



Investigating aerosols as a way to reconcile K2-18 b JWST MIRI and NIRISS/NIRSpec observations

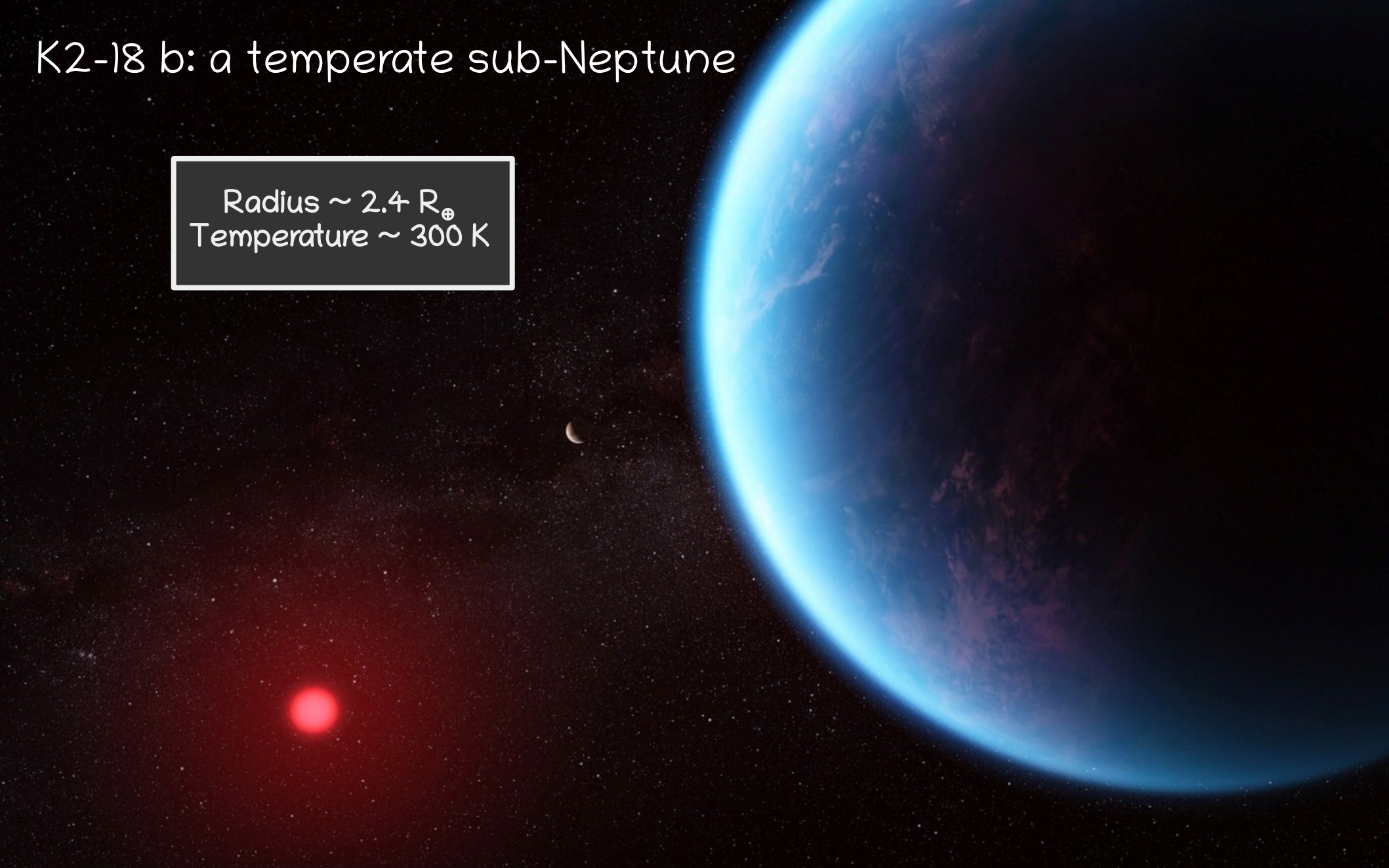
Yassin Jaziri (LATMOS-UVSQ)

This project has received funding from the European Research Council (ERC) under the ERC OxyPlanets projects (grant agreement No. 101053033)



