

# Molten exoplanets as a window into the earliest Earth

TIM LICHTENBERG

Mark A. Garlick / markgarlick.com

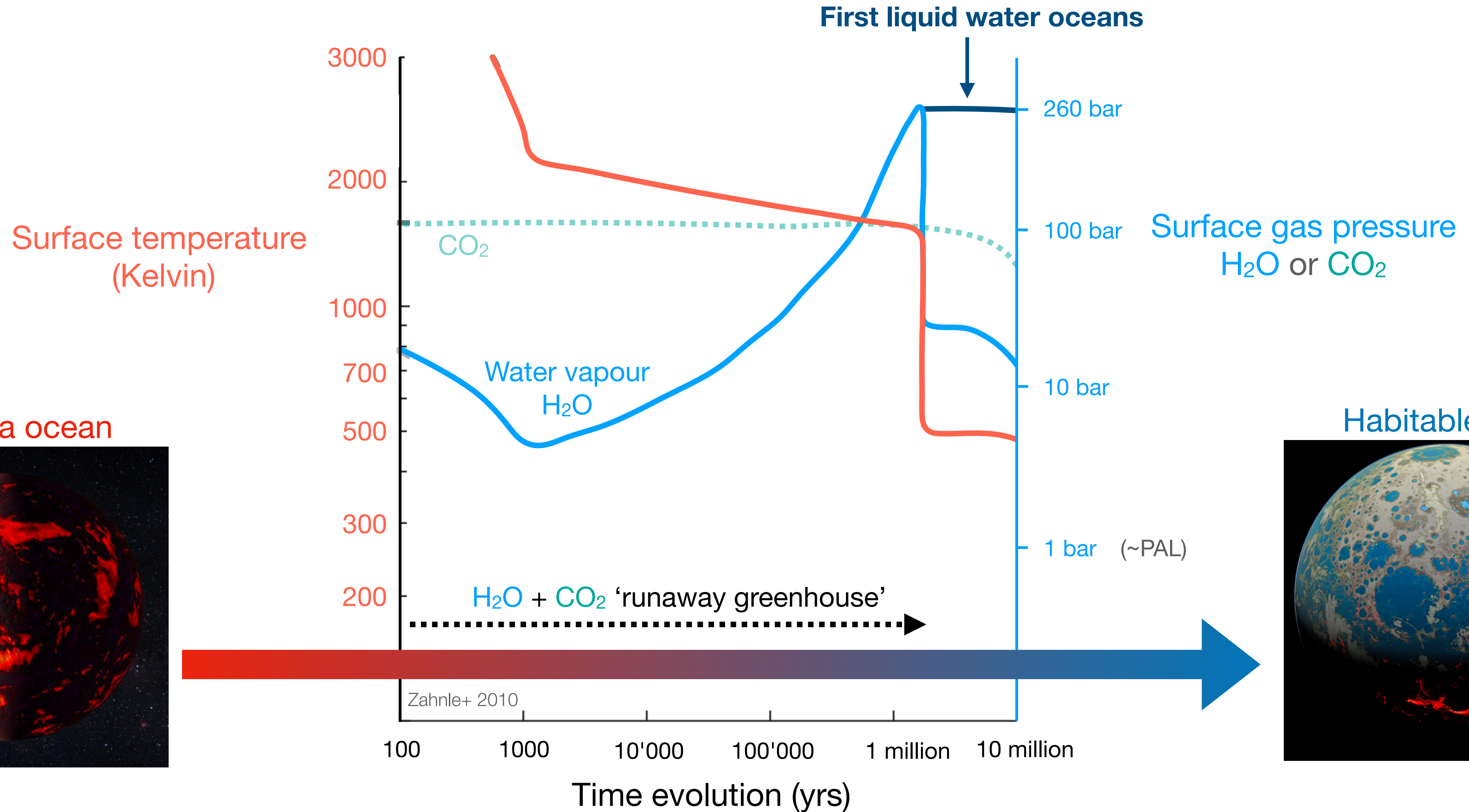


# Hadean Earth: heaven or hell?

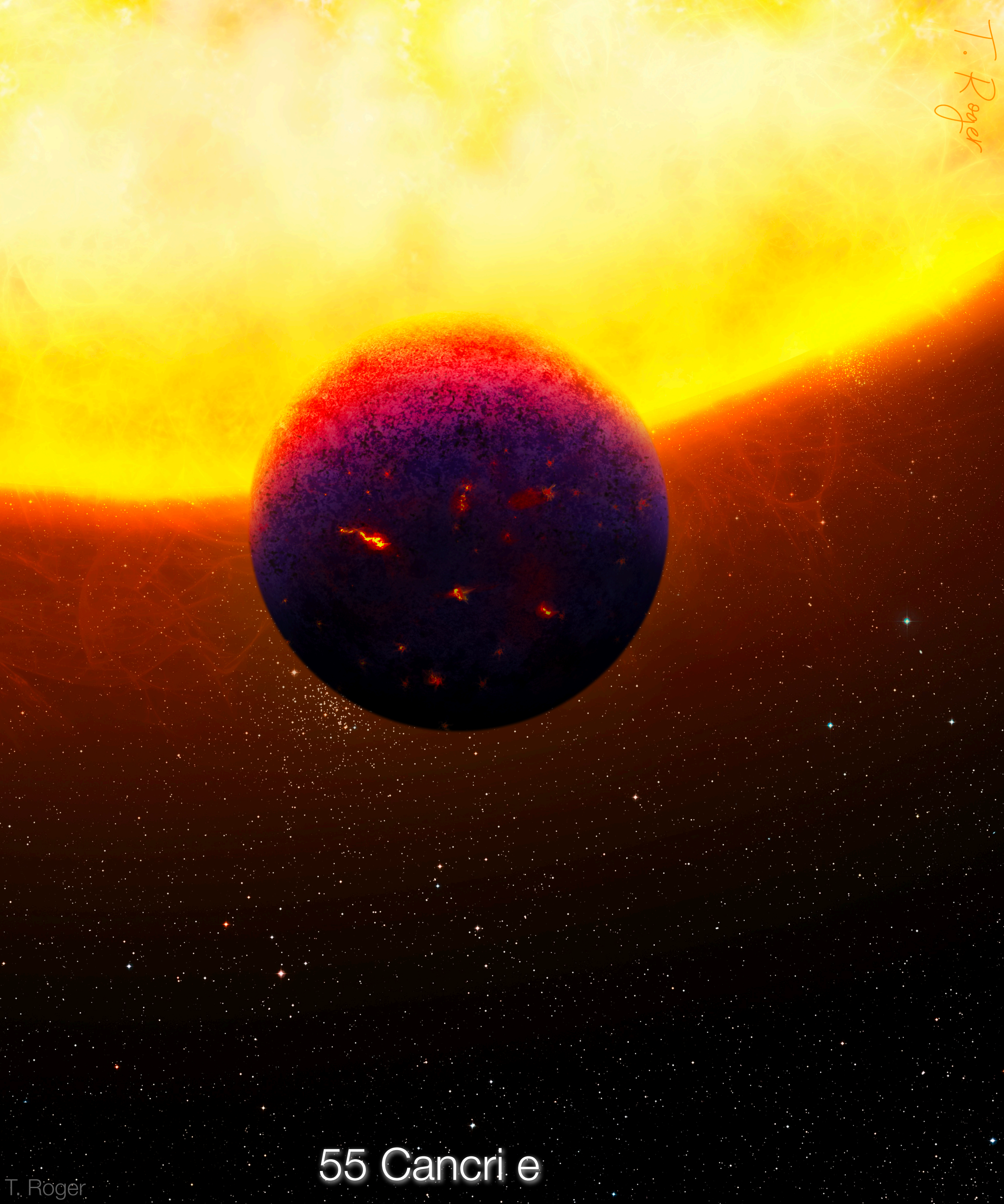




