New Horizons Arrokoth Encounter Surface Composition Maps

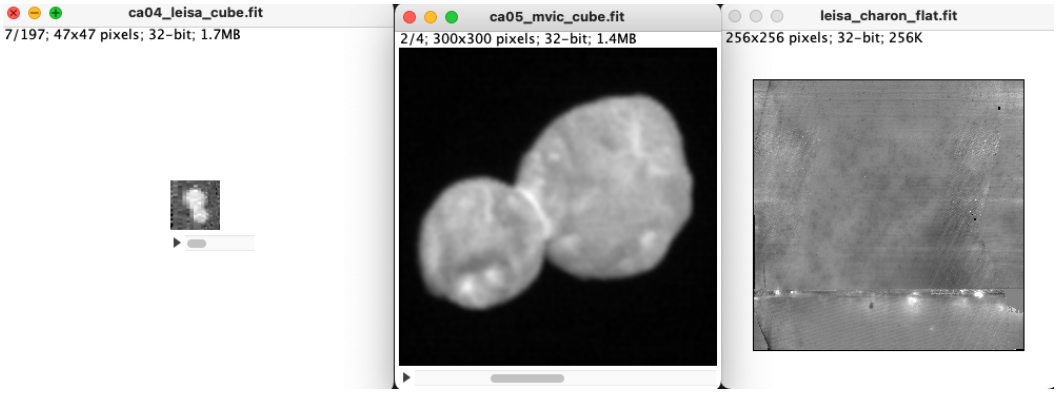
Data

(1) Is the presentation of the data adequate, are the data in an adequate format, are the data useful to the science community?
Yes. The dataset.cat file in particular was helpful to understand the data.

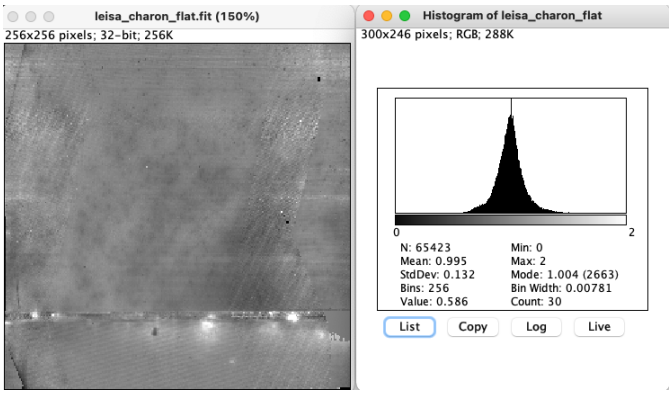
(2) Are supporting data needed (e.g. calibration data)?
No.

(3) Can the data be read programmatically using only the information contained in the PDS labels?
Yes. I was able to read all of the .fit files using ImageJ and could understand their contents based on the labels and dataset.cat.

(4) Do the data look physically reasonable when it is displayed?
I looked at the LEISA image cube, MVIC image cube, and flat field in ImageJ and stretched the data. All three looked reasonable when displayed and had the expected number of layers.



Here is a histogram of the flat field, showing that all of the values are small.

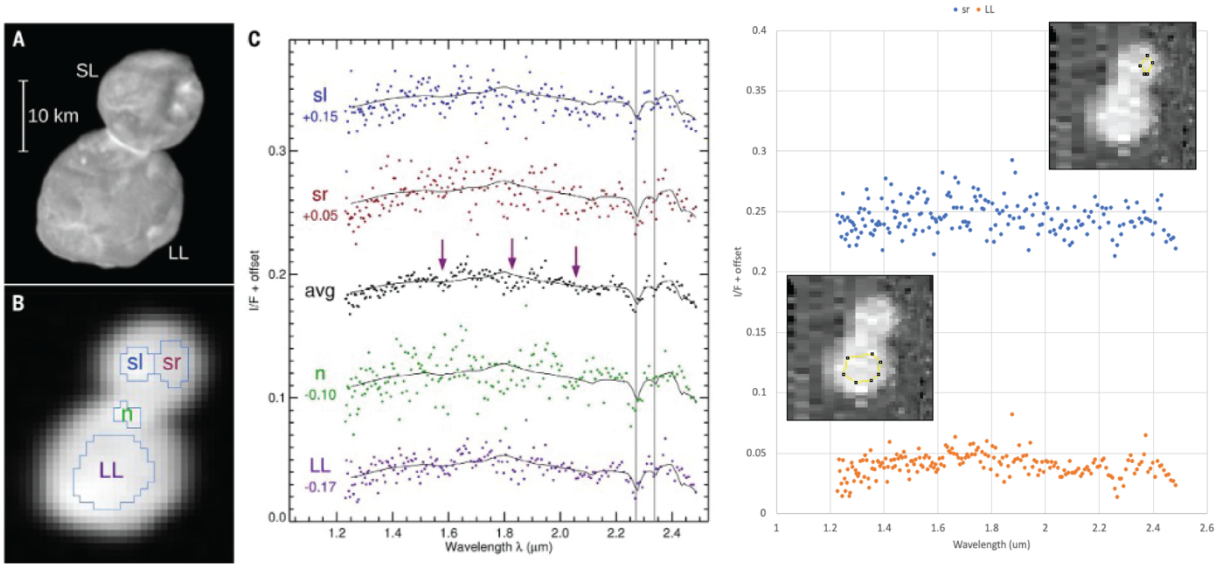


(5) Are there any unexpected deviations observed in the data?