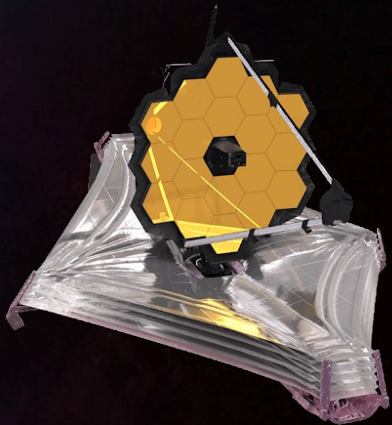
K2-18 b: a temperate sub-Neptune

Radius $\sim 2.4 R_{\oplus}$
Temperature ~ 300 K



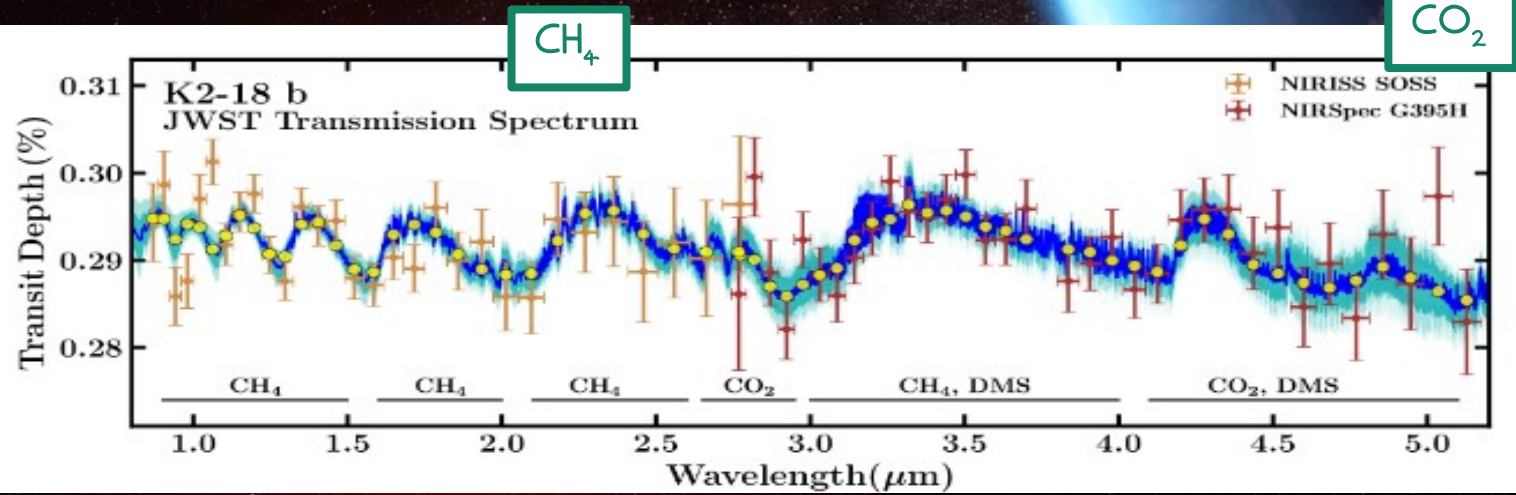
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JWST

Hu et al. (2025)

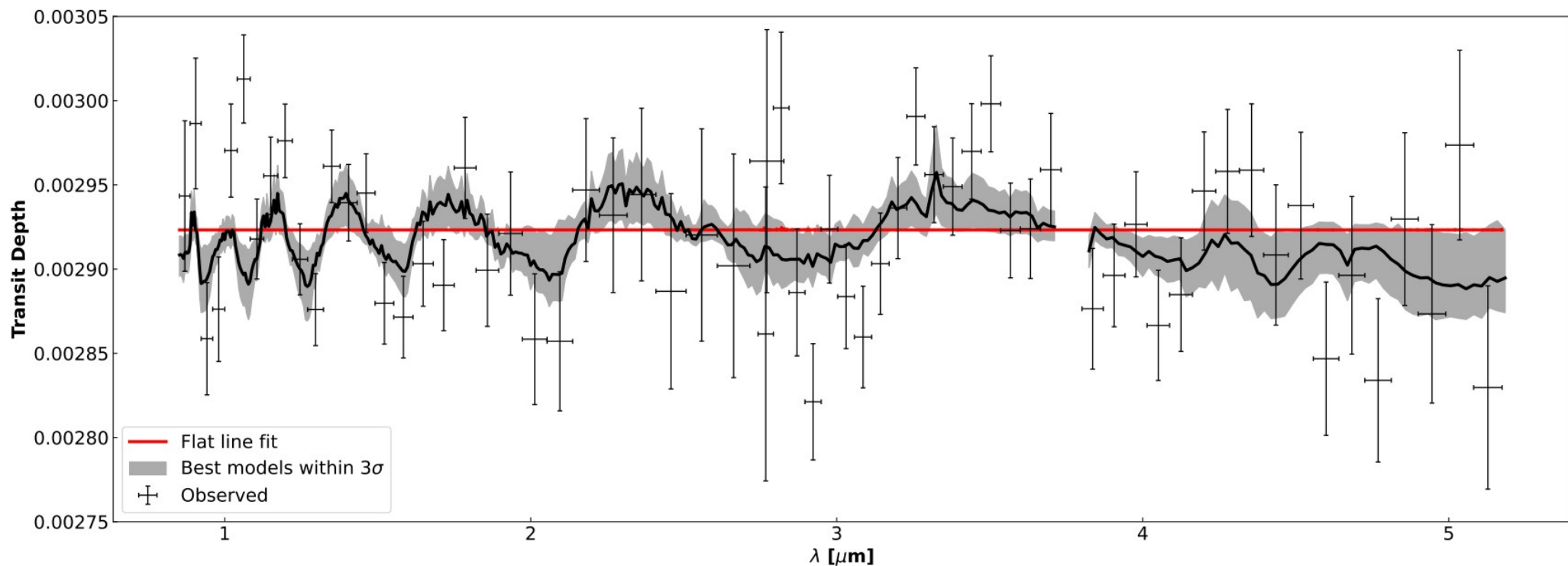


Madhusudhan et al. (2023)

