# New Visualization Tools from the NASA Exoplanet Archive

Ricky Nilsson, Aurora Kesseli, Michael B Lund, Nicholas Susemiehl, Julian van Eyken, Jessie Christiansen

Caltech / IPAC - NExScI

The NASA Exoplanet Archive hosts curated catalogs of exoplanet and host star data and provides tools to work with these data. We have recently released new visualization tools for observation planning and exoplanet data exploration.

## Exoplanet Scatter Plots and Histograms

Our tables containing parameters of confirmed exoplanets (currently over 5,600 planets with parameters drawn from single or multiple references) and stellar hosts now have an updated plotting service. It provides interactive and highly configurable histograms and scatter plots to explore exoplanet and host star distributions, which can easily be exported as publication-ready figures.
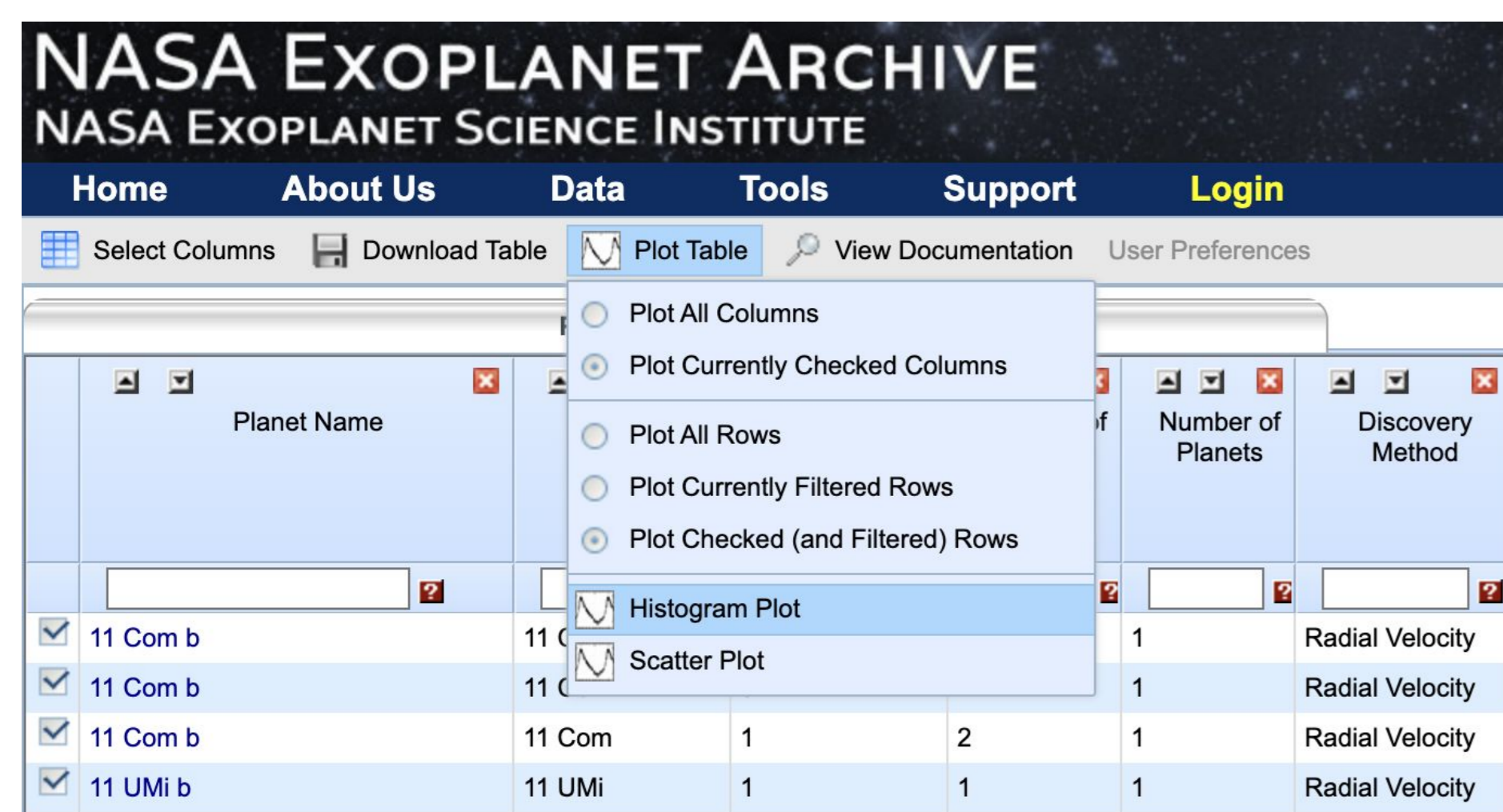