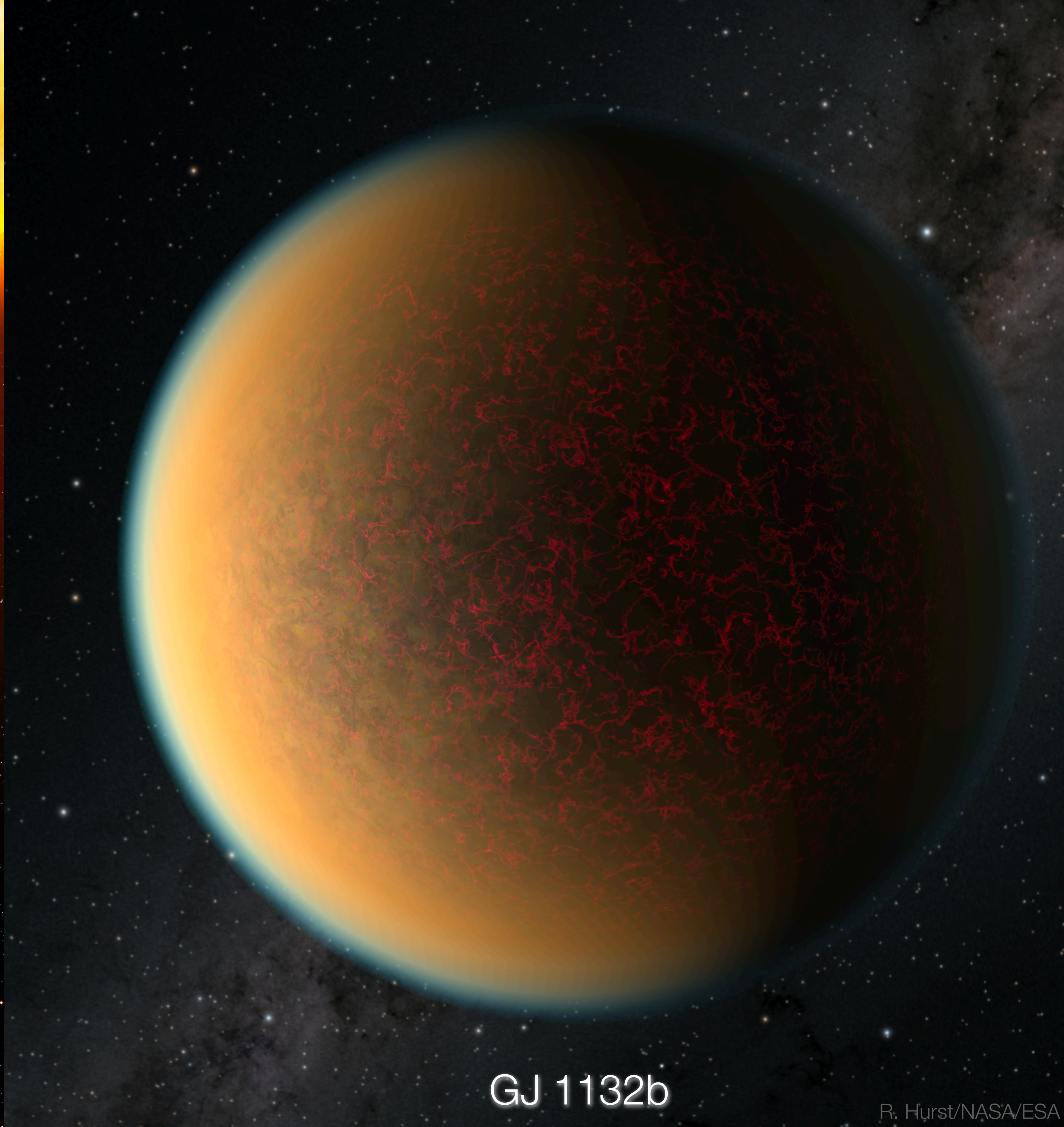
# From magma- to water oceans







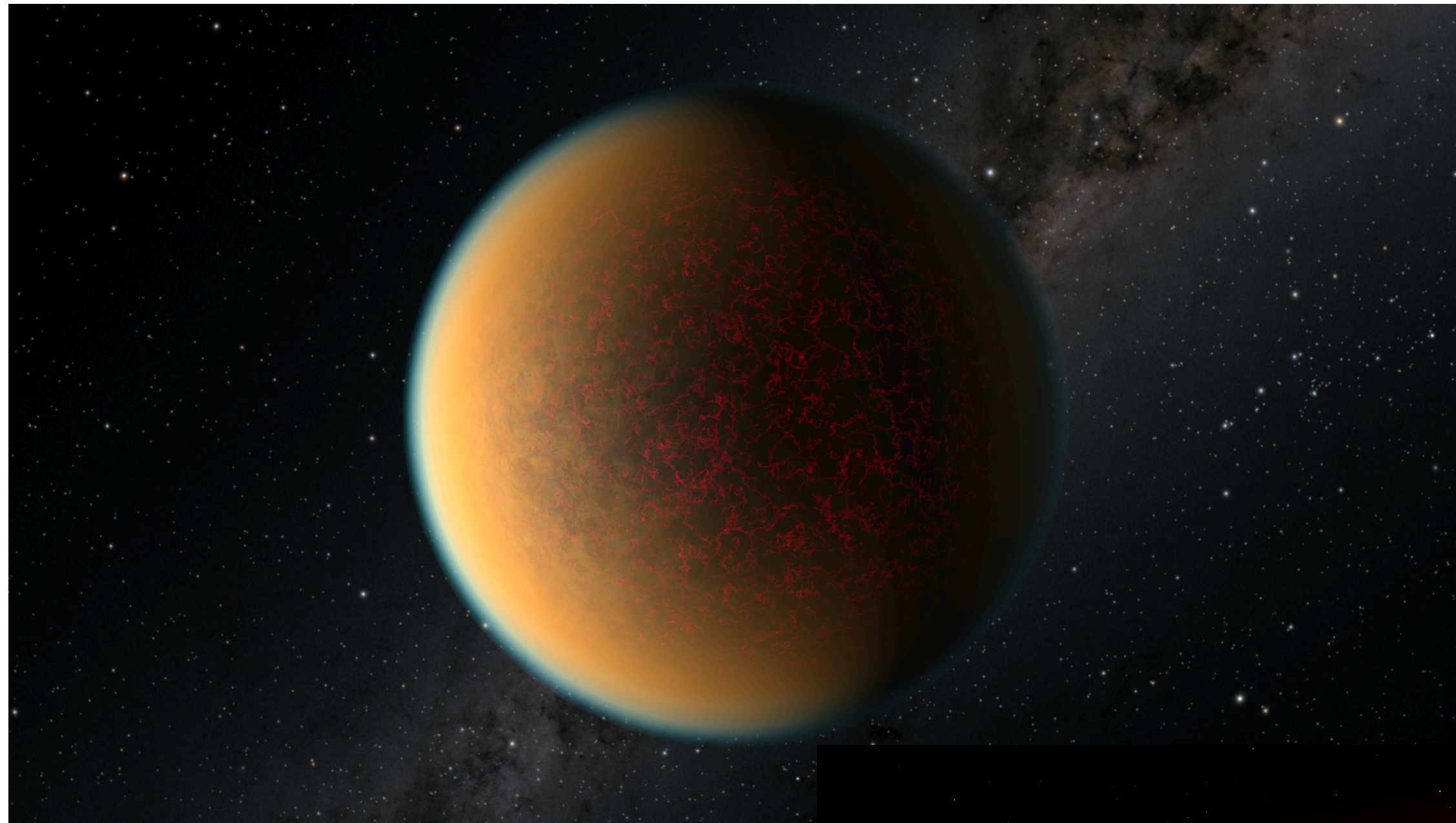