Fitting to observation

Jaziri et al. 2025a

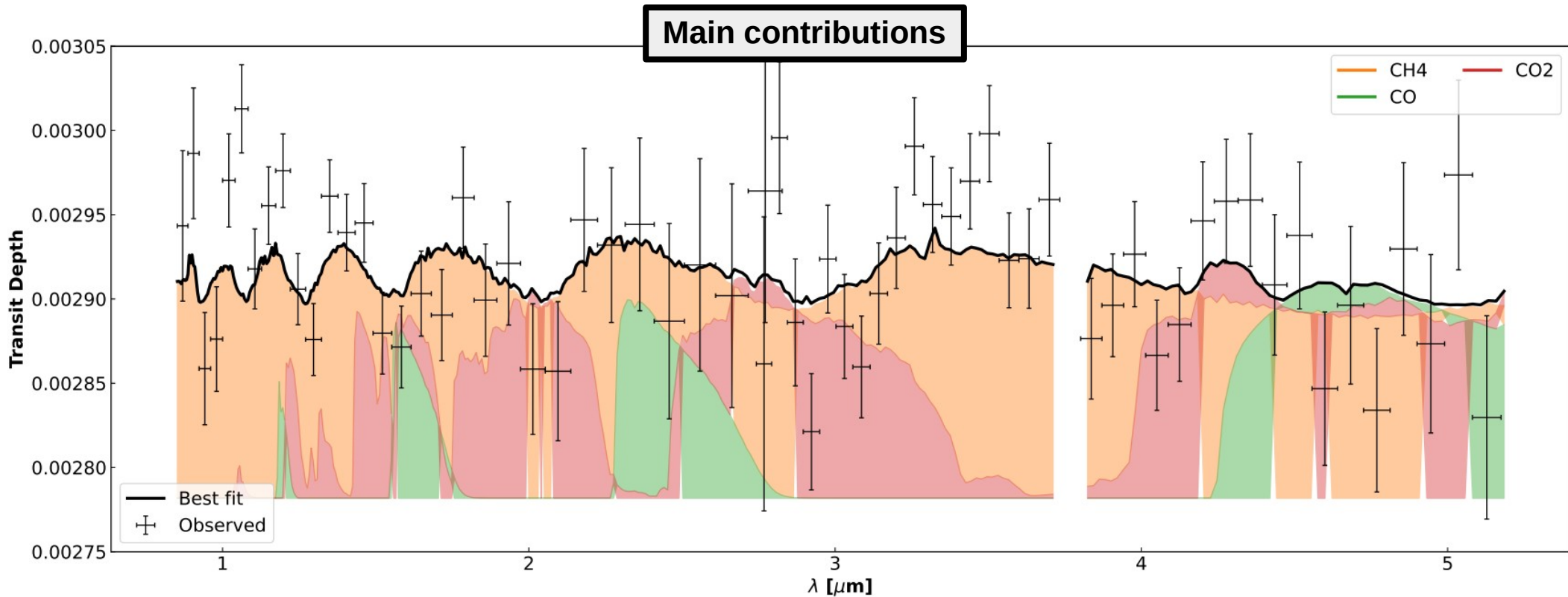
Metallicity	C/O
266^{+291}_{-104}	> 2.1



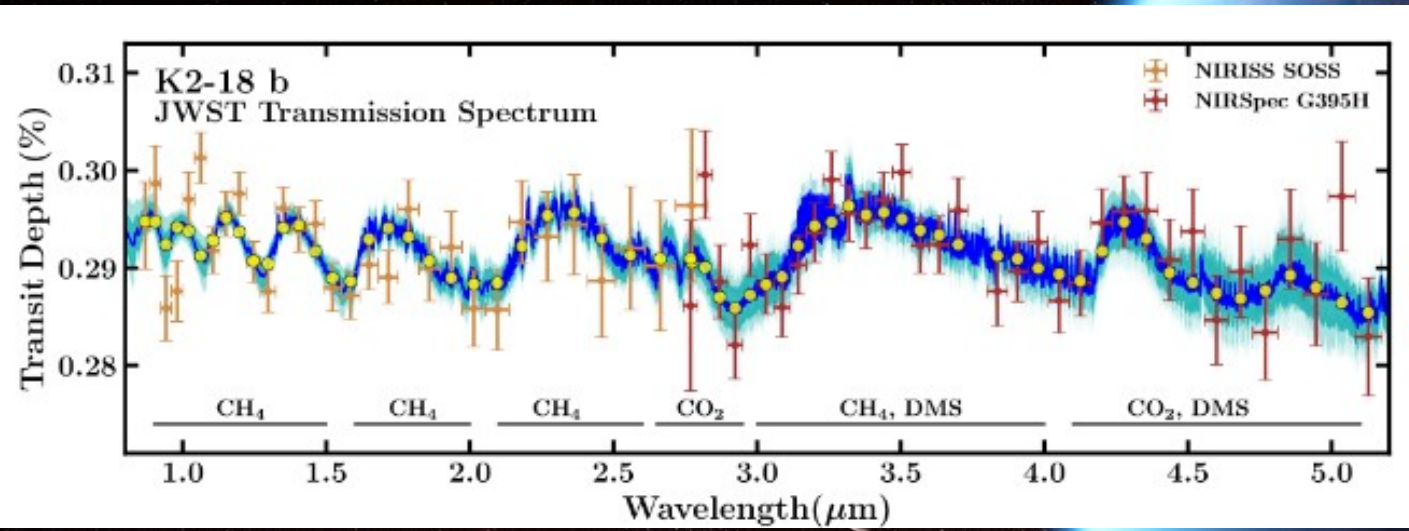
Species contributions

Jaziri et al. 2025a

