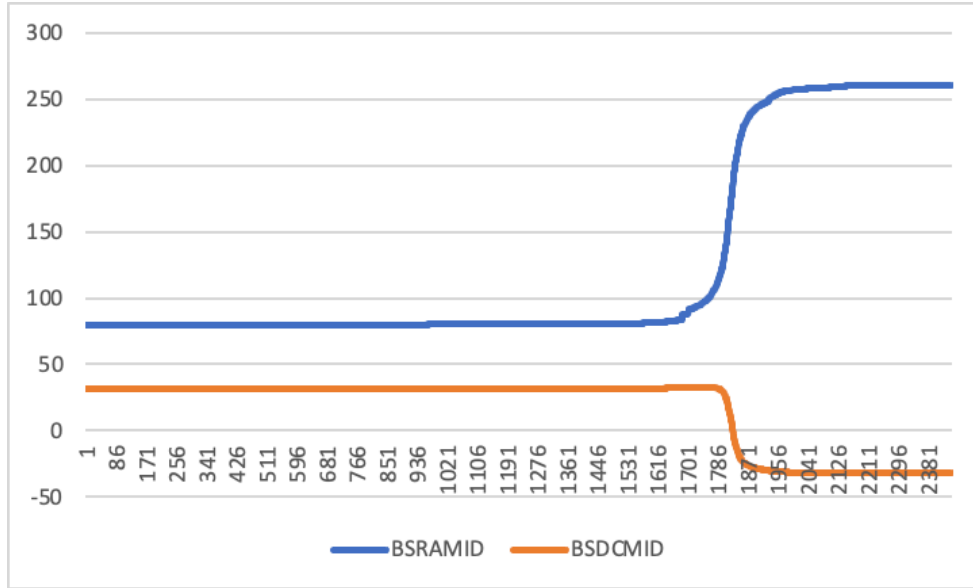
```

4. Data

- Files can be correctly read by python, pds4 python tool and ds9.
- SPICE data are available and included in the label completely
- Header are checked, found a few instrument temperature data are missing, I checked ['NAXIS1', 'NAXIS2', 'EXPTIME', 'OBSID', 'STRTSCLK', 'STOPCLK', 'CCDT1', 'EXPMODE', 'TARGETID', 'CFORMAT', 'BSRAMID', 'BSDCMID']







5. Conclusion: Certifiable, need to complete the documents.