

Review of Cometary Afp Data

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John Noonan
Oct 16, 2025

PDS SBN Review, Oct 16, 2025 - Cometary Afp Dataset

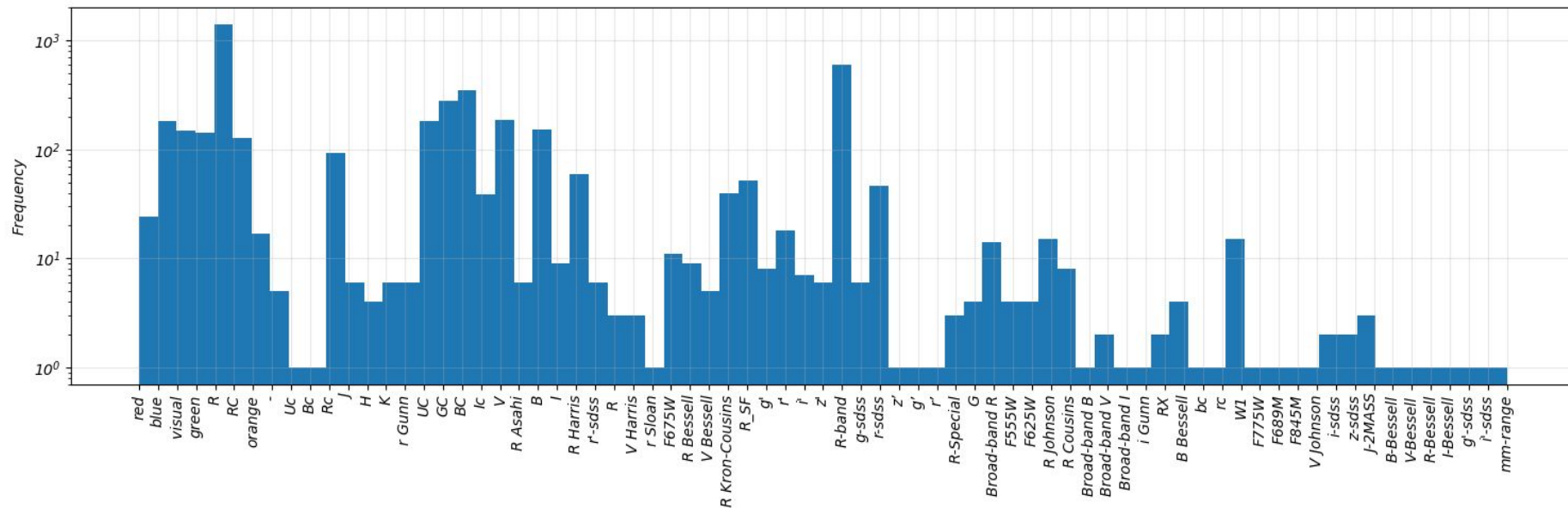
Dataset Description

- CSV file with 334 comets between 1976 and 2023, 4350 total records.
- The csv file has 18 columns:
 - Comet's name,
 - Classification
 - Perihelion distance (au)
 - Date of observation
 - Heliocentric distance (au),
 - Geocentric distances (au)
 - Phase angles (degrees)
 - Orbital branch
 - Bandpass
 - Pixel scale (arcsec per pixel)
 - Aperture radius (arcsec)
 - Projected aperture radius (km)
 - Afp (cm)
 - Afp uncertainty (cm)
 - Gas-to-dust ratio
 - Reference
 - DOI
 - Link to NASA ADS

