Desiccation of the Trappist-1 Planets

Draft 0.0

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2 The Model

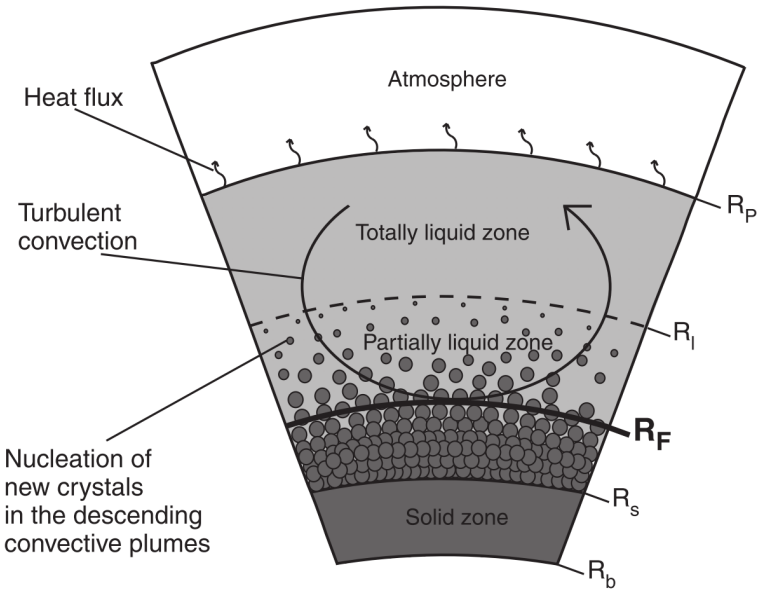

Figure 1: Structure of the magma ocean at a time step during the solidification process. r_p is the radius of the planet, at r_l the temperature equals the liquidus temperature, at r_s the solidus temperature, and r_b is the bottom of the initially molten magma ocean. From Lebrun et al. (2013).