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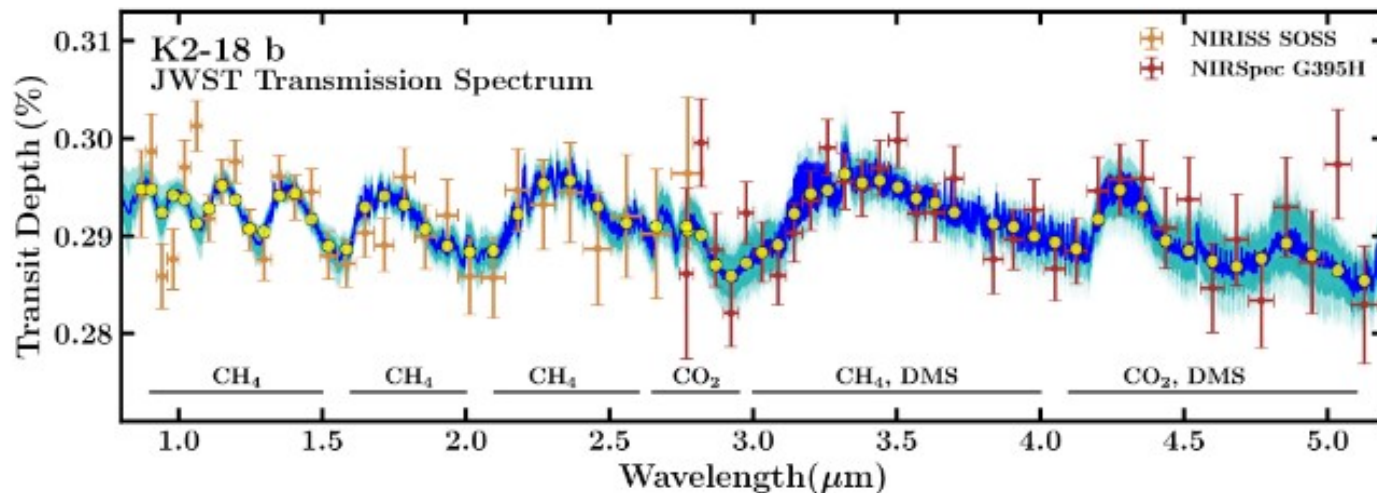
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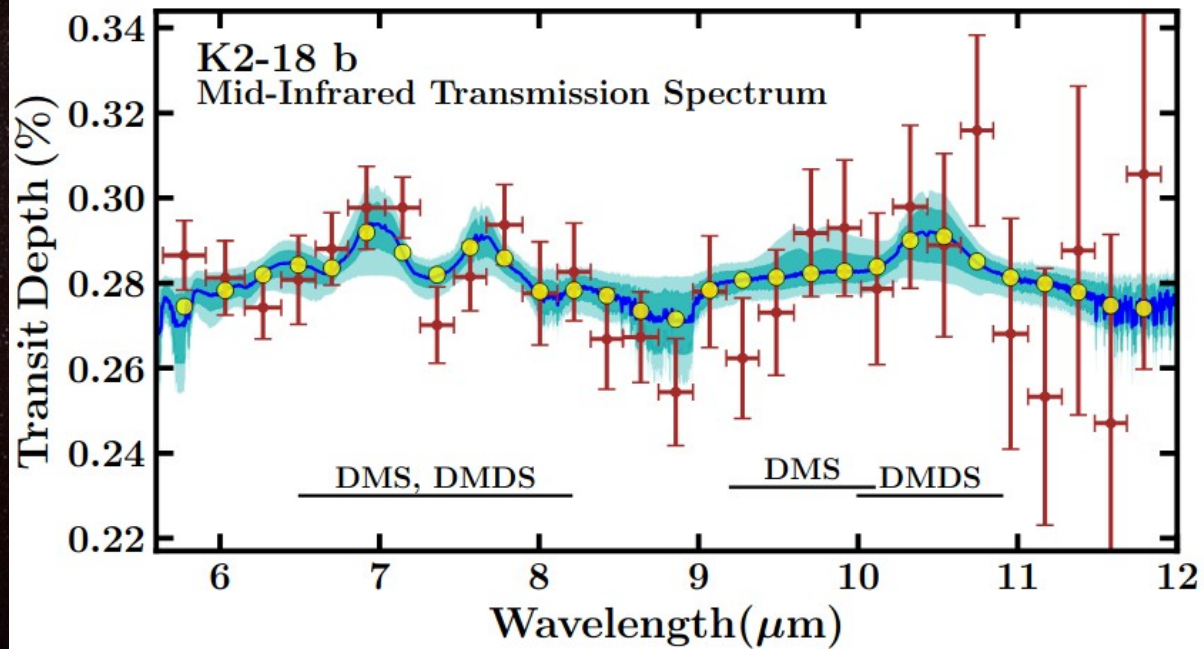
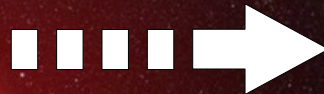
Madhusudhan et al. (2023)

