

## READ ME File for: 'June\_2017\_apojove\_paper\_data.zip'

Dataset DOI: [10.5258/SOTON/D1222](https://doi.org/10.5258/SOTON/D1222)

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This dataset supports the publication:

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**Title:** *Chandra observations of Jupiter's X-ray auroral emission during Juno apojove 2017*

**Journal:** Journal of Geophysical Research: Planets (*Special edition: Midway through Juno*)

The following README document briefly explains what data is used to produce the plots in the Weigt et al. study. The GitHub link to access the scripts used to create the polar maps is: <https://github.com/waledeigt/zeno-py> (this link is also in the text as well as the acknowledgements).

The Rayleigh test script can be found from Jackman et al., (2018) (DOI: 10.1029/2018JA025490).

This data contains the following:

- The processed data with the relevant mapping information required for the polar plots (Figures 1-5).
- The light curves and unbinned timing data used for the timing analysis (Figures 6 and 7).
- The positions of the photons found from the Vogt et al. (2011, 2015) flux equivalence mapping model (Figure 9).

The relevant data files are discussed in more detail in the breakdown of figures below. The processed data was taken from the event file (OBS\_ID 20001) from the *Chandra Data Archive* and the *Chandra Source Catalogue* (<https://cda.harvard.edu/chaser/>). The event file used was collected October 2018.

The breakdown of the figures are as follows:

### Figures 1 – 5:

Data required for polar plots is as follow:

- Photon location information (S3 longitude and latitude) and the X-ray point spread function (PSF) information (the location and value of the max PSF plotted on the heat maps) are found in: "20001\_photonlist\_full\_obs.txt"
- The relevant sub-solar longitude (SSL) information is taken from JPL Horizons (<https://ssd.jpl.nasa.gov/>). The Horizons ephemeris file for this study can be found in "chandra\_horizons2000\_20001\_e.txt"
- The script "python\_go\_chandra.py" (or equivalent Jupyter notebook version) will generate polar plots for the user.

### Figures 6 and 7:

Data required for the Rayleigh test is as follows:

- The unbinned time data for all photos detected on the North and South pole can be found in: **"20001np\_nobin\_RT\_timing\_data.txt"** and **"20001sp\_nobin\_RT\_timing\_data.txt"**
- The light curves used for all the intervals discussed in the paper (North All, North HS1, North HS2 and South All) are:
  - **"20001np\_lc\_60sec.fits"**
  - **"20001sp\_lc\_60sec.fits"**
  - **"20001\_np\_hs1\_lc\_60sec.fits"**
  - **"20001\_np\_hs2\_lc\_60sec.fits"**

(\*\*\*NOTE\*\*\* the 60 second binned light curves were to make the first panel more aesthetically pleasing and was **NOT** used in the timing analysis)

### Figure 9:

Data required for the mapping plots are as follows:

- Photon location information (S3 longitude and latitude): **"20001\_photonlist\_full\_obs.txt"**
- The specific photon location of North HS1 and HS2 are found in: **"hot\_spot\_photons\_hs1\_int.txt"** and **"hot\_spot\_photons\_hs2\_int.txt"**
- JRM09 field line contours can be found in the following folders for the North and South respectively: **"vogt\_flux\_mapping\_contours\_jrm09\_north"** and **"vogt\_flux\_mapping\_contours\_jrm09\_south"**
- The mapped photons for North All, North HS1 and HS2 can be found in:
  - **"20001\_np\_photons\_all\_mapping\_data.dat"**
  - **"20001\_nhs\_hs1\_photons\_mapping\_data.dat"**
  - **"20001\_nhs\_hs2\_photons\_mapping\_data.dat"**

Please do not hesitate to ask if there are any issues with the data or would like to know more about how the python scripts work.

My contact email is: [D.M.Weigt@soton.ac.uk](mailto:D.M.Weigt@soton.ac.uk)

The link to the Juno data is in the acknowledgements section also. Figure 9 was provided by the JADE team.

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The *'June\_2017\_apojove\_paper\_data.zip'* was created January 2020.