



AMERICAN MUSEUM  
OF NATURAL HISTORY

# Revealing the Turbulent, Stormy Atmospheres of Giant Planet Analogs

Johanna Vos

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 [johannavos.github.io](https://johannavos.github.io)

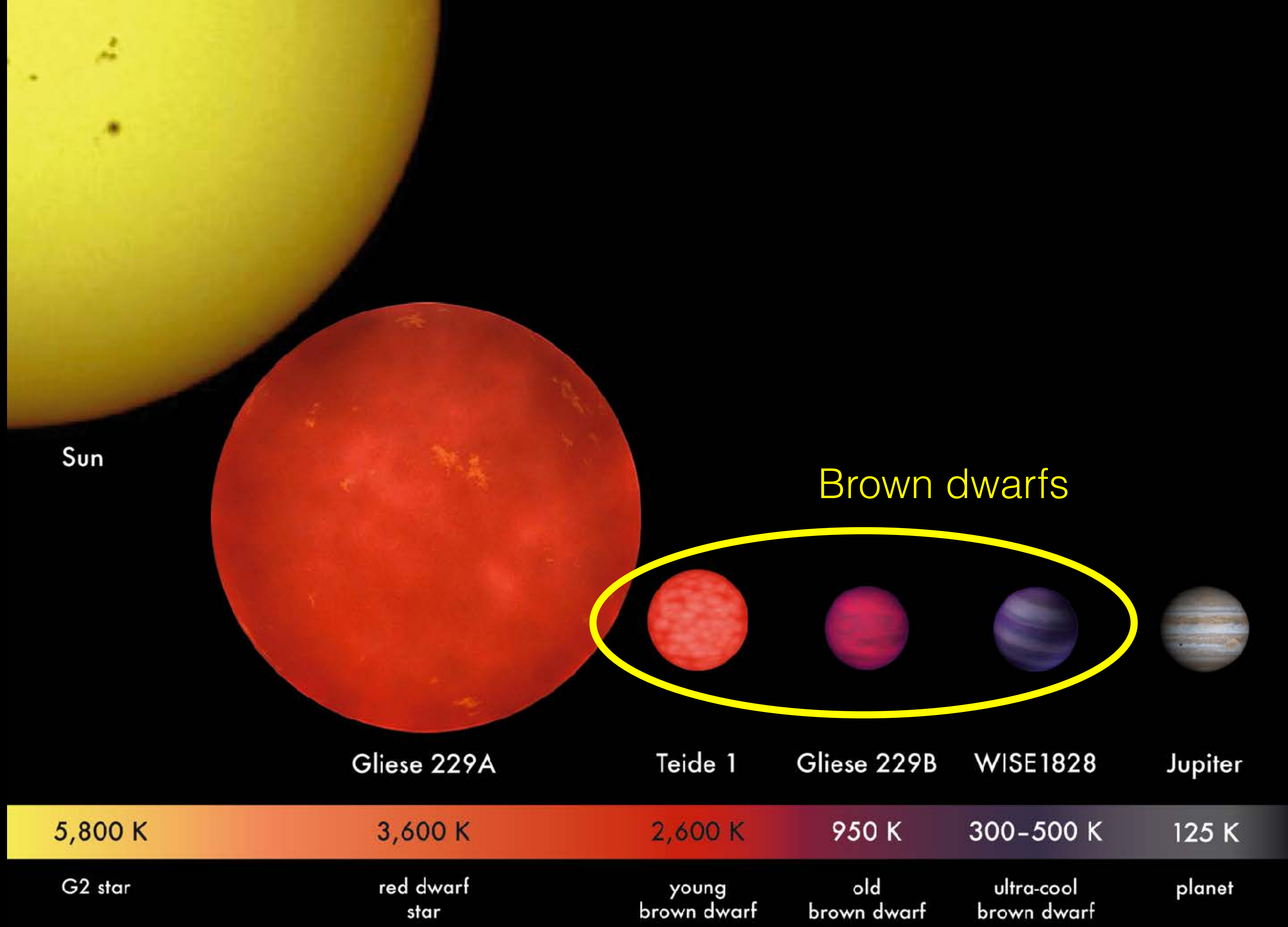
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## **Results in a nutshell:**

Young brown dwarfs show more dramatic weather patterns than old brown dwarfs.