55 Cancri e



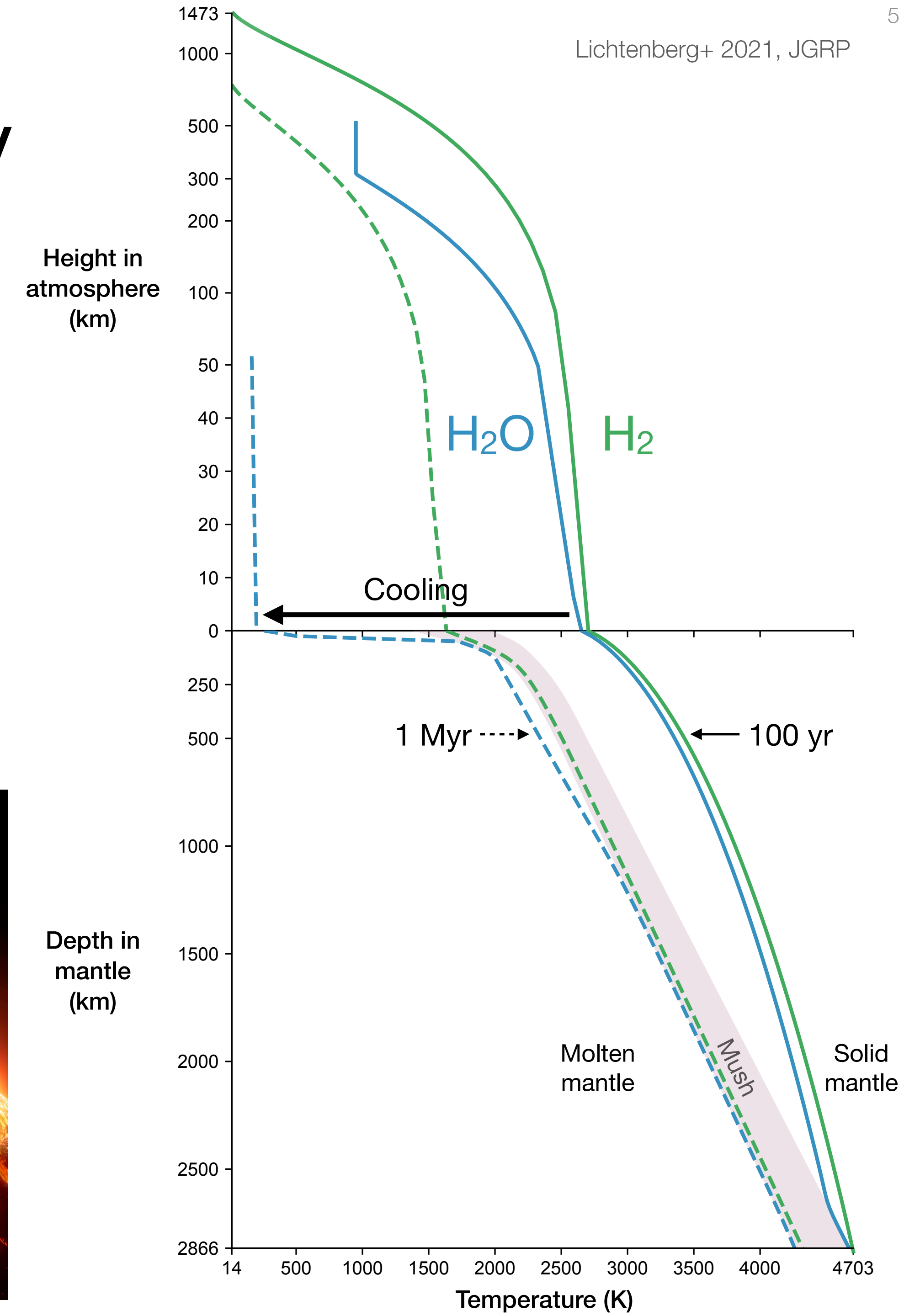
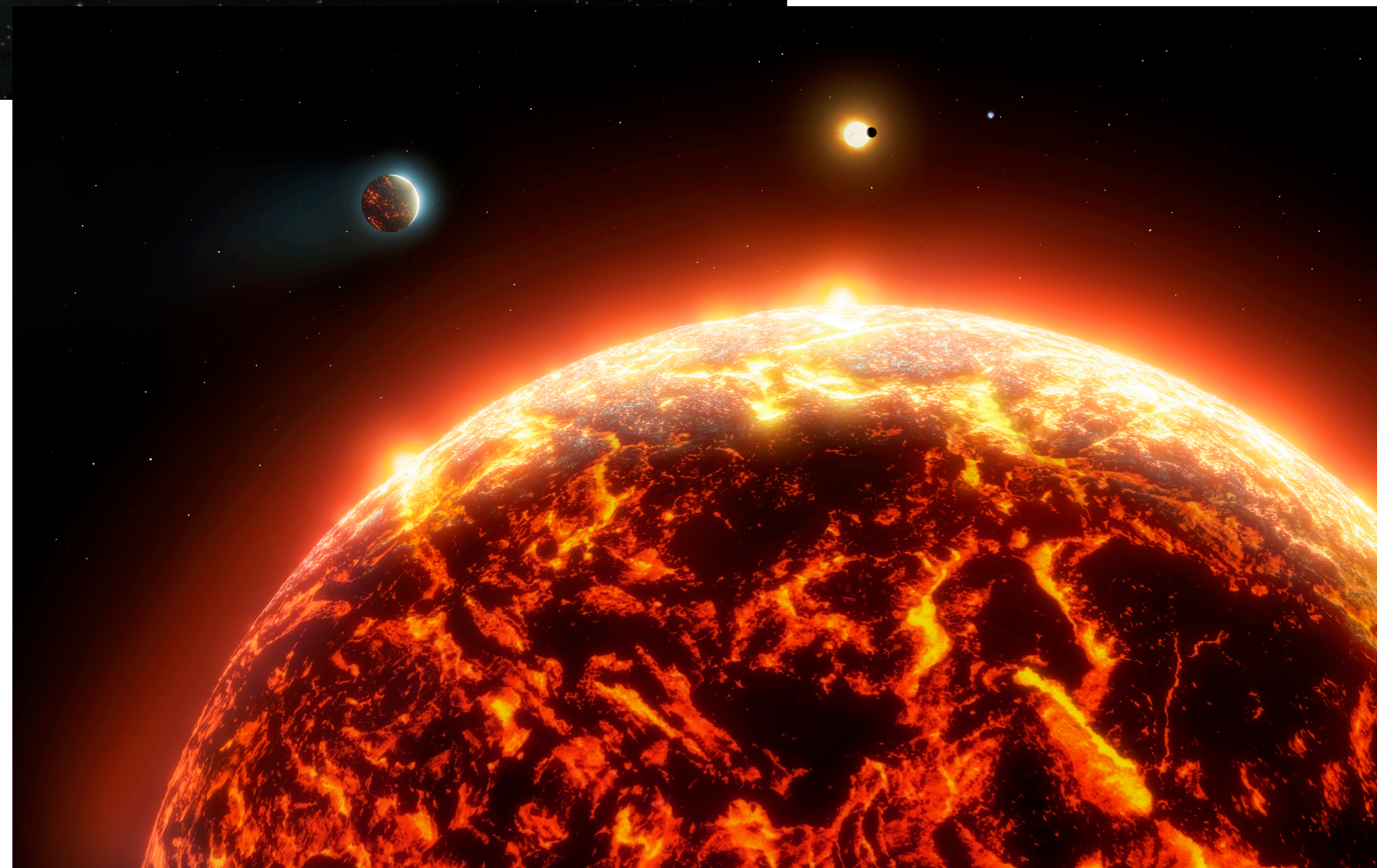
GJ 1132b