K2-18 b: a temperate sub-Neptune

New JWST observations



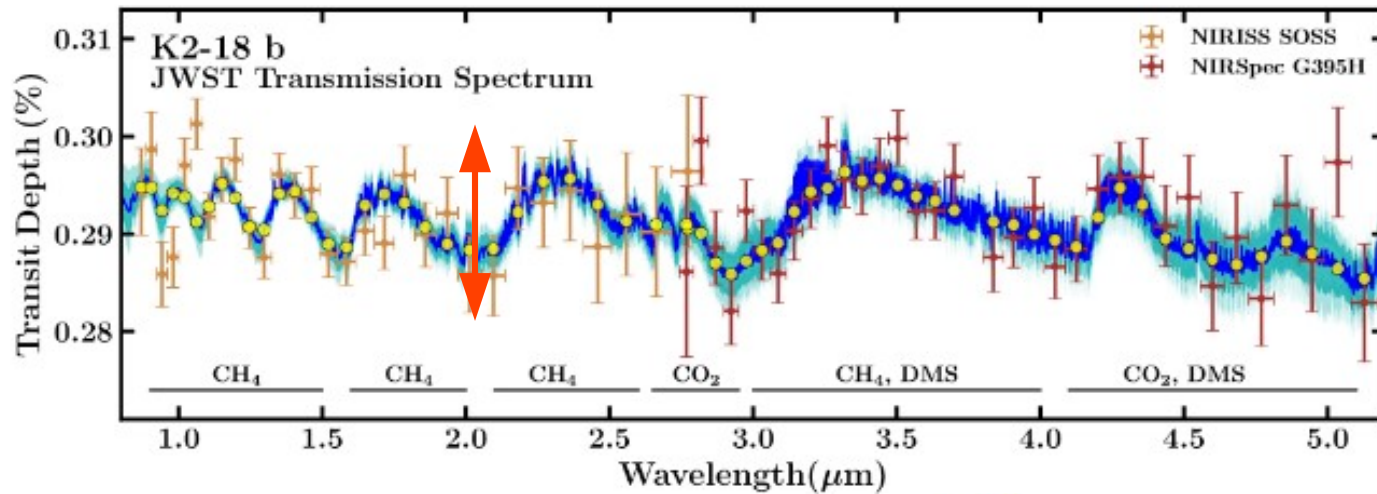
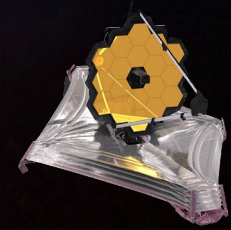
Madhusudhan et al. (2023)



Madhusudhan et al. (2025)

