

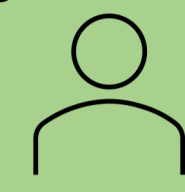
TOI-2498 b: A hot, bloated Super-Neptune in the Neptune desert

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(to be submitted soon!)

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1 The System

Stellar parameters

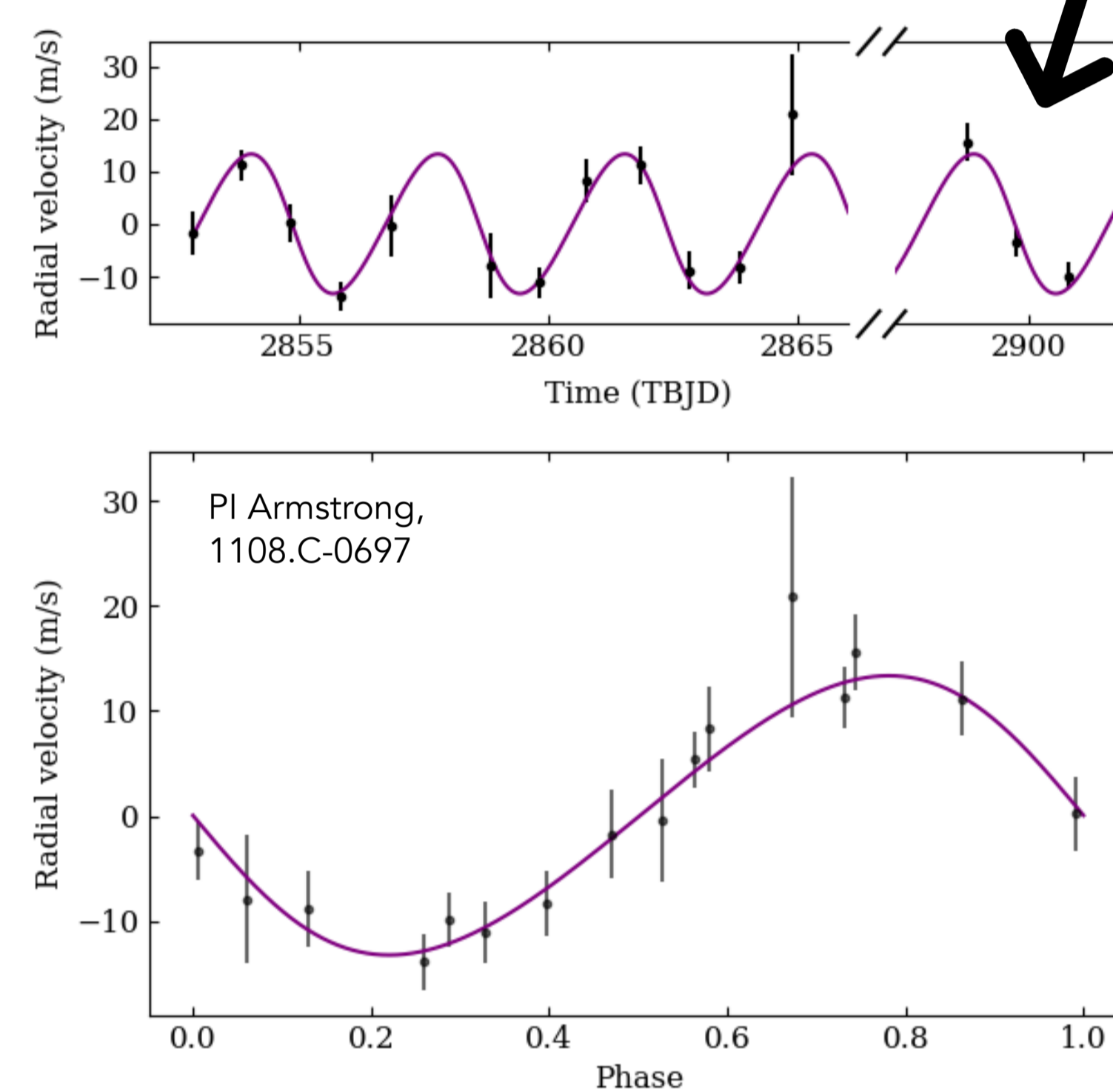
Vmag: 11.2 mag
Mass: $1.09 \pm 0.02 M_{\odot}$
Radius: $1.28 \pm 0.03 R_{\odot}$
T_{eff}: 5905 ± 12 K

Planet parameters

P_{orb}: 3.728 days
Mass: $34.02 \pm 4.14 M_{\oplus}$
Radius: $6.27 \pm 0.27 R_{\oplus}$
Density: 0.76 ± 0.2 g cm⁻³

3 Analysis

- We construct a **joint model** using the **exoplanet** [4] package – including both photometry and spectroscopy.
- We use a **PYMC3** [5] MCMC sampler to constrain our parameters.
- We search for additional planets through analyzing radial velocity periodograms and looking for **transit timing variations**.