Data Access and Investigation Tools

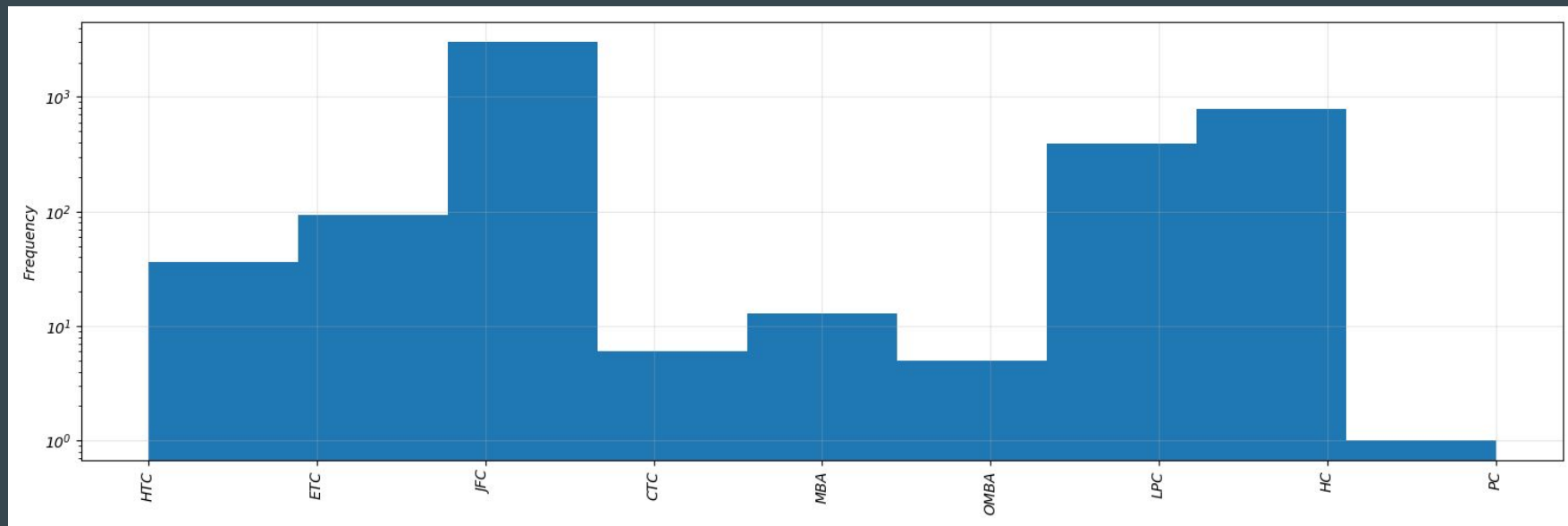
- Data accessed with Python and pds4_tools Python package.
 - Additional packages for reading .tab files: Pandas, NumPy
- Data were easy to read in, plot, and manipulate.
 - Loaded in tables via Python Pandas “read_csv” for csvs
- All .xml files were readable with pds4_tools Python Package
 - No errors produced

Bandpasses Used



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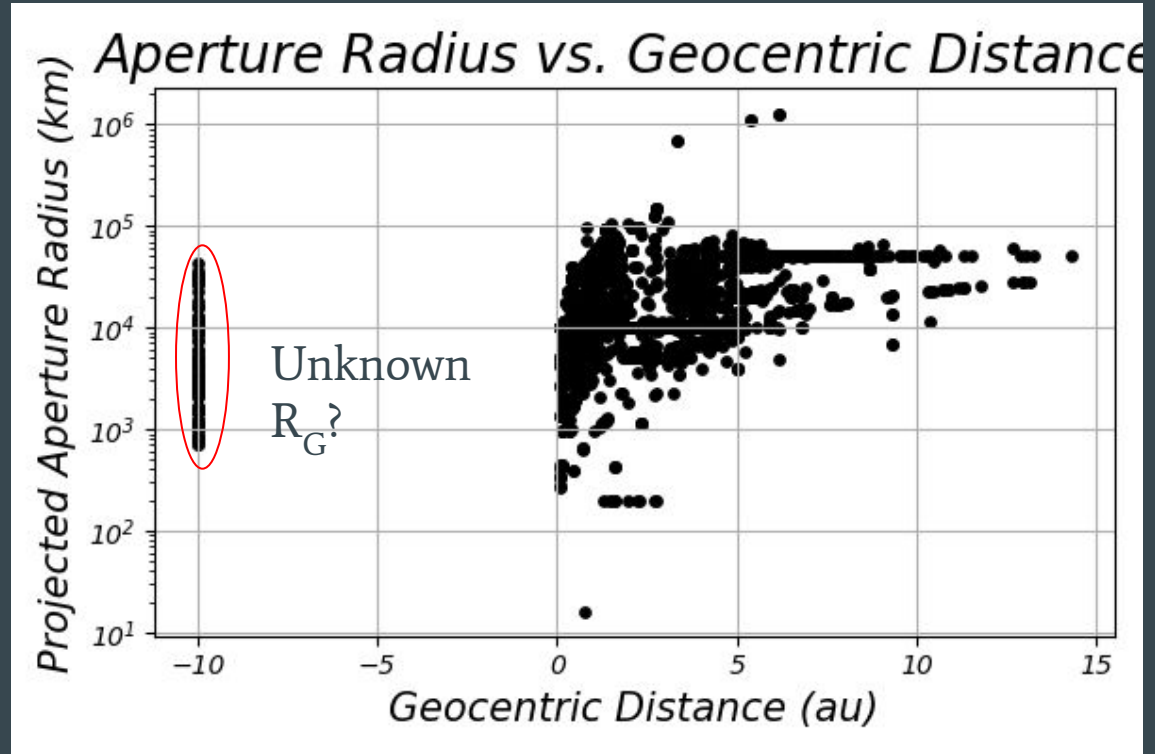
Dynamic Classifications