Fig.1a: Interactive plots are launched from the tables' *Plot Table* menu button.





Fig. 1b: Histogram showing the mass distribution (in Jupiter masses) of exoplanets in the 0-14 $M_{Jup}$ range grouped by discovery method. The plot theme selection is set to Presentation (3 other themes are available, as well as 6 color palettes for categorical data and 20 color palettes for continuous data).
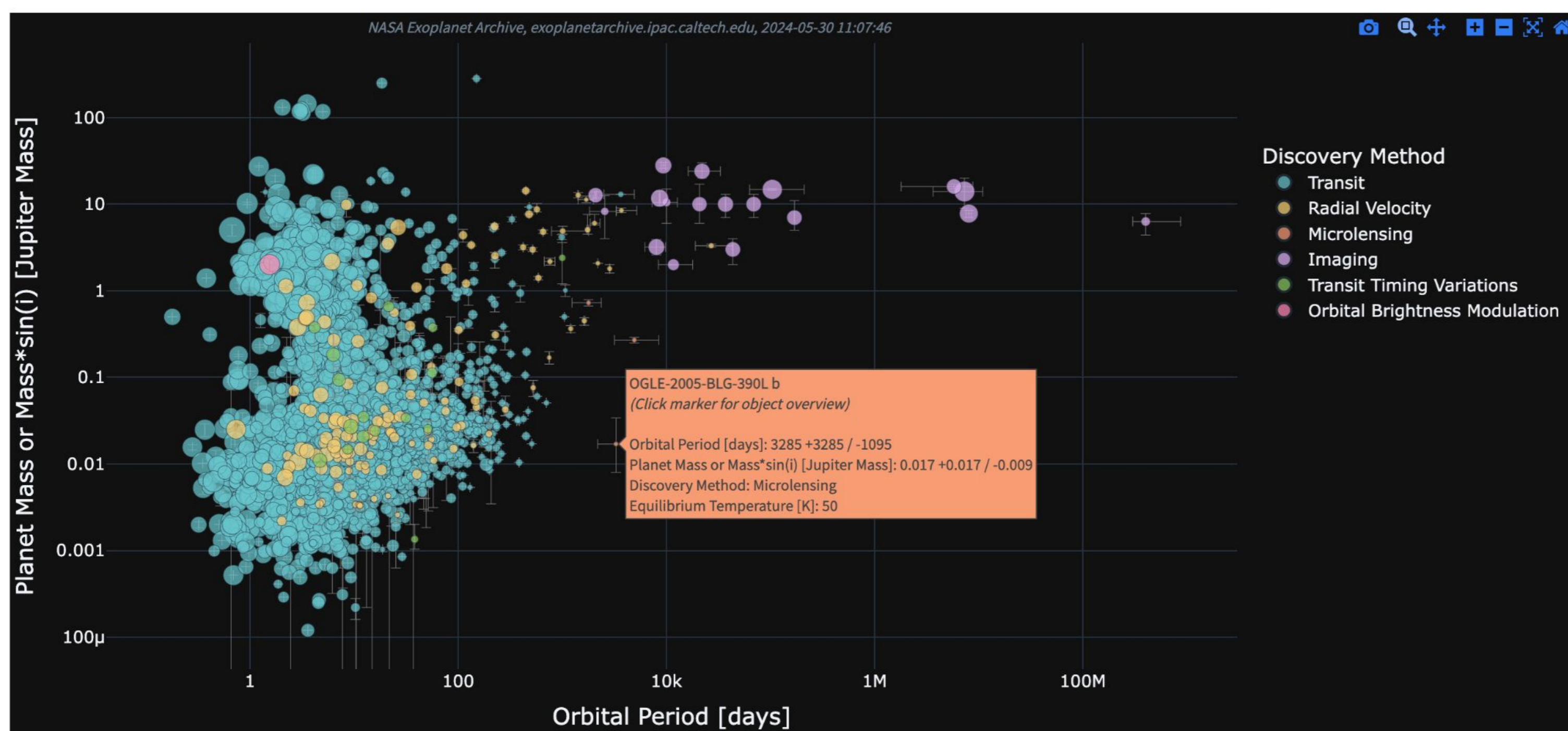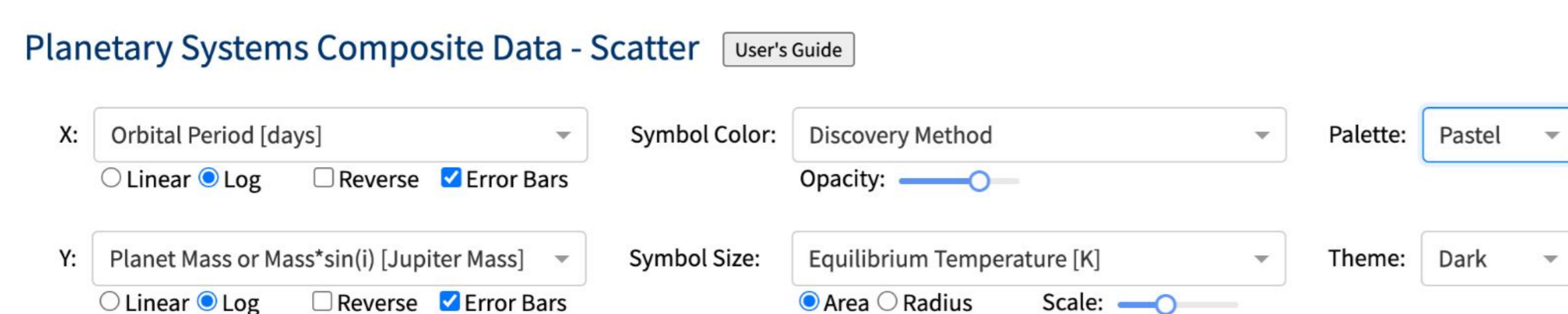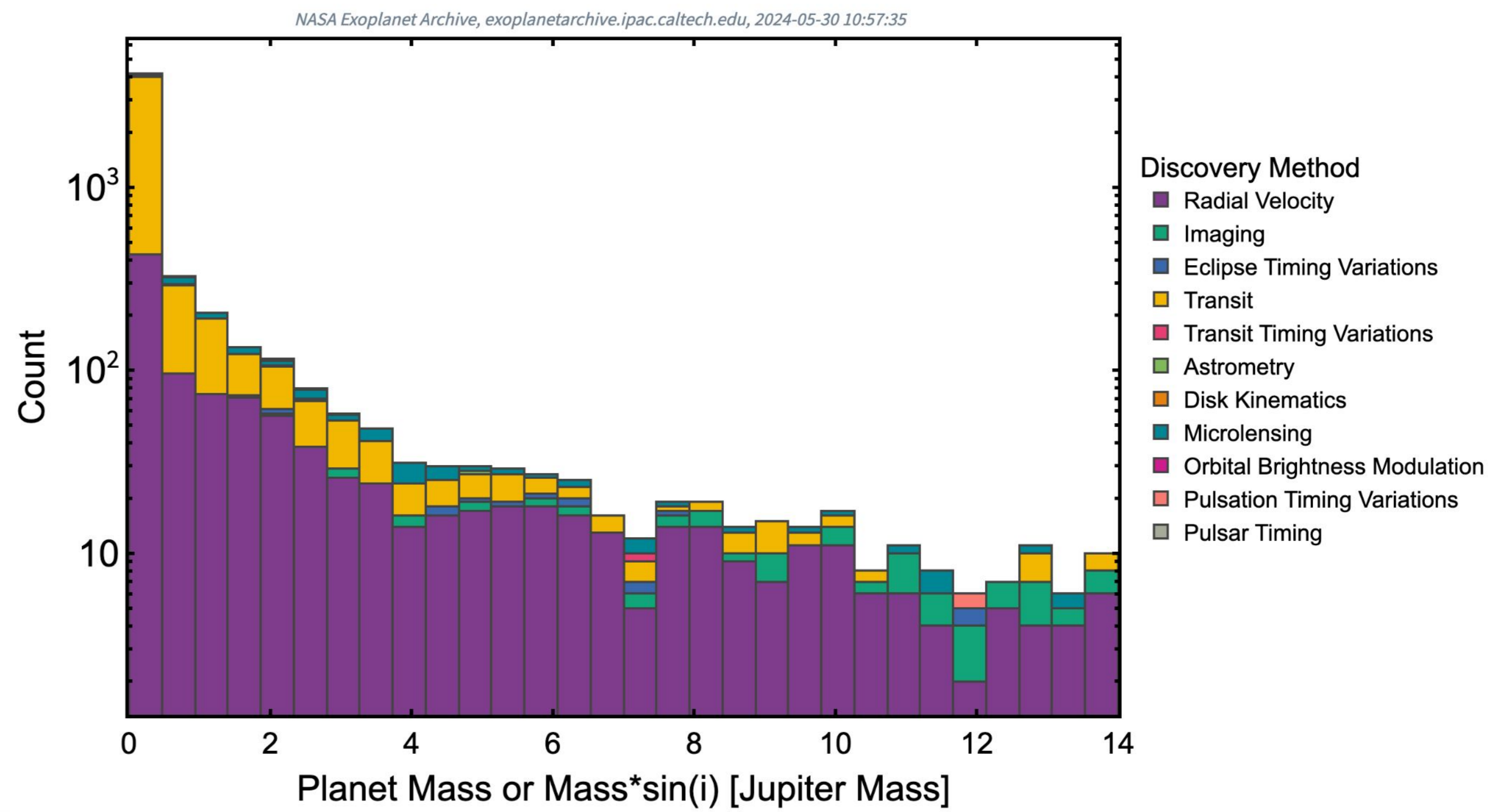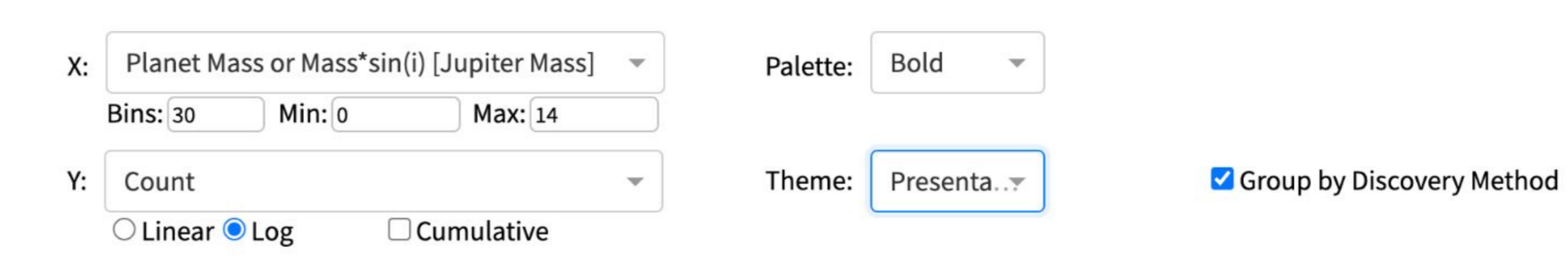
Fig. 1c: Dark themed scatter plot of exoplanet masses vs orbital periods, including error bars, with symbol size scaling as planet temperature and symbol color representing discovery method. Axes can be reversed, shown on logarithmic or linear scale, and error bars can be toggled on/off. Clicking on a data point in the plot will open the Exoplanet Archive Overview page for that specific planet.