3 Validation with GJ1132b

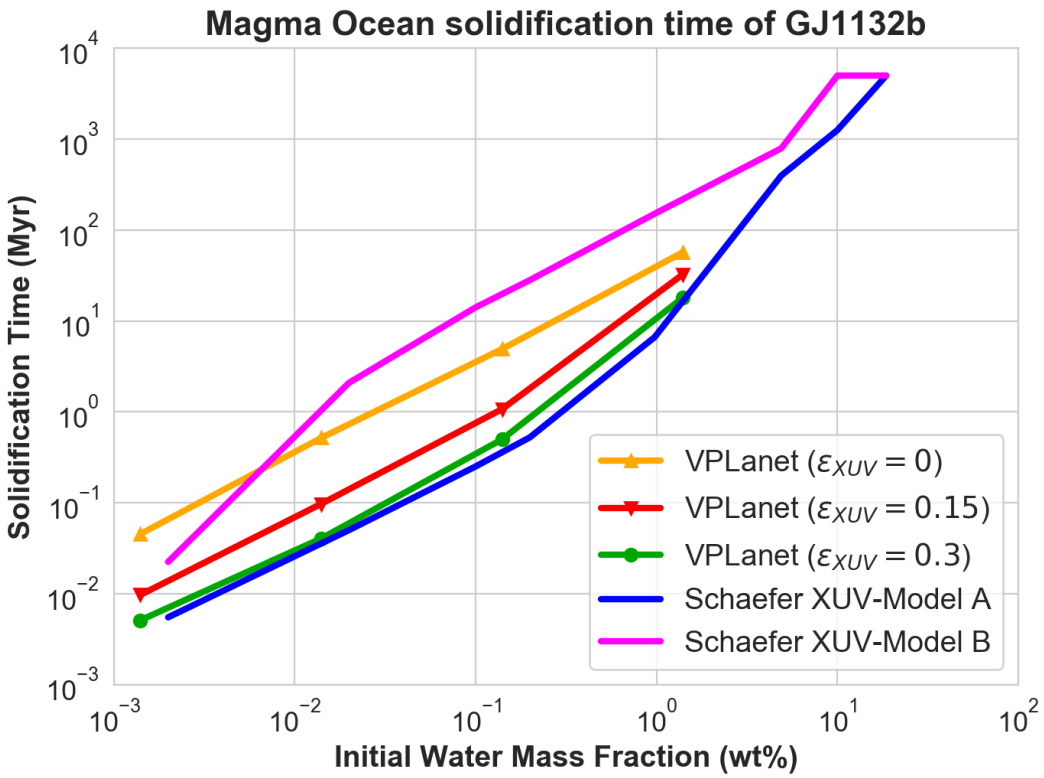

Figure 2: Solidification time of GJ1132b's mantle depending on the initial water mass fraction. Results with VPLanet for three different XUV absorption efficiencies (0, 0.15, 0.3) are compared to the results from Schaefer et al. (2016) (Fig. 5).

4 Trappist-1

4.1 Time Evolution

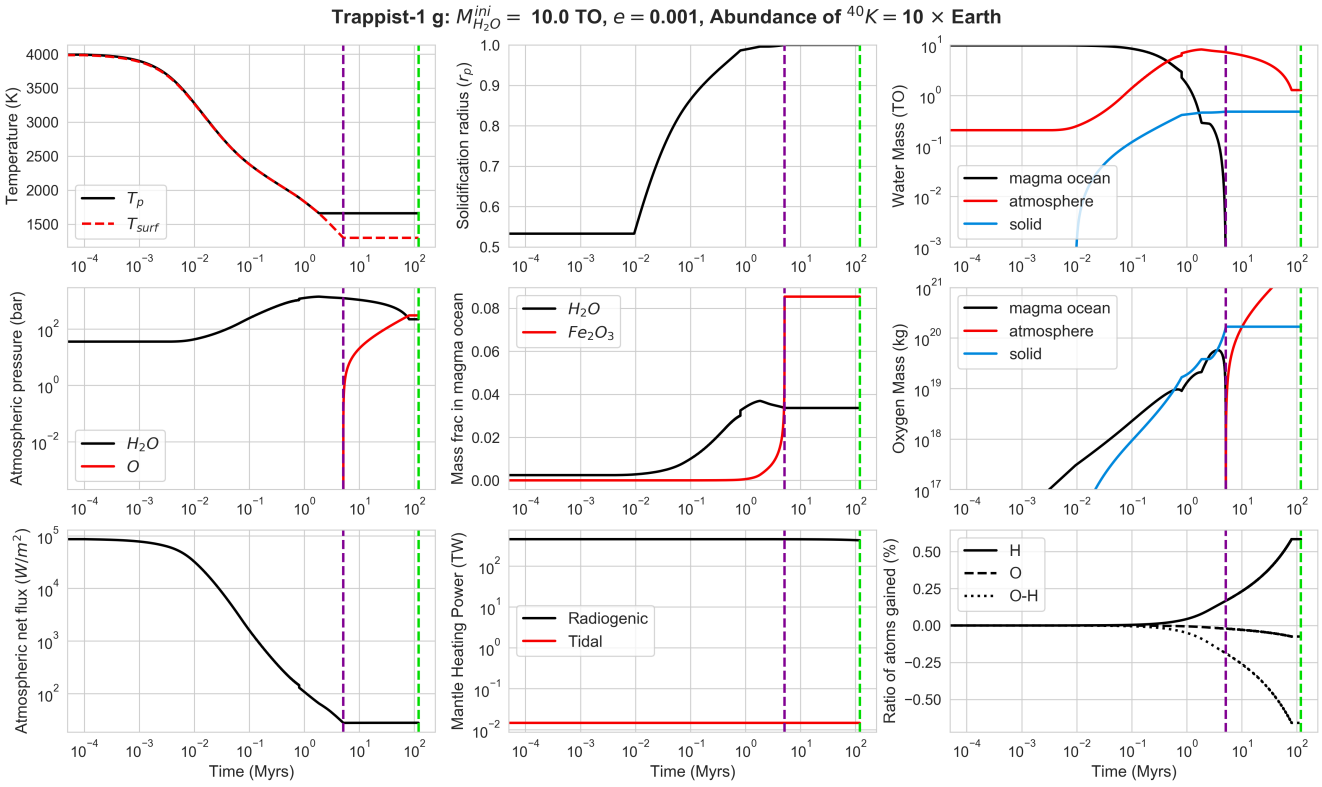

Figure 3:

4.2 Results

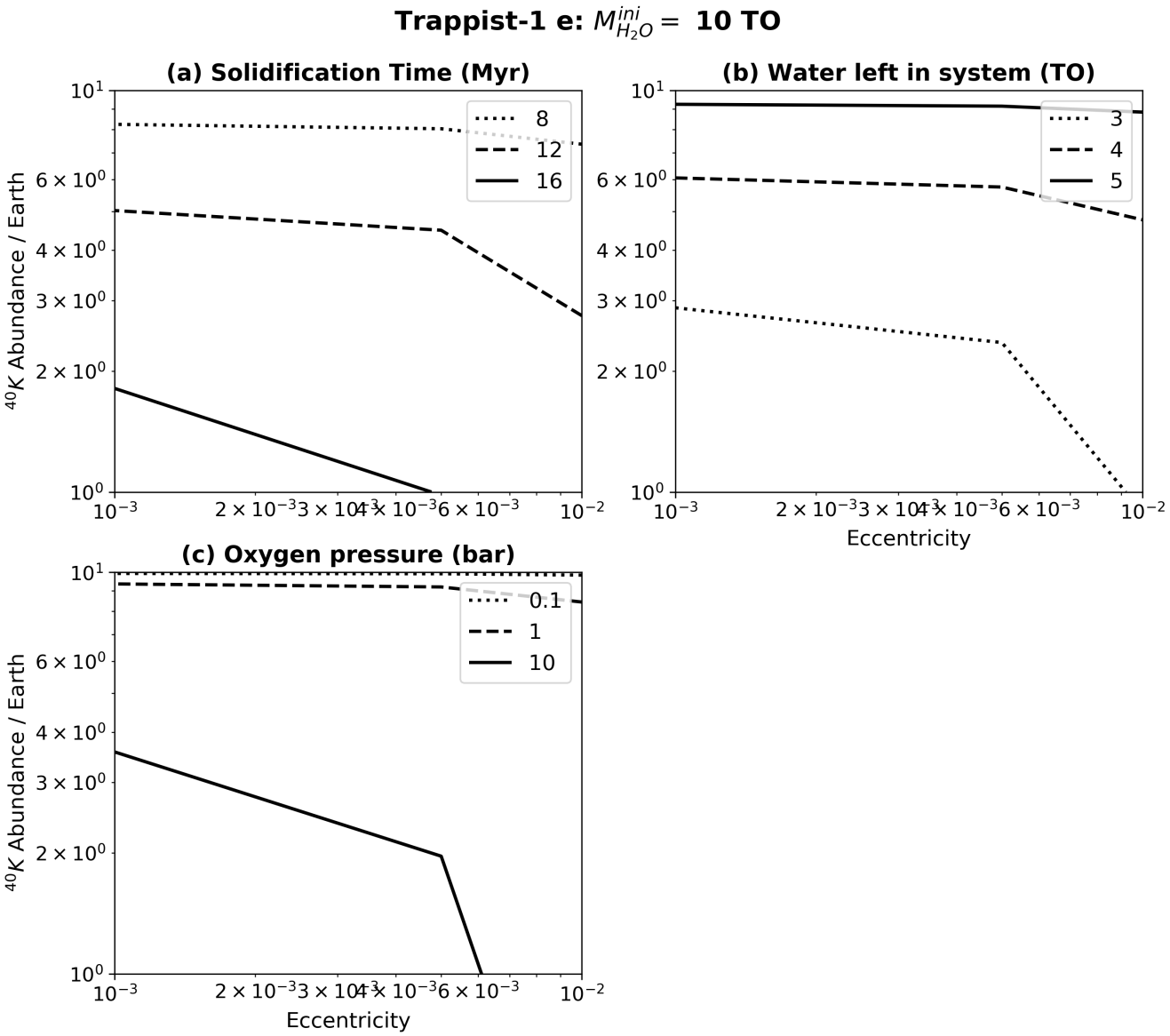

Figure 4:

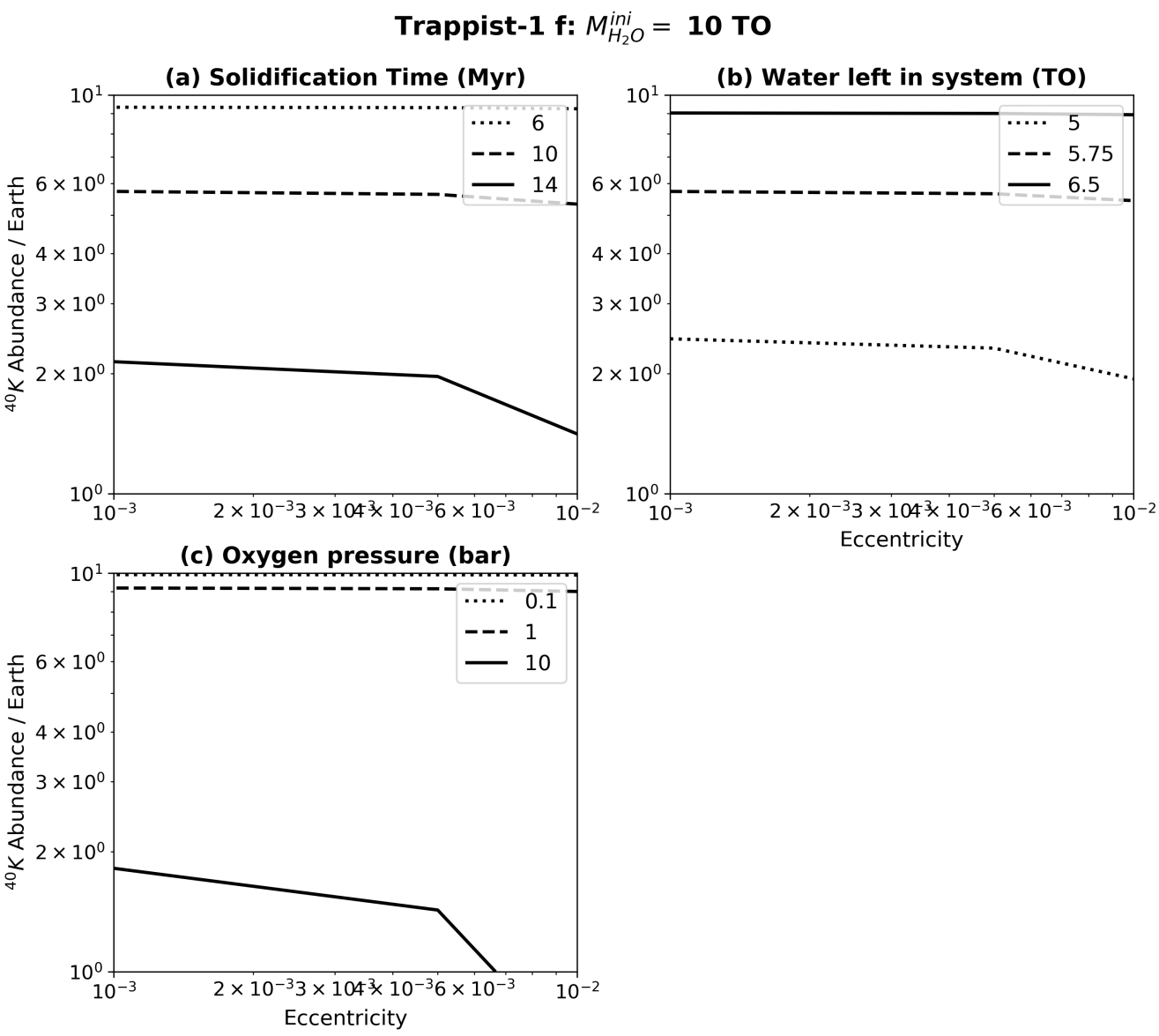
Trappist-1 f: $M^{ini}_{H_2O}$ = 10 TO
(a) Solidification Time (Myr)
(b) Water left in system (TO)
(c) Oxygen pressure (bar)
^{40}K Abundance / Earth
Eccentricity
6
10
14
5
5.75
6.5
0.1
1
10