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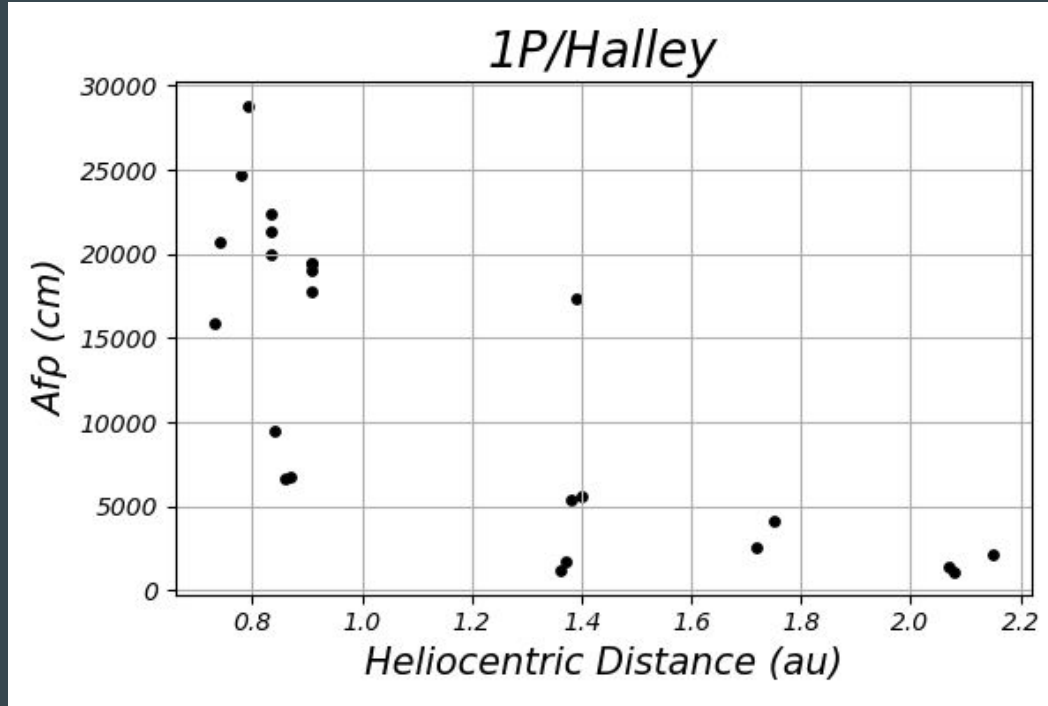
Aperture Radii

- Trend as expected, with some clear error message codes (-9.99)
 - 377 measurements w/ negative R_g