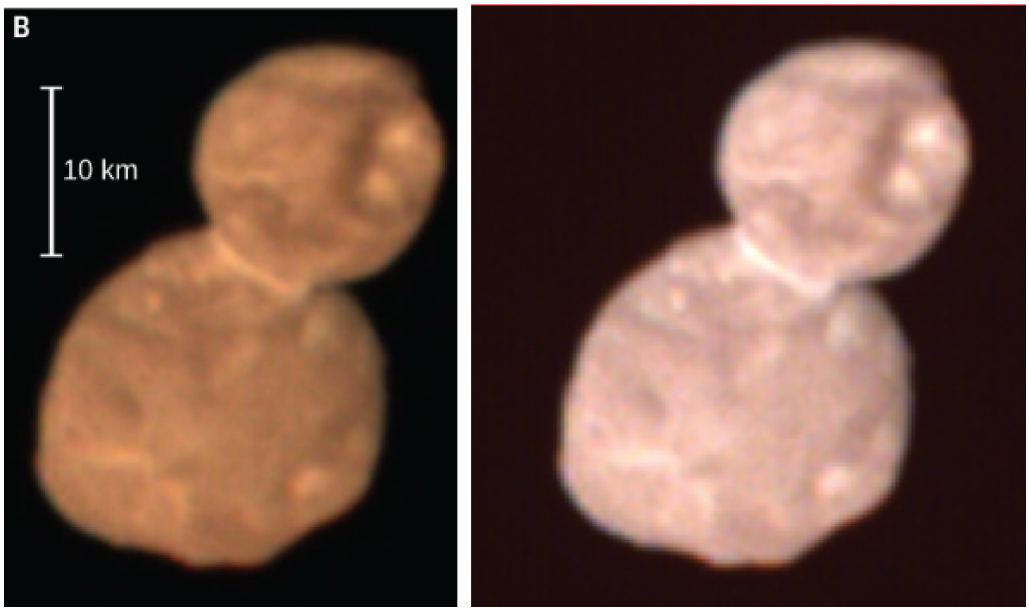
None noted. The flat field is not uniform, but this fact is explained in the documentation, along with the information that it is noted in the documentation that Arrokoth was never imaged towards the edges of the detector (where the flat field is least uniform).

(6) Formulate a scientific inquiry and attempt to use the data to answer it.

As these data are associated with peer-reviewed publications, and in particular with figures within those publications, I set out to and was able to recreate the figures.



Left hand side (A–C) from Grundy et al. 2020. Right hand side data extracted using ImageJ from the ROIs indicated, plotted in Excel using the ca04_leisa_wavelengths.tab to determine the wavelength. I/F data plotted with the same offsets used in C. Flips are sometimes tricky with different software. The flips for the instruments were described in the instrument kernels, and I flipped the LEISA images from the way they were displayed in ImageJ to match the publication. I used the ca04_leisa_wavelengths.tab file to populate the x-axis wavelength values. I did not perfectly recreate the ROIs and the data as plotted are reasonably close to those in the published figure.



Left hand side (B) from Grundy et al. 2020. Right hand side color composite made from the BLUE (in the blue channel), RED (in the green channel), and NIR (in the red channel) layers of the CA05 cube using ImageJ, flipped and stretched to come close to the image from the publication.

Documentation

(1) Does the data set contain all documentation needed to use and understand the data?
Yes.

(2) Is the documentation well organized, clear, and self-consistent?
Yes. The dataset.cat file was particularly useful.

One small note, I was not aware until looking through the documentation that LEISA was officially retitled to the Lisa Hardaway Infrared Mapping Spectrometer. This new name appears in the catinfo.txt document. The leisa.cat document does not mention this new name. It might be helpful to mention both names in the catinfo.txt document since the original acronym is used almost everywhere else in the documentation.

Typos:

aareadme.txt: Linear Etelon Imaging Spectral Arrray is misspelled twice

docinfo.txt: +->JD_SUBSOLARLATITUDES.LBL SubSolar Latutide table, PDS label

leisa.cat: This was a key consideration when tranmitting data…

mvic.cat: The other six CCDs all use Time Delay and Intgration…