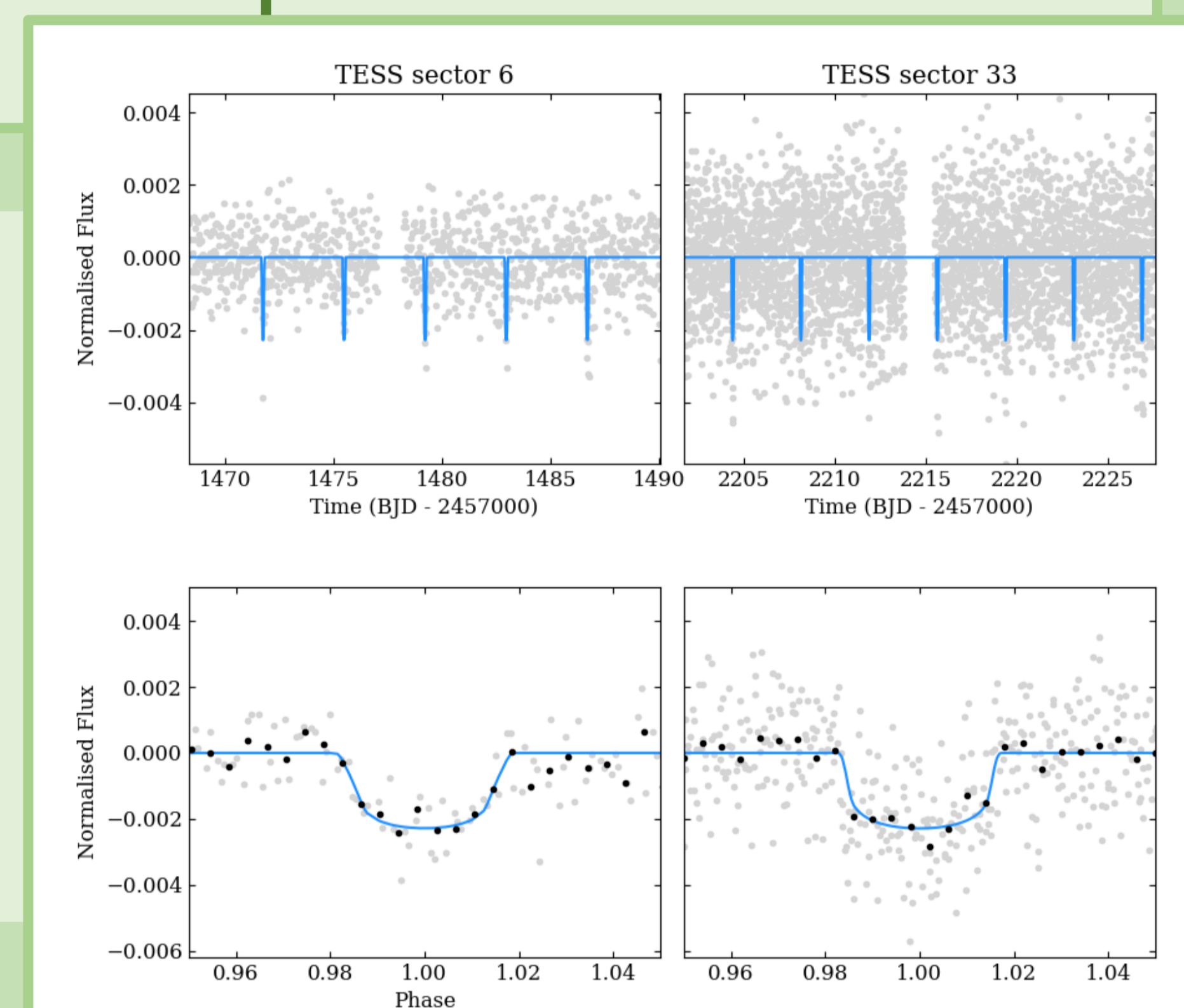
2 The Data

Spectroscopy

16 radial velocity measurements from **HARPS** [1]

Photometry

1 partial and 2 full transits from **LCOGT** [2]
12 full transits from **TESS** [3] sector 6 (30 min cadence) and sector 33 (2 min cadence)