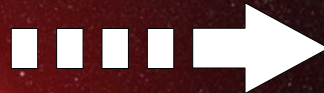
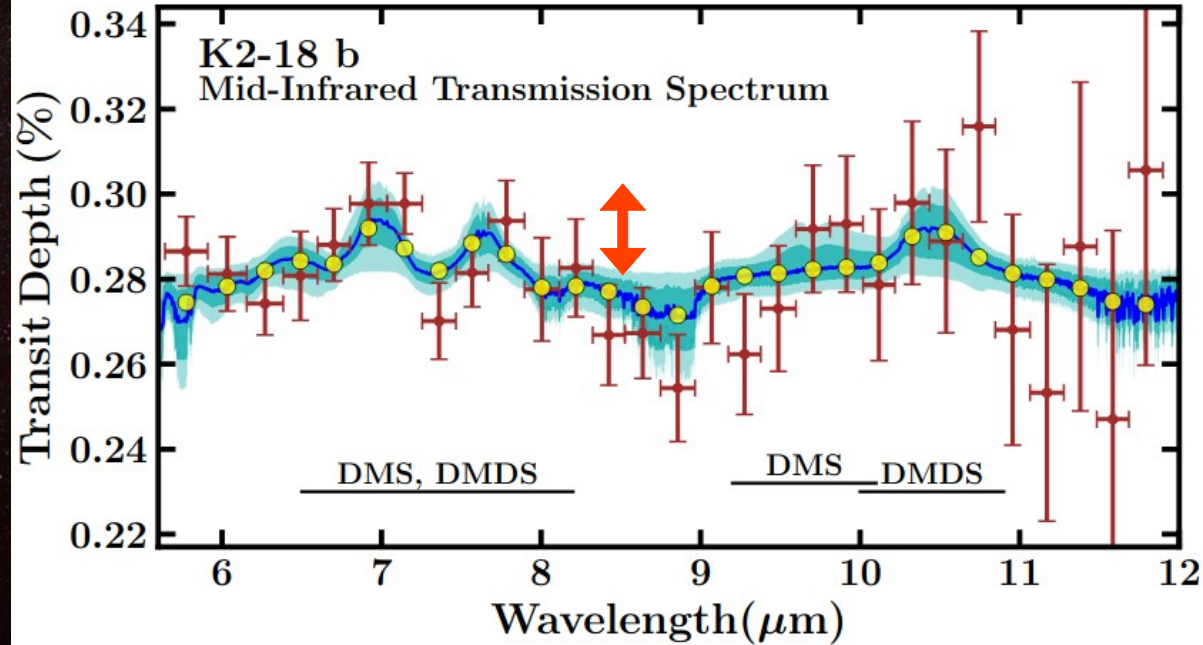
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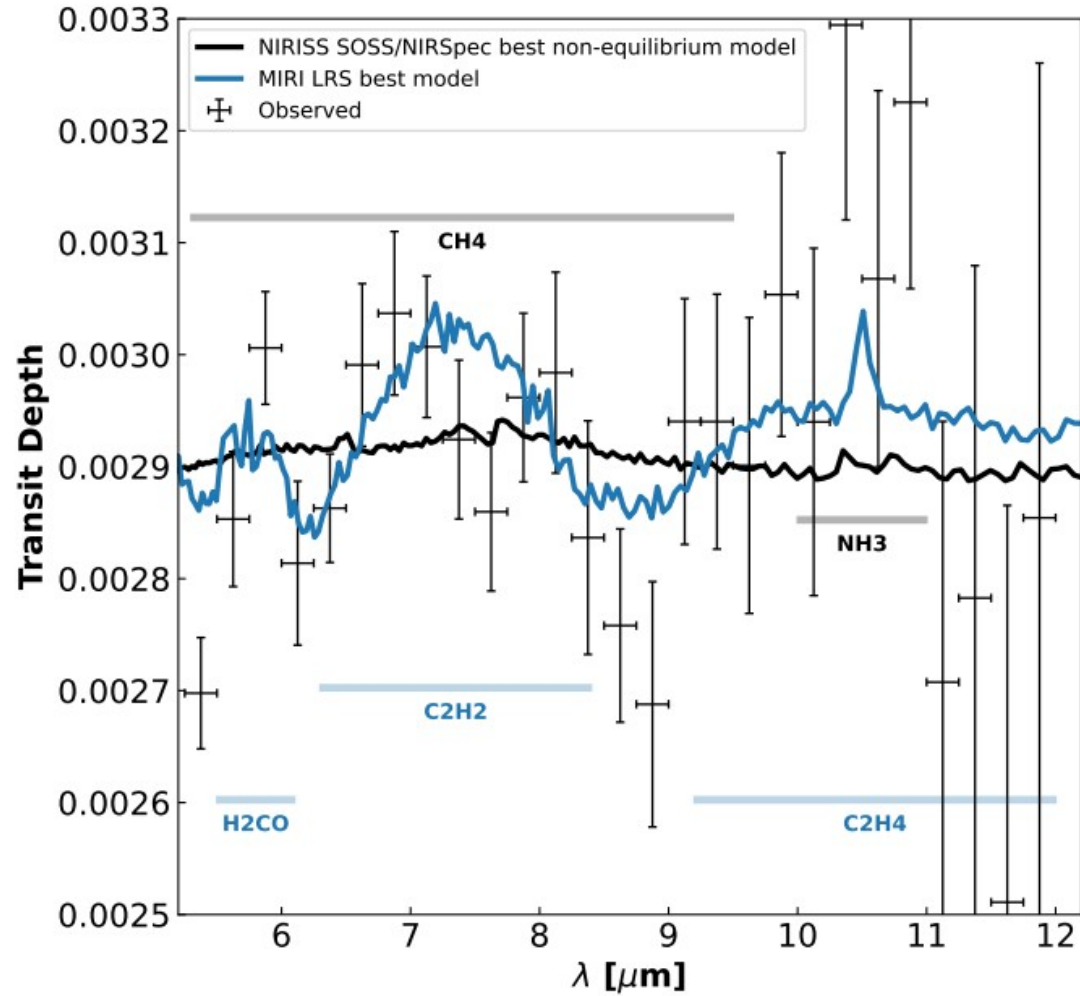
Madhusudhan et al. (2023)