Sun

Brown dwarfs

Gliese 229A

Teide 1

Gliese 229B

WISE 1828

Jupiter

5,800 K

3,600 K

2,600 K

950 K

300-500 K

125 K

G2 star

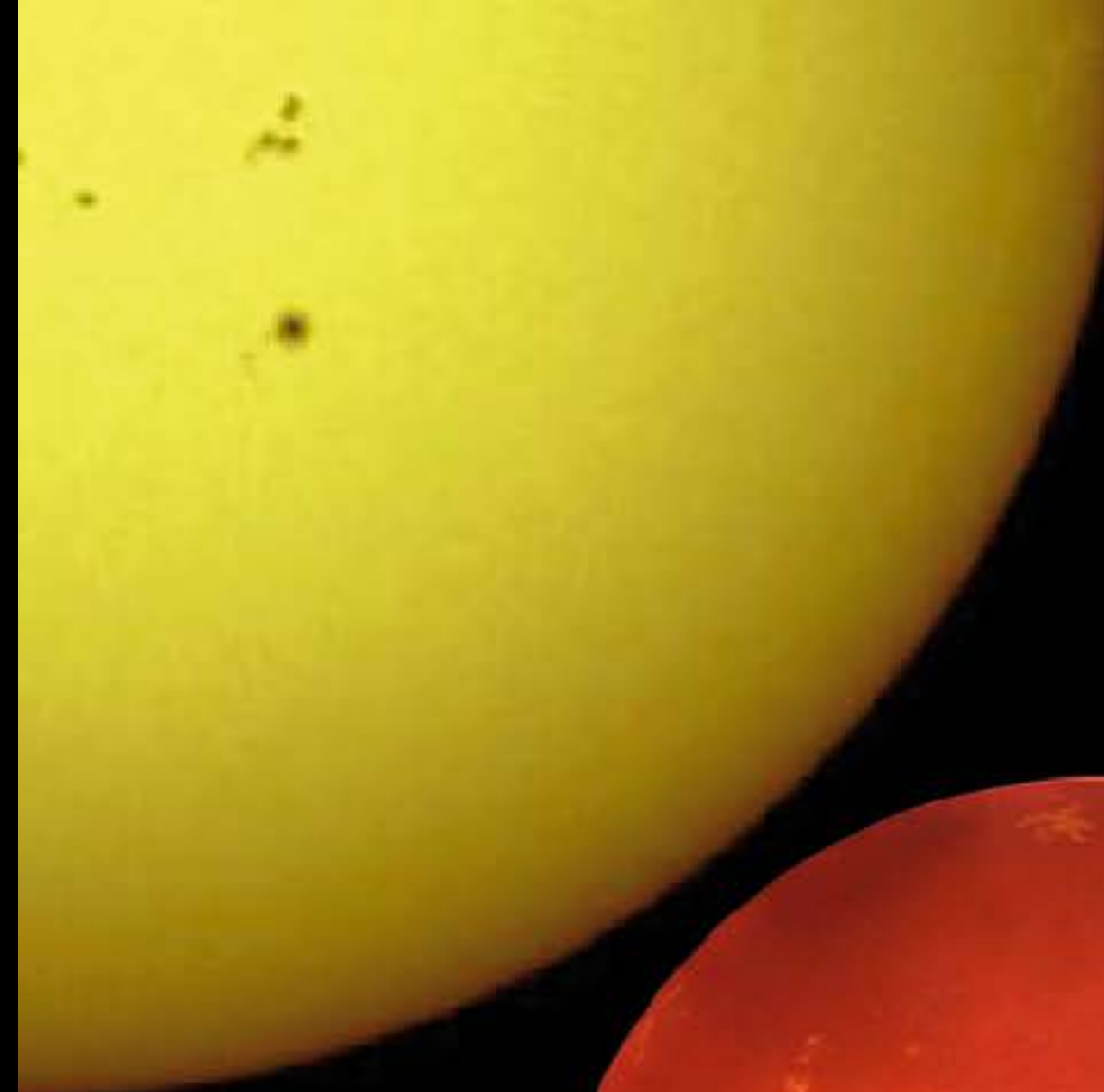
red dwarf star

young brown dwarf

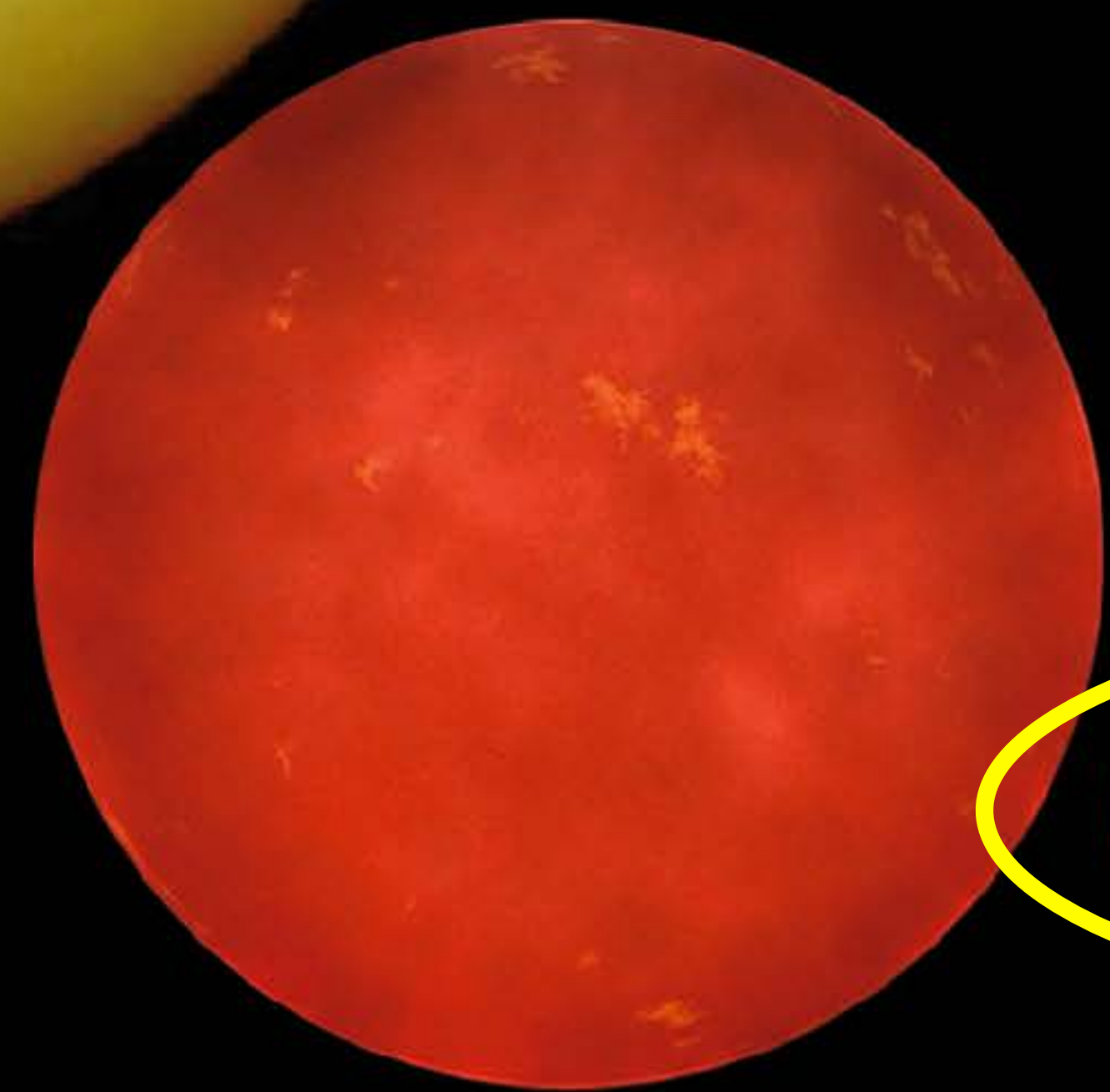
old brown dwarf

ultra-cool brown dwarf