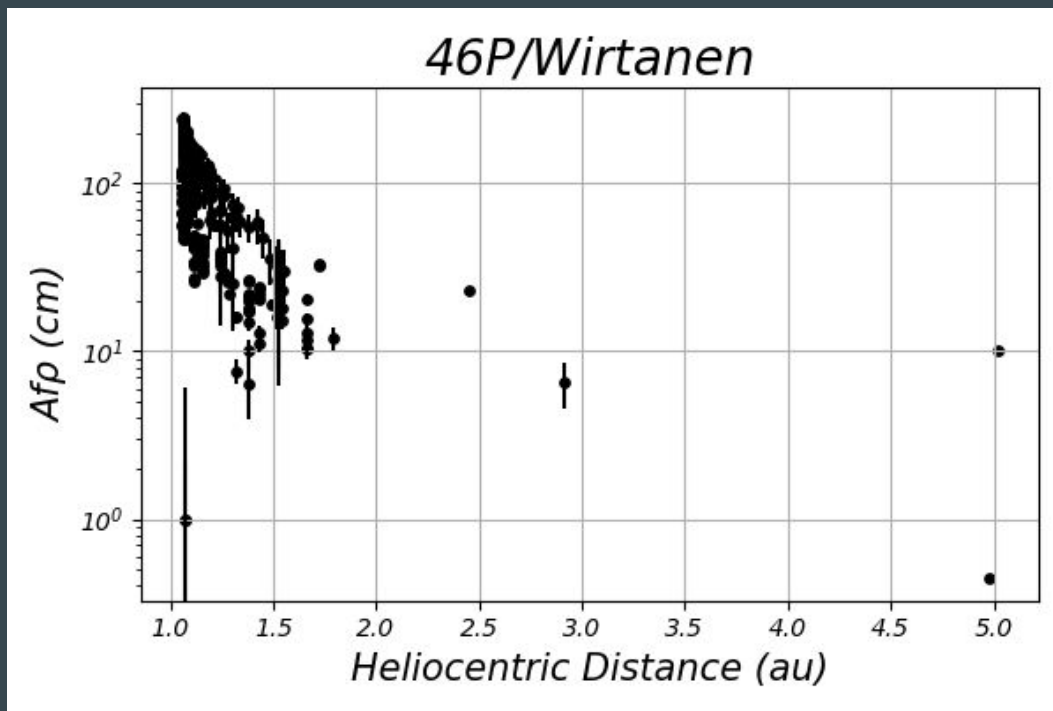
Science Plots

- Simple file structure and easy documentation provided for easy data manipulation
- I was able to easily make plots showing Afp as a function of heliocentric distance



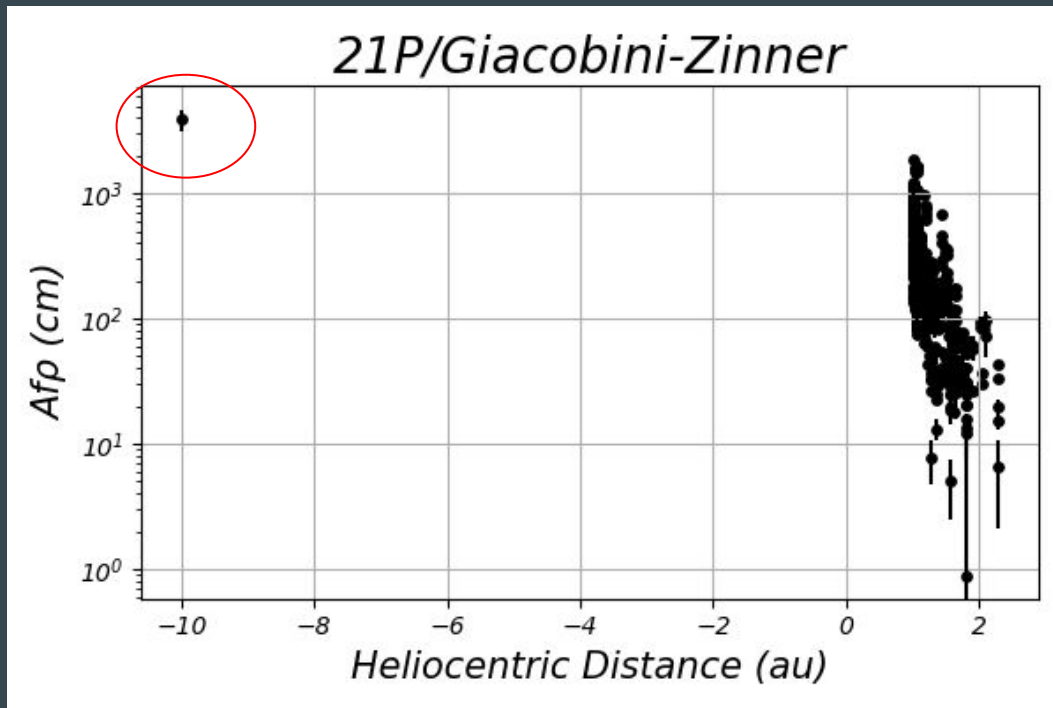
Science Plots

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Science Plots

- Simple file structure and easy documentation provided for easy data manipulation
- Some negative values for reasonable Afp data
 - I.e. 21P, -9.9 heliocentric distance?
 - 55 measurements w/ negative R_H



Liens

- Minor
 - Negative values in csv not described in overview.txt
 - E.g. -9999.99, -99.99, -9.99
 - Error codes need explanation for heliocentric and geocentric distances
- Major
 - None, very cool dataset!

Summary

- All files are easy to read and manipulate
- Documentation is clear and helpful
- When added to the current v2 dataset of SWAN derived water production rates this will be an excellent publicly available dataset.

Conclusion: Dataset is certifiable as reviewed.