# Hot atmospheres are puffy

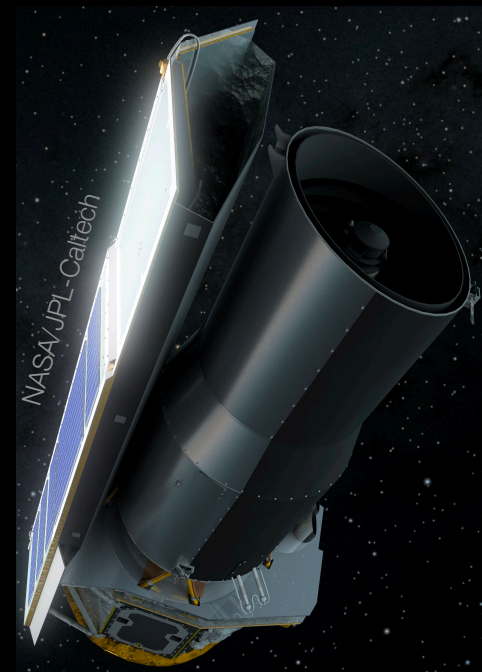


Puffiness depends  
on composition

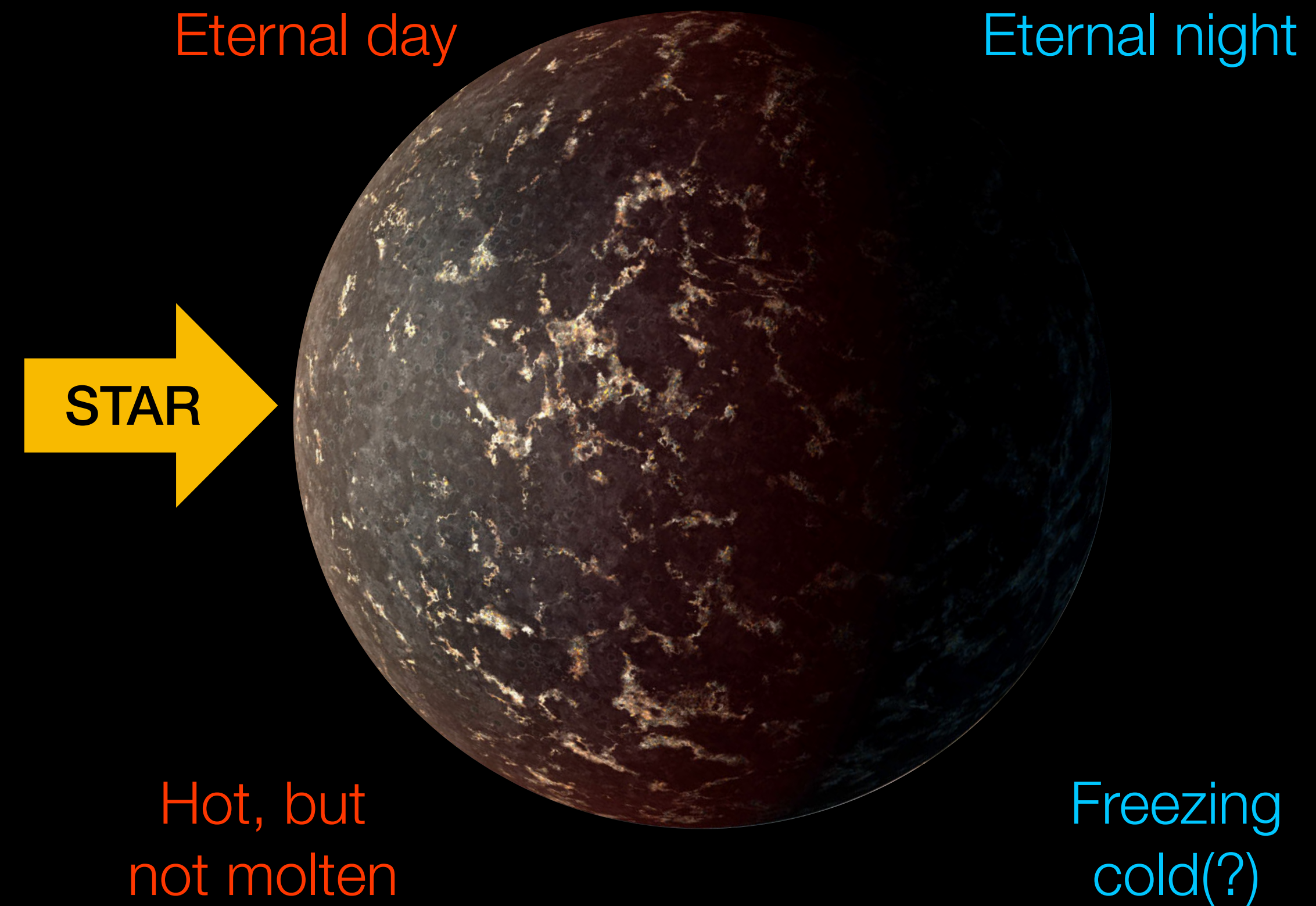
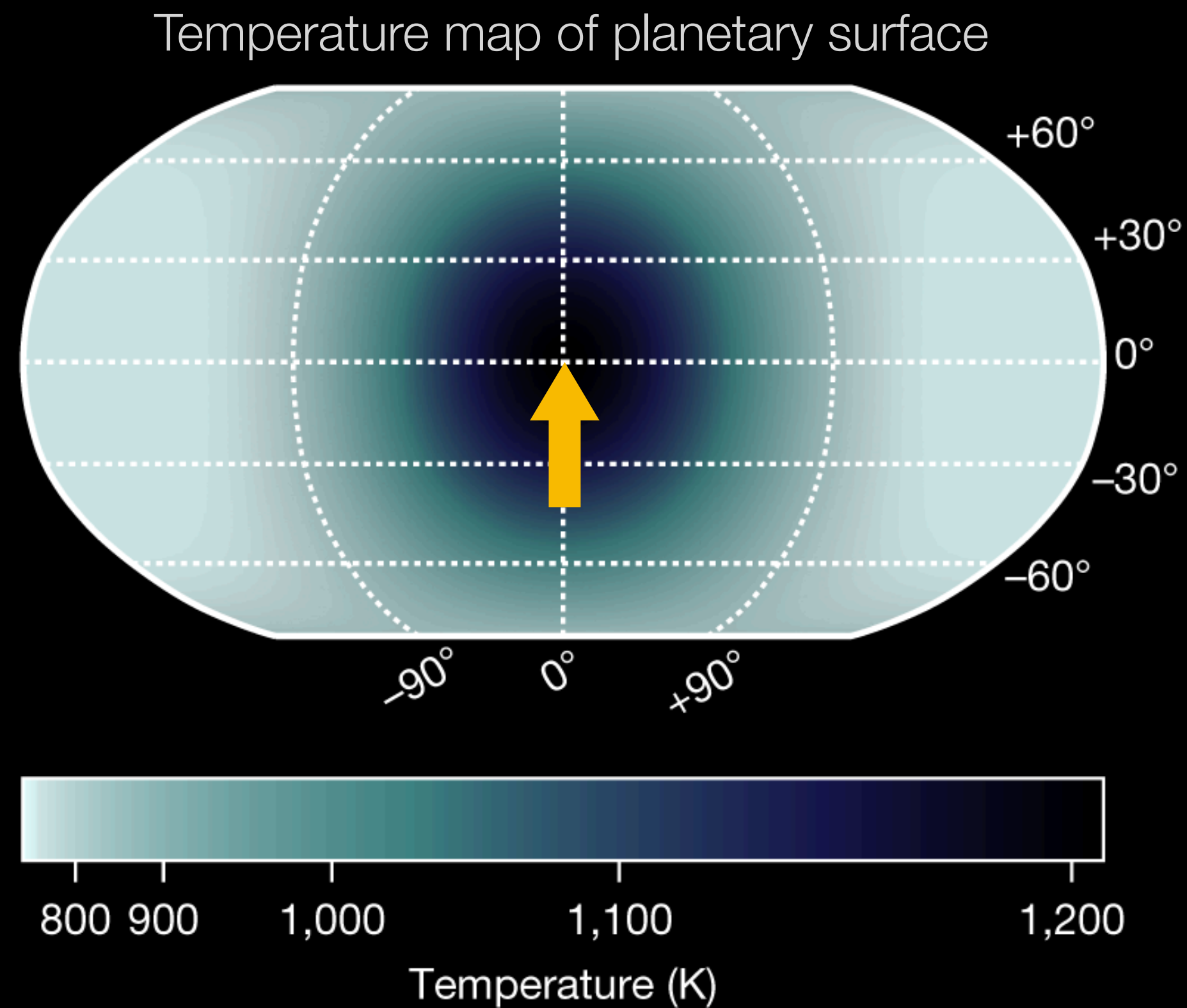