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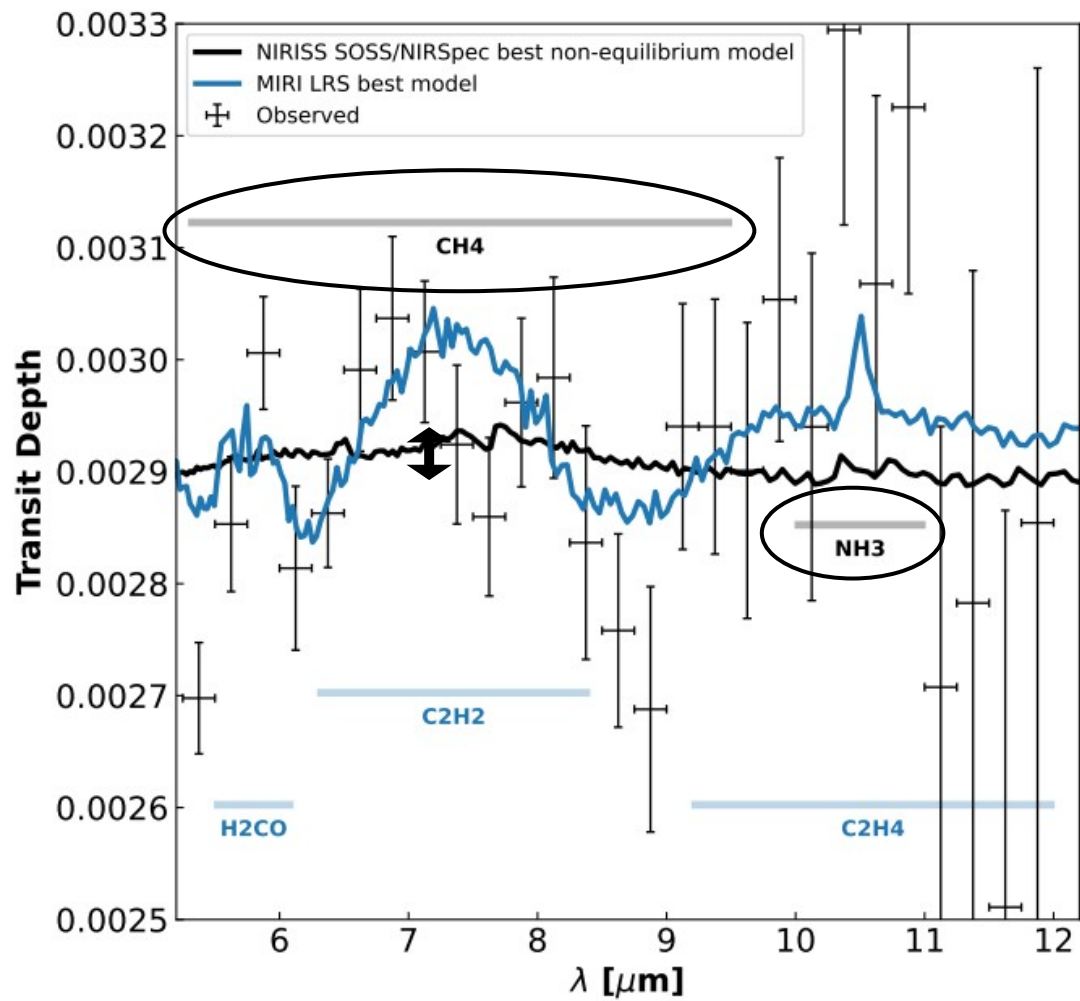
Fitting to observation