planet



Sun



Gliese 229A



Teide 1



Gliese 229B

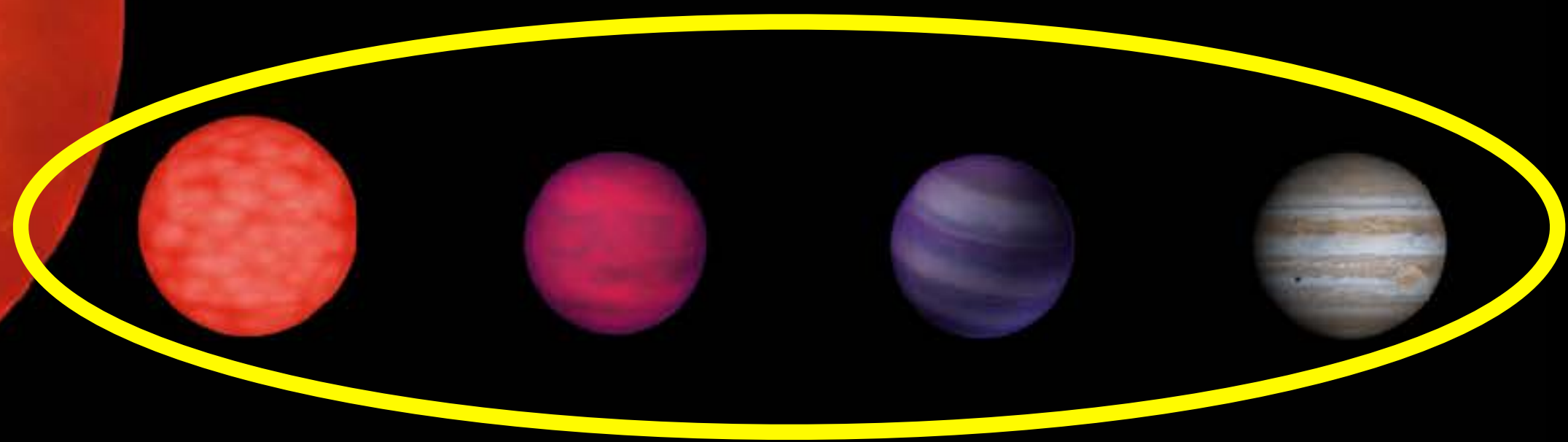


WISE 1828



Jupiter