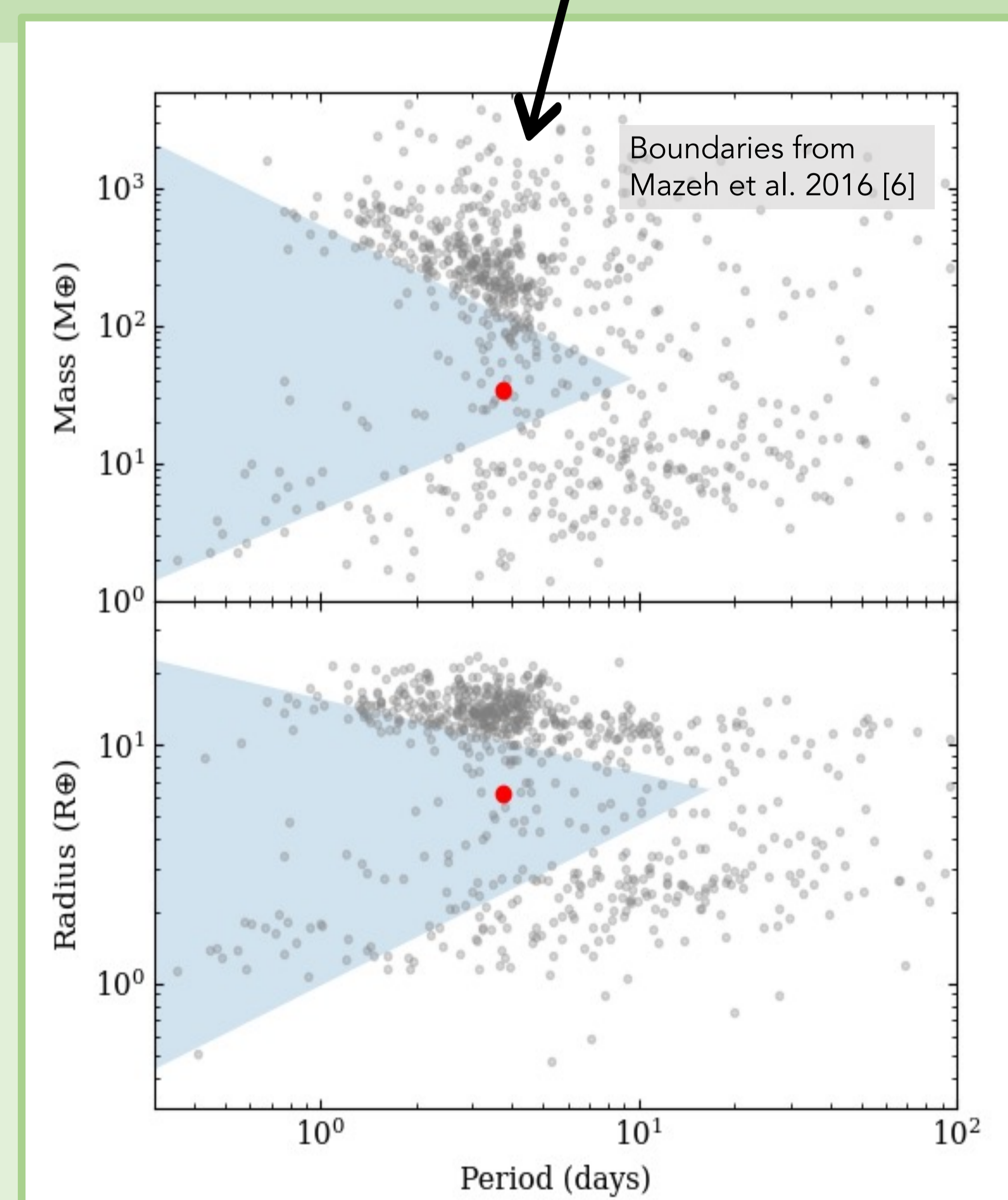
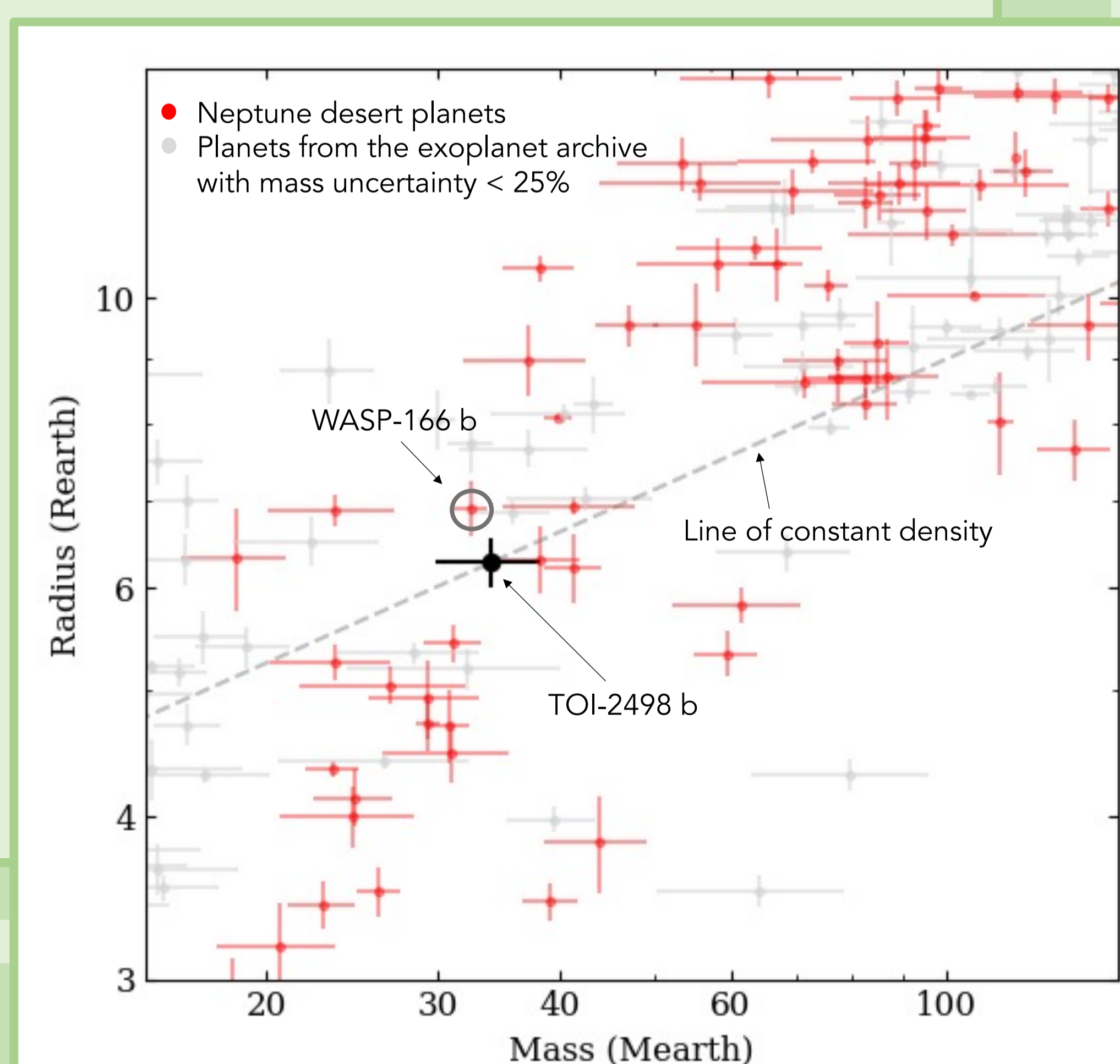


4 Results

- TOI-2498 b is a **hot bloated Super-Neptune** transiting a G-type star.
- We estimate a **single-planet system**.
- TOI-2498 b is within the **Neptune desert**.

5 Discussion

- We model the **evaporation history** [8] and find that TOI-2498 b likely started as a **Saturn-sized planet** before reducing in size over its 3.6 ± 1.1 Gyr lifespan. We find that TOI-2498 b is now **stable to photoevaporation**.
- An estimated $30 \pm 7\%$ of the mass of TOI-2498 b is located in a gaseous envelope.
- TOI-2498 b is close to **WASP-166 b** [7] in MR space – could be a case for **comparative atmospheric studies**.



References

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- [4] Foreman-Mackey D., et al., 2021, exoplanet-dev/exoplanet v0.4.4
- [5] Salvatier J., Wiecki T. V., Fonnesbeck C., 2016a, Astrophysics Source Code Library, pp ascl-1610
- [6] Mazeh T., Holzer T., Faigler S., 2016, Astronomy & Astrophysics, 589, A75
- [7] Hellier C., et al., 2019, Monthly Notices of the Royal Astronomical Society, 488, 3067
- [8] Fernández Fernández et al. (submitted)

Electronic version of this poster!



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