Figure 5:

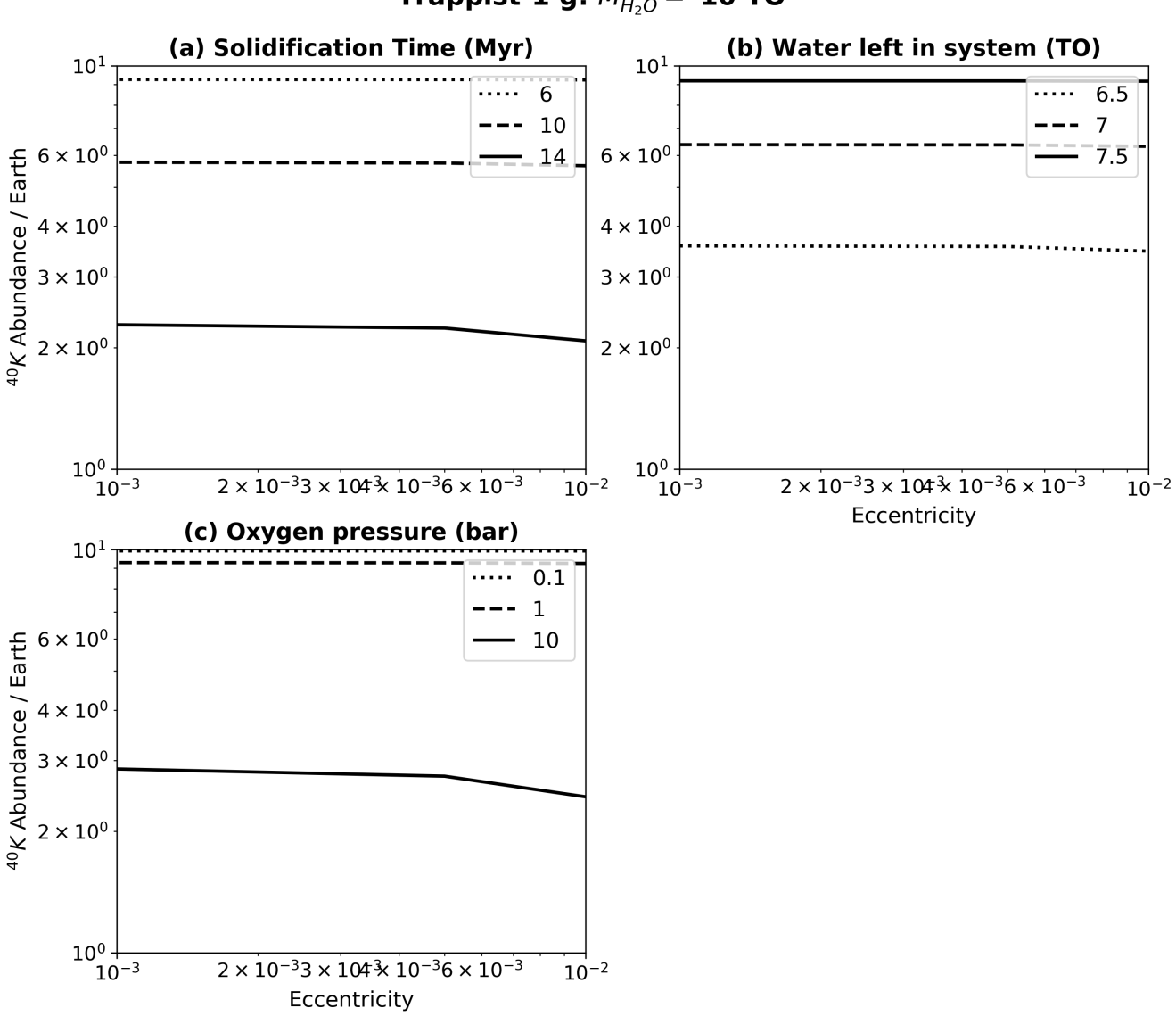

Figure 6:

5 Conclusions

References

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L Schaefer, R D Wordsworth, Z Berta-Thompson, and D Sasselov. Predictions of the Atmospheric Com-

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