Brown dwarfs are exoplanet analogs



5,800 K

3,600 K

2,600 K

950 K

300-500 K

125 K

G2 star

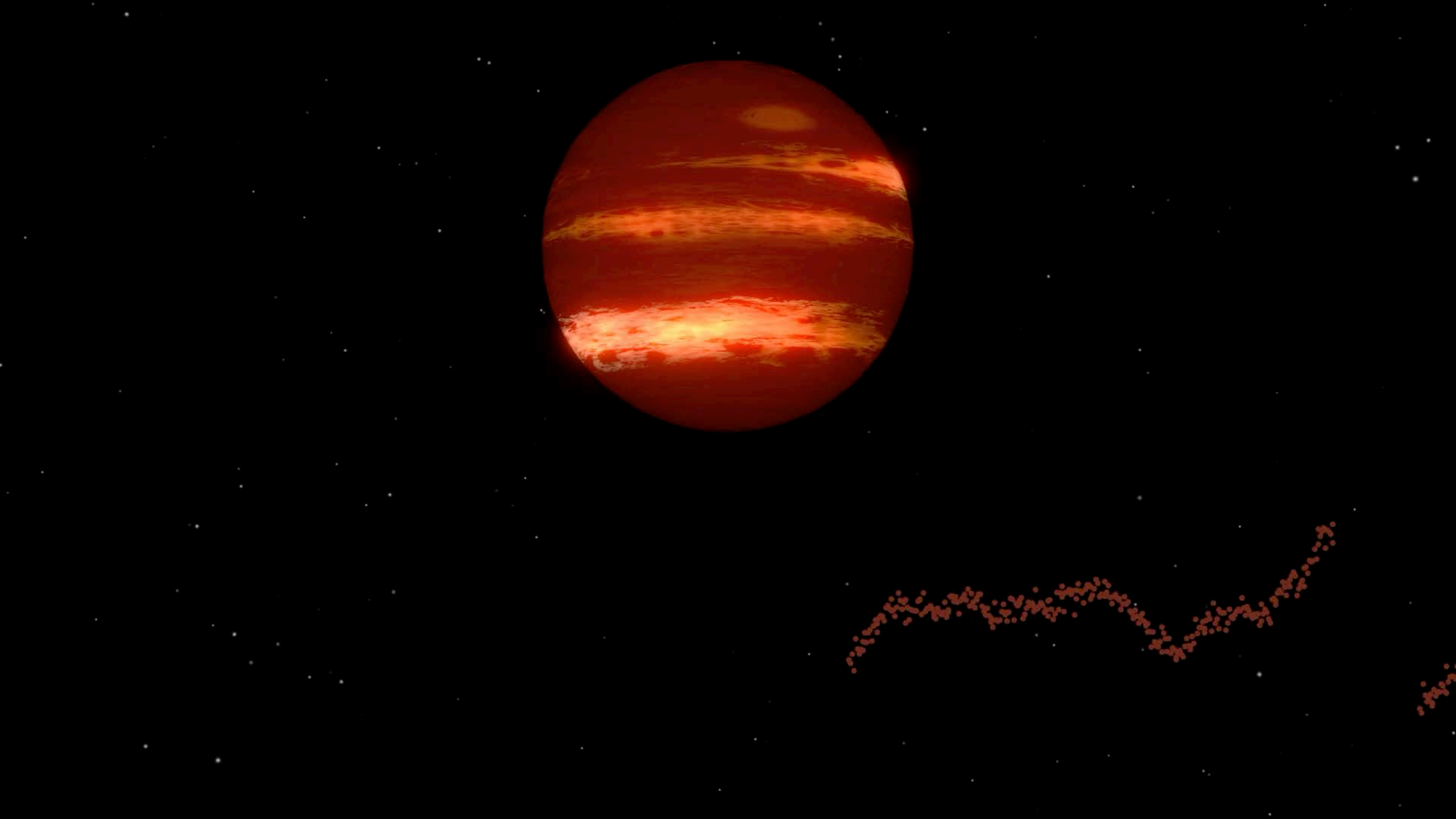
red dwarf star