# A naked planet: LHS 3844b

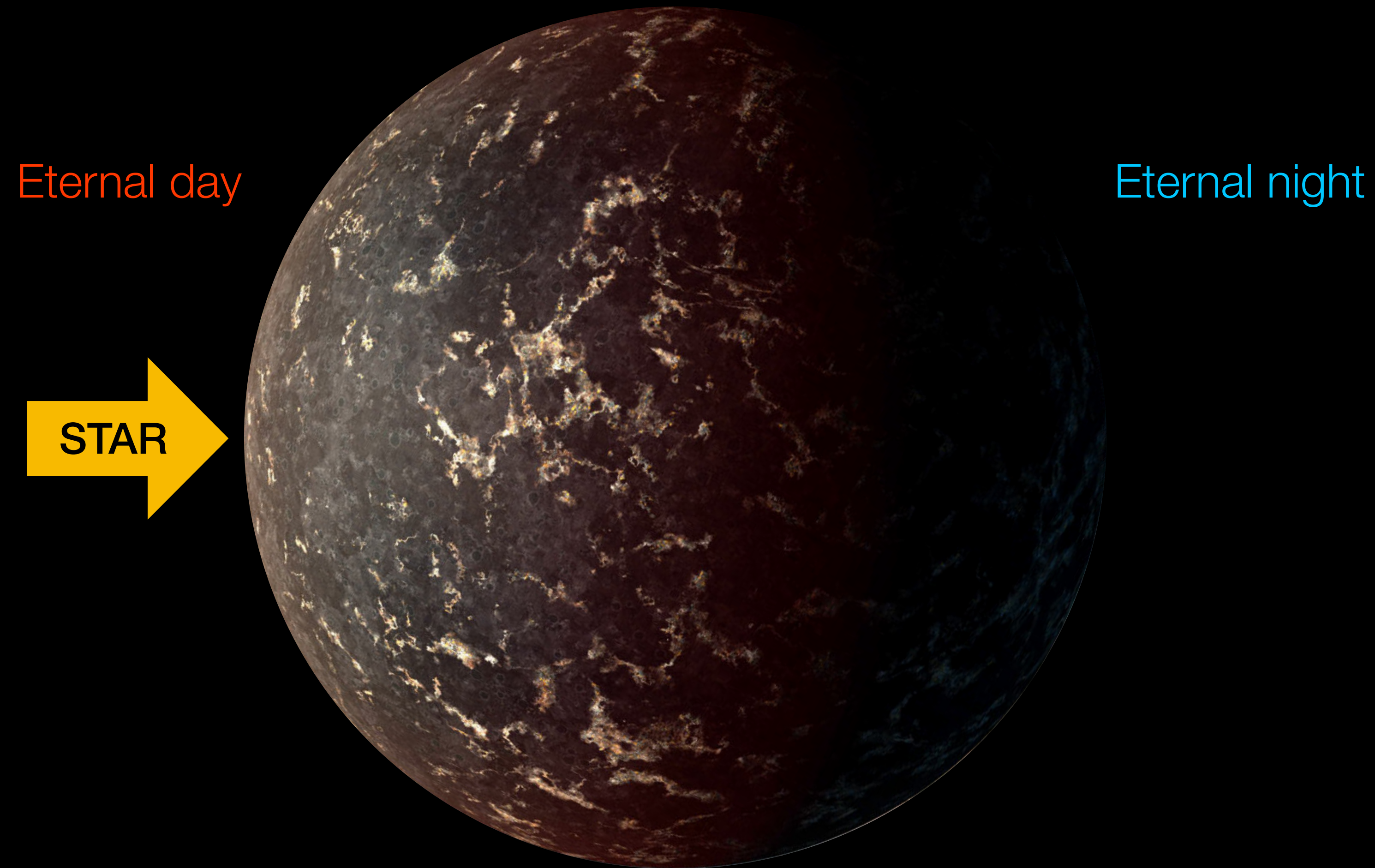


Spitzer space telescope



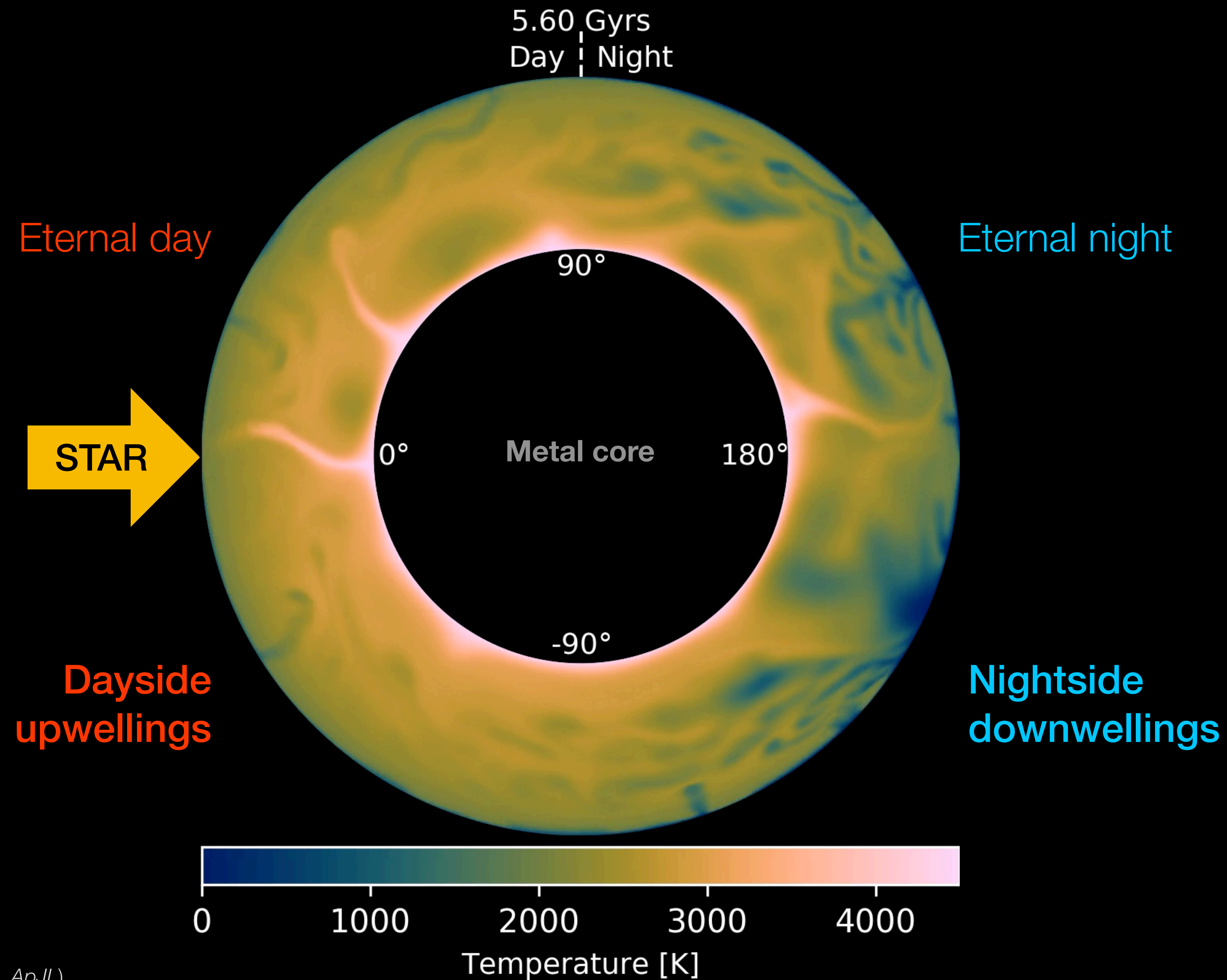


# A naked planet: LHS 3844b



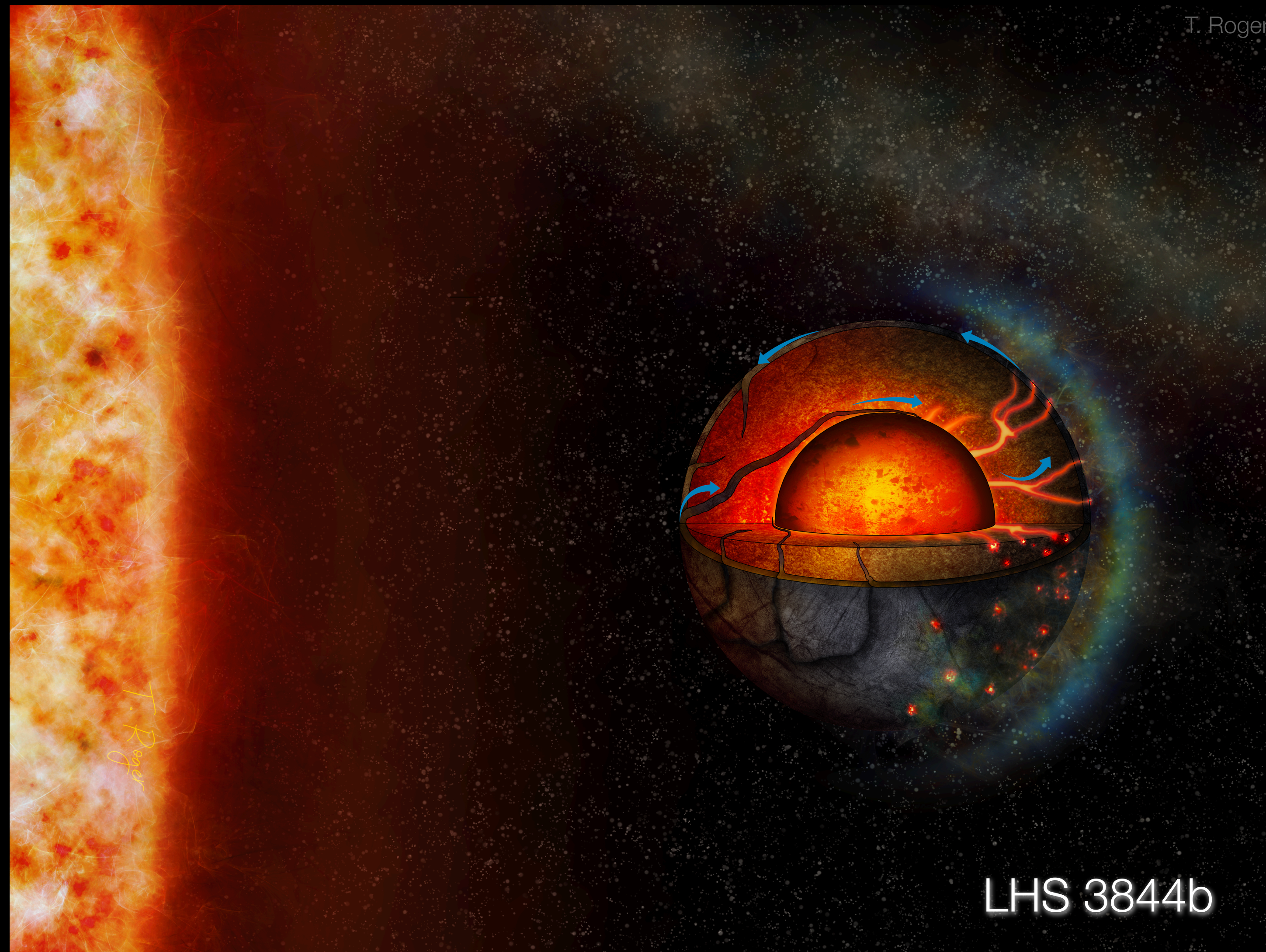


# Hemispheric tectonics on stripped super-Earths?





# Interior workings of a super-Earth





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Outgassing & tectonics determine the fate of rocky worlds

- ▶ Exoplanet climate & surfaces can be observationally probed
- ▶ Empirical tests for Early Earth scenarios
  - ➔ Informs studies on origins of life at home
  - ➔ Frequency of Earth-like climates on temperate orbits