## Exoplanet Spectra

The new Atmosphere Environment provides a unified interface to browse, visualize, plot, and download all of the emission/eclipse and transmission spectra in the NASA Exoplanet Archive.

- Currently supports transmission and emission/eclipse spectroscopy. Spectra of directly imaged exoplanets will be supported by end of summer
- Overplotting for easy comparison between different instruments or different planets with the same instrument
- All data are available for downloaded in multiple formats
- Holdings substantially complete for JWST, and completing the HST and Spitzer holdings is a high priority. Ground- based spectra are also supported - if there is a particular target or spectrum you would like to see, let us know!
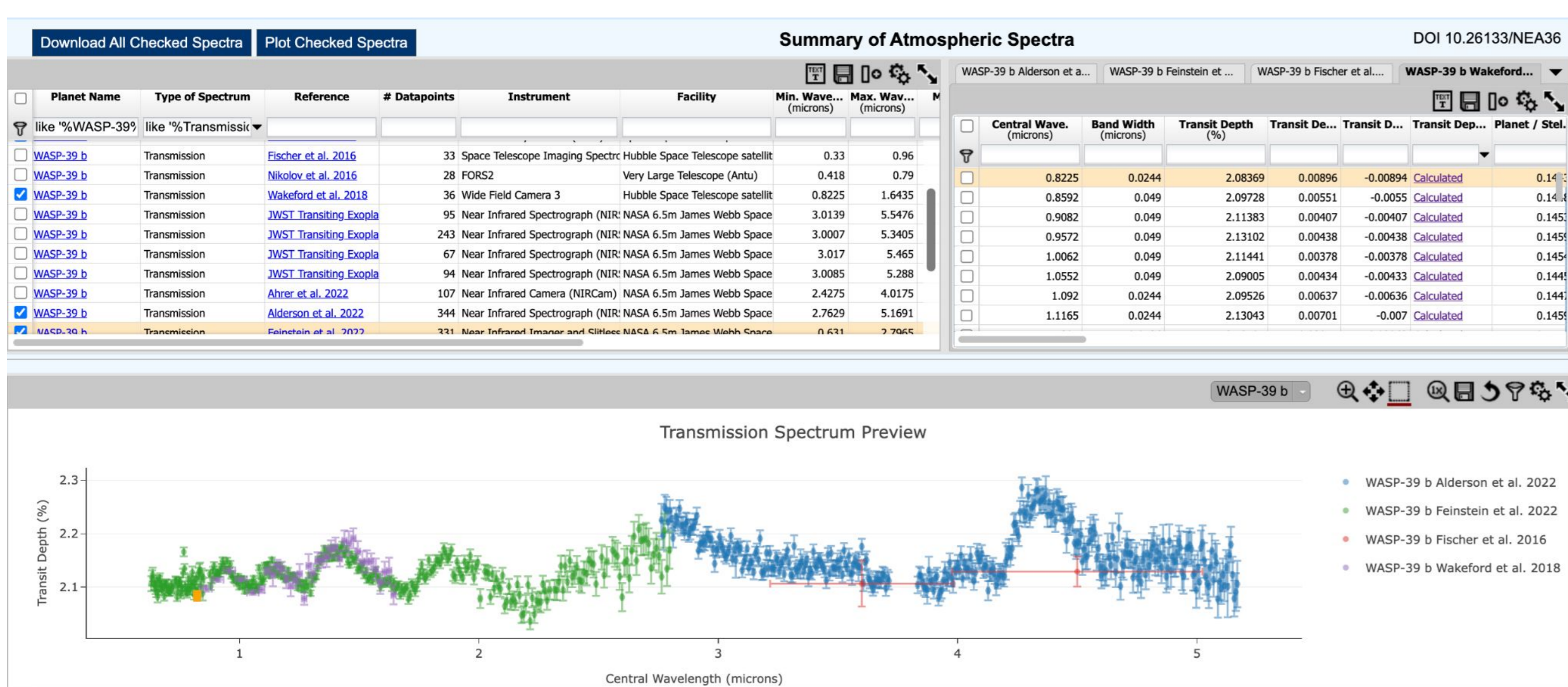


Fig. 2: Combined transmission spectrum of WASP-39 b showing HST, JWST, and Spitzer spectroscopic data.