young brown dwarf

old brown dwarf

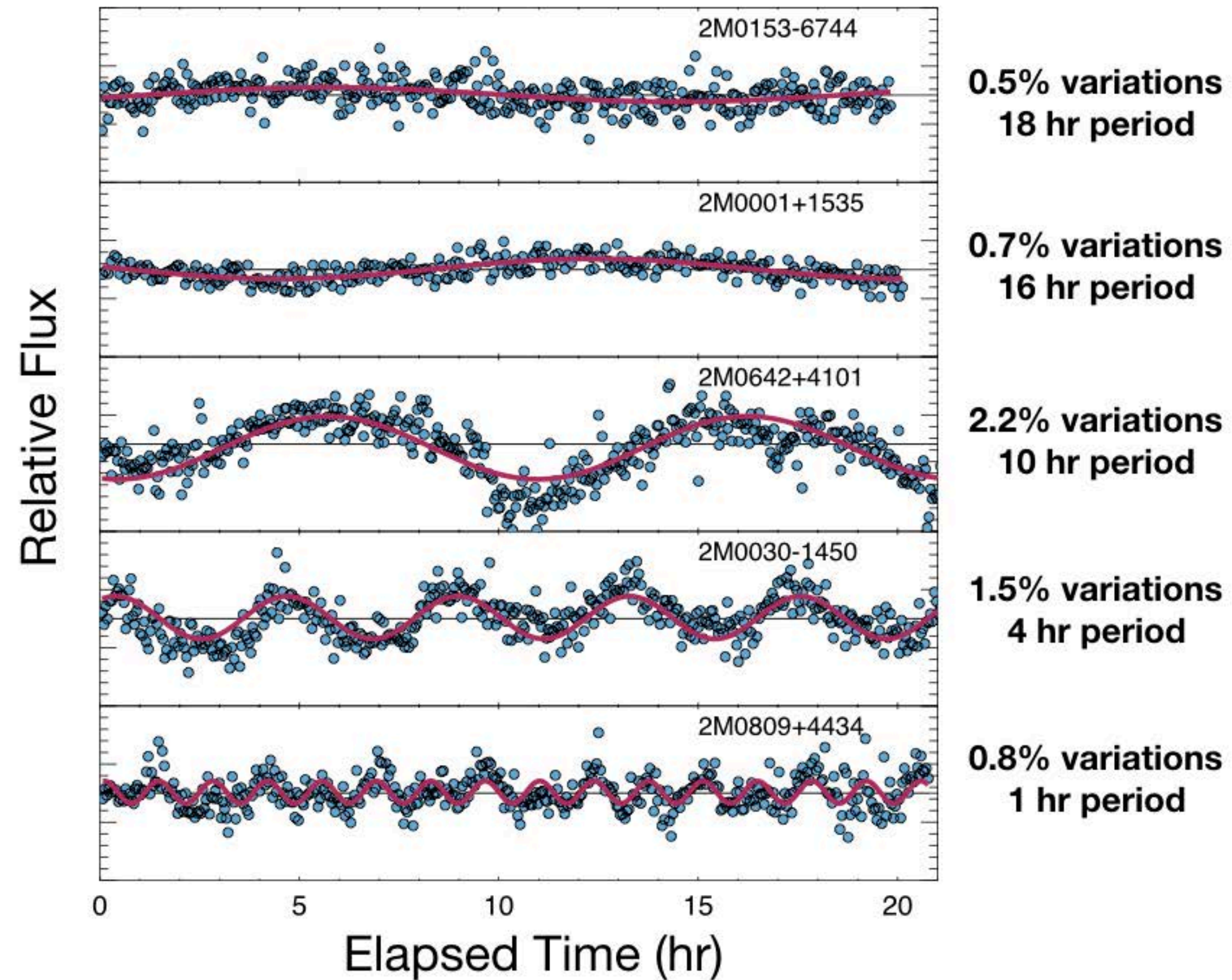
ultra-cool brown dwarf

planet

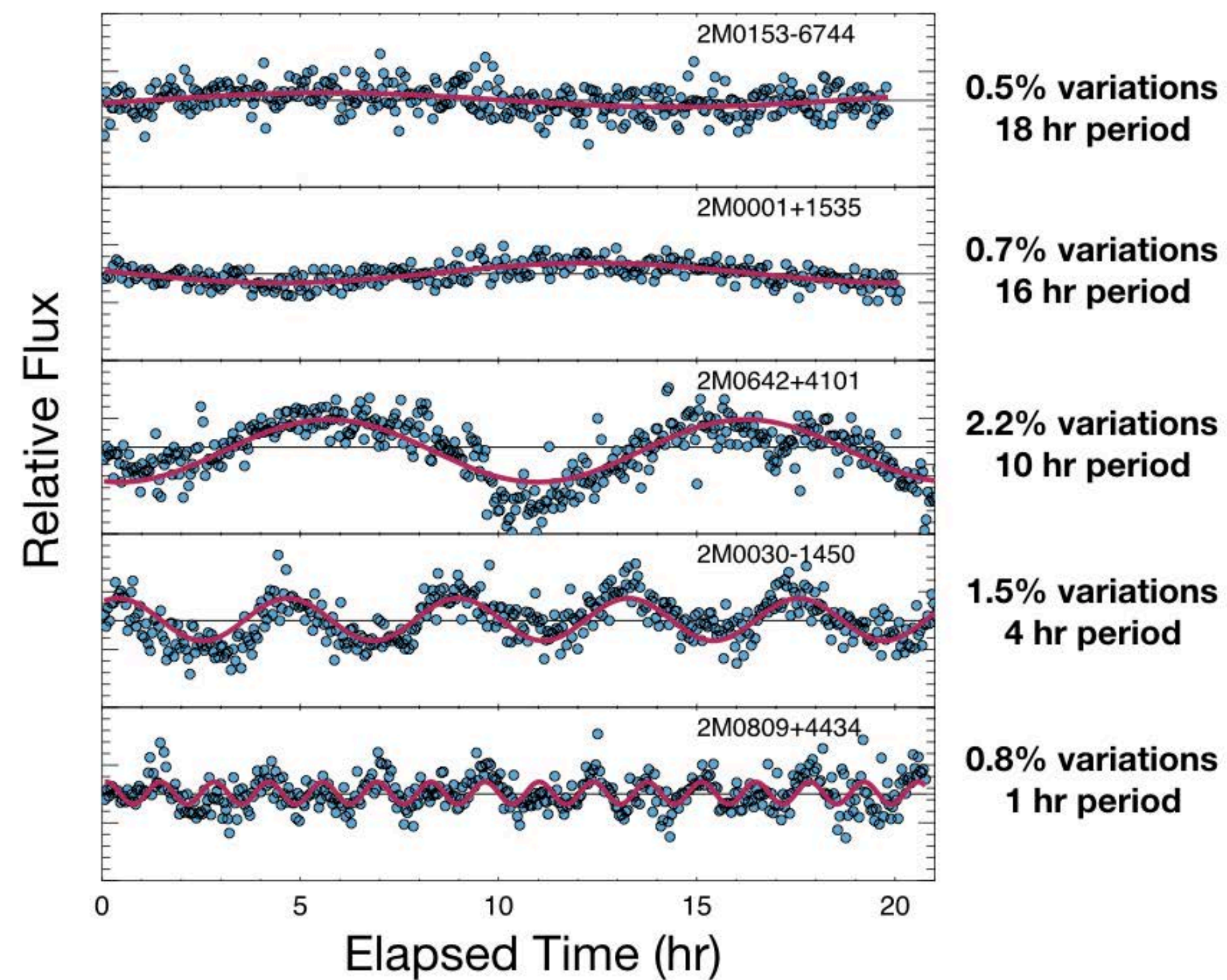




# We detected cloud-driven variability in a large number of our targets



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## Result 1:

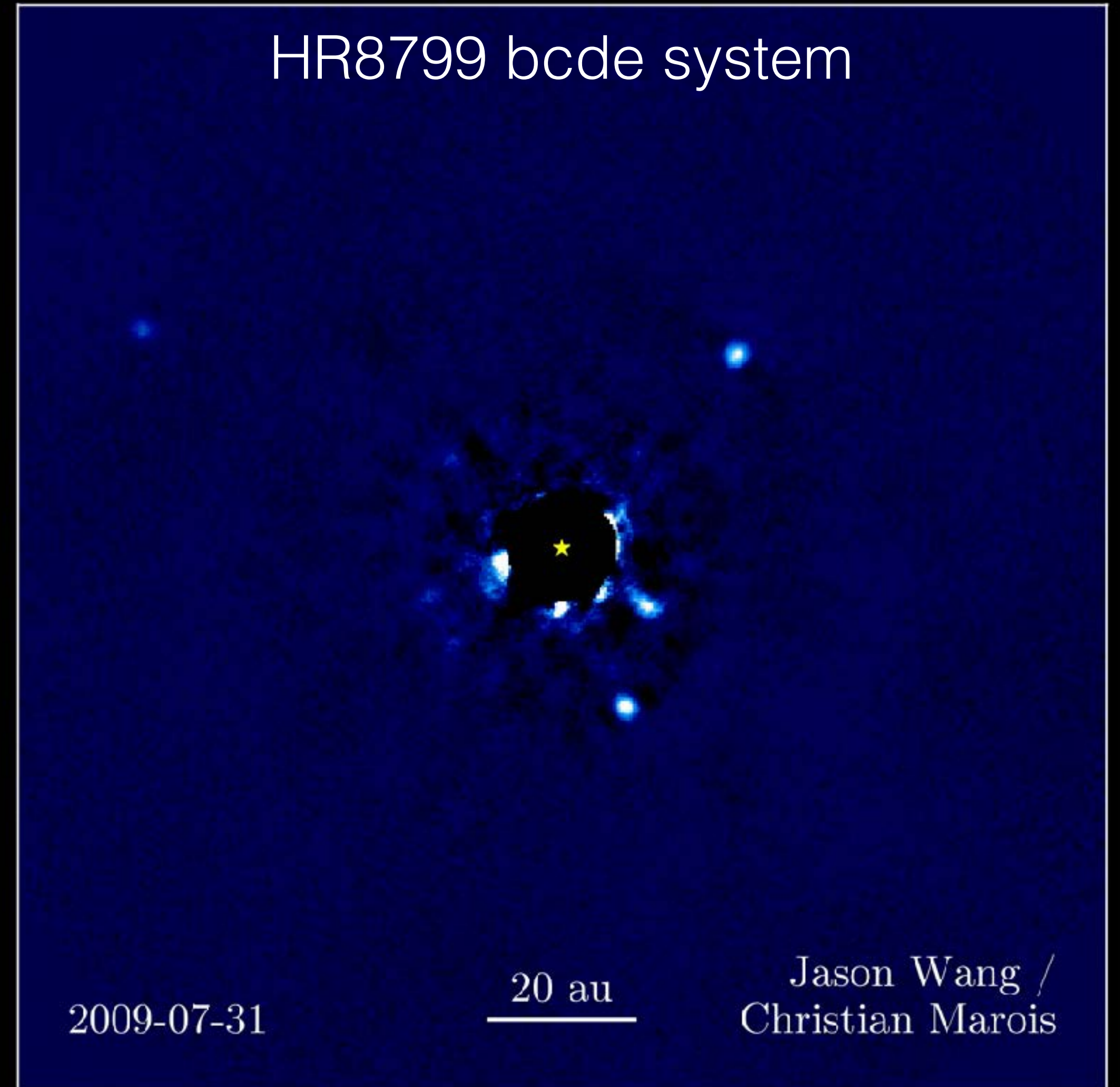
Young giant planet analogs are more likely to be variable than high-mass old brown dwarfs

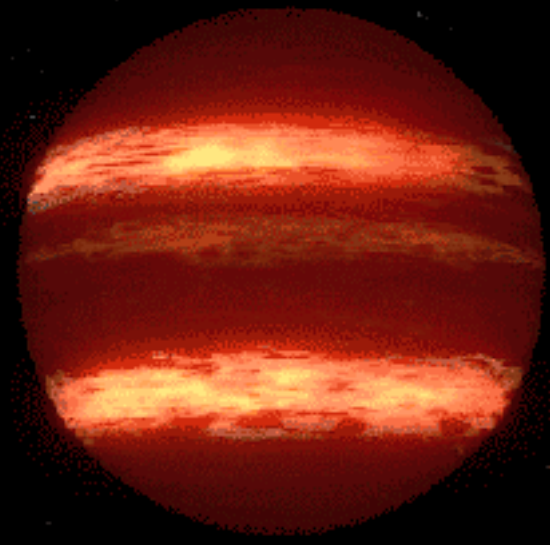
## Result 2:

Amplitudes of variability can be higher for young population



We will carry out similar observations on **directly-imaged exoplanets** with the **James Webb Space Telescope**





# Acknowledgements

## Co-authors:

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