Jaziri et al. 2025b



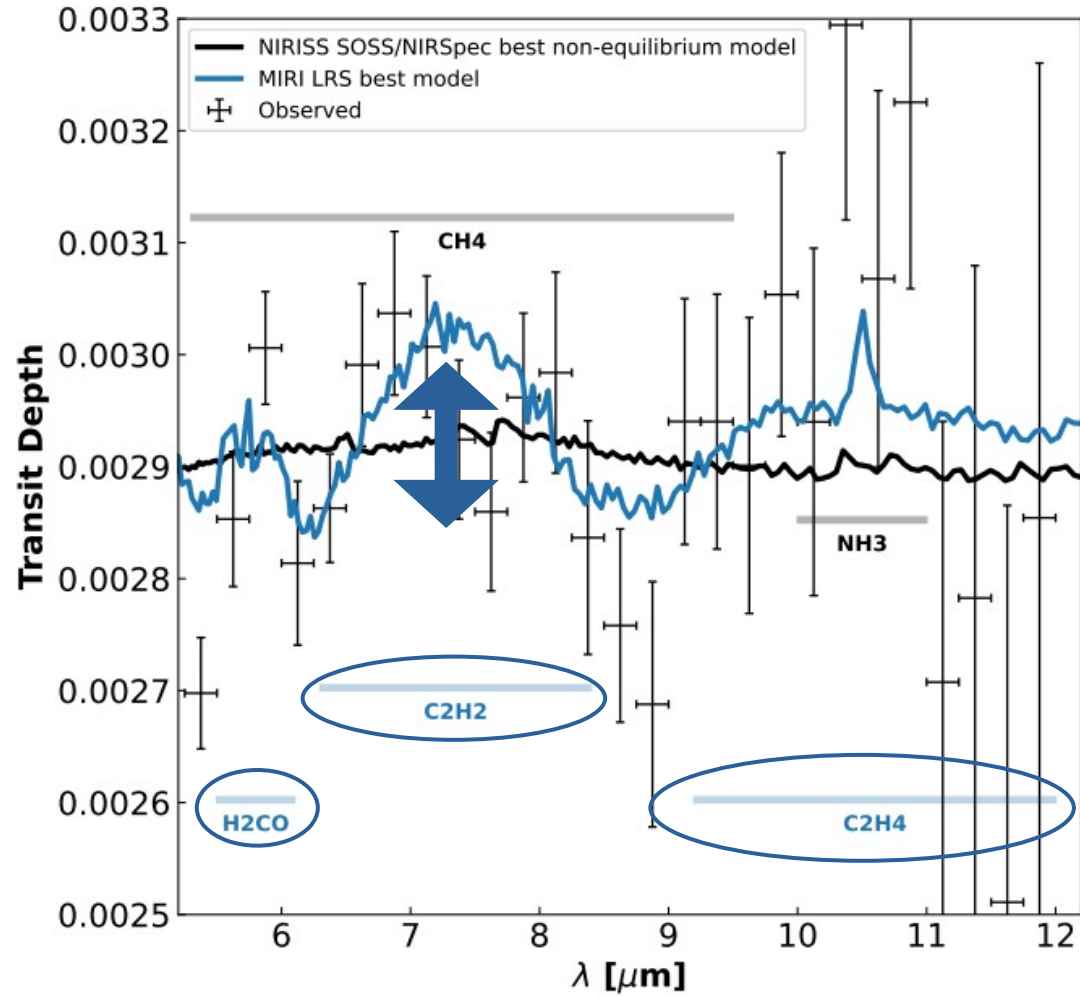
Fitting to observation

Jaziri et al. 2025b



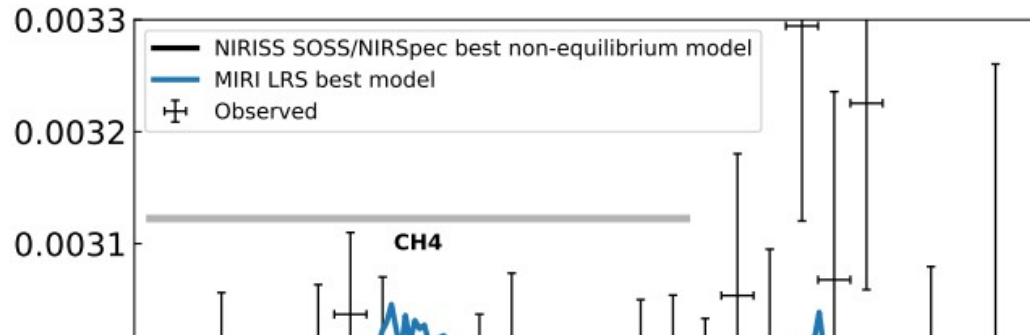
Fitting to observation

Jaziri et al. 2025b

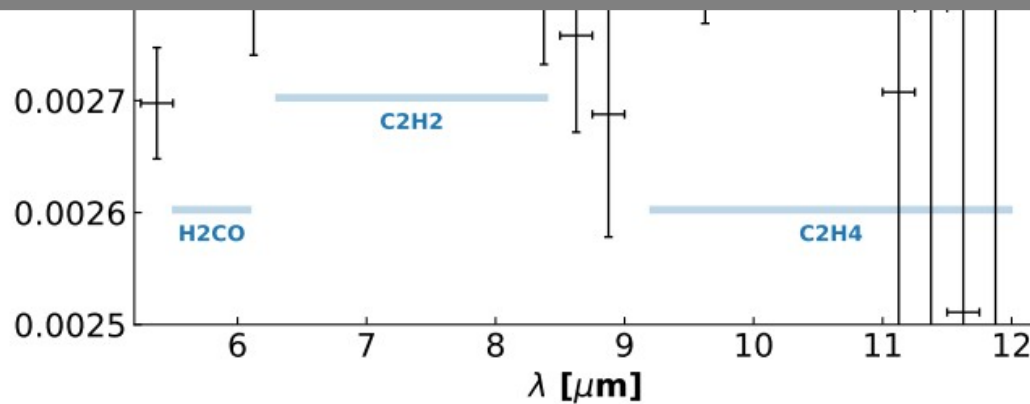


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