## Transit Visibility

The Transit and Ephemeris Service, which allows orbit predictions for observation planning, now includes in its results table a link to a target and transit event airmass plot. The plots are interactive and show detailed event data regarding transit visibility and observing times for a given night and observatory.
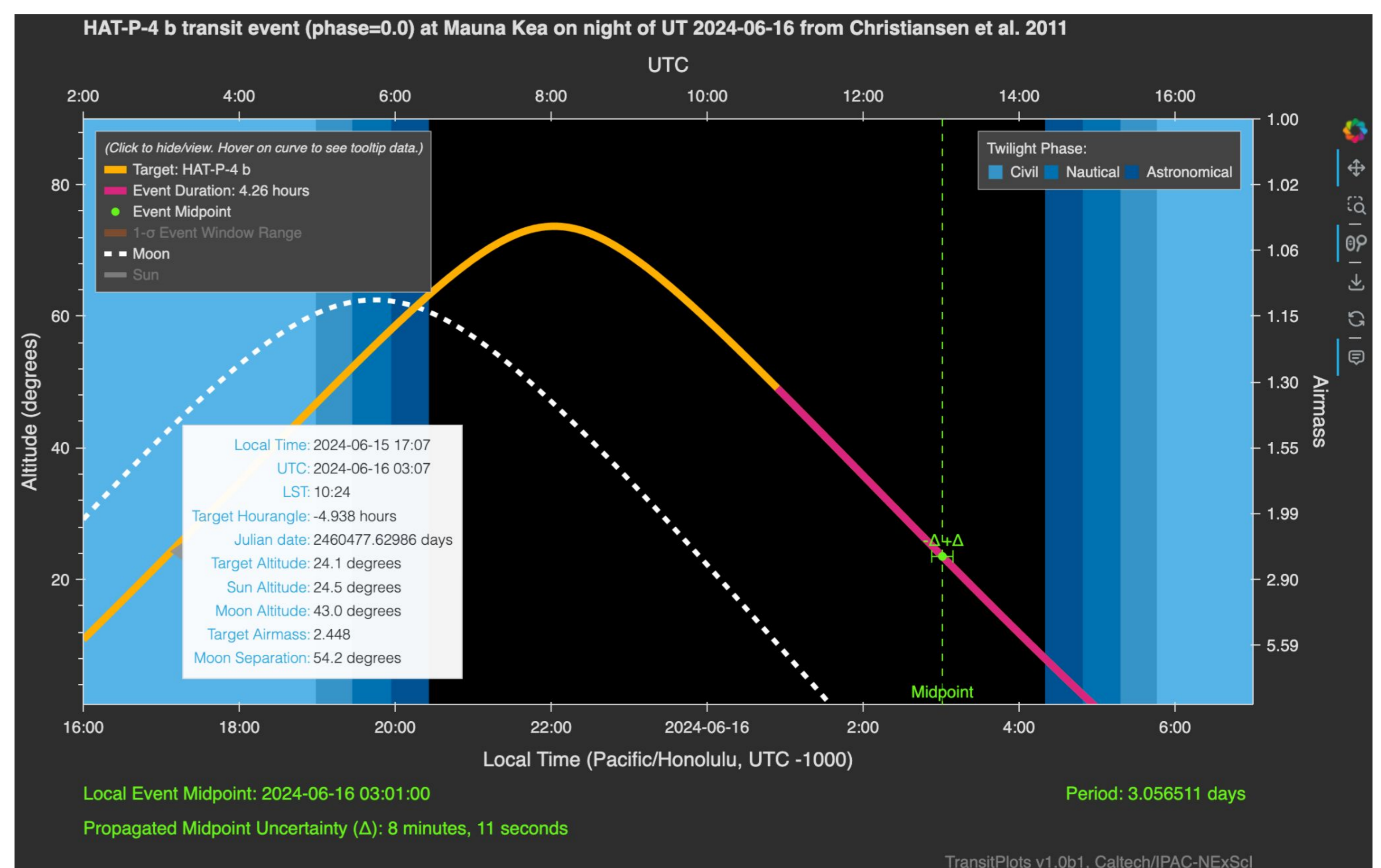


Fig. 3: Transit event airmass for HAT-P-4 b from Mauna Kea on night of 2024-06-16, predicted from Christiansen et al. 2011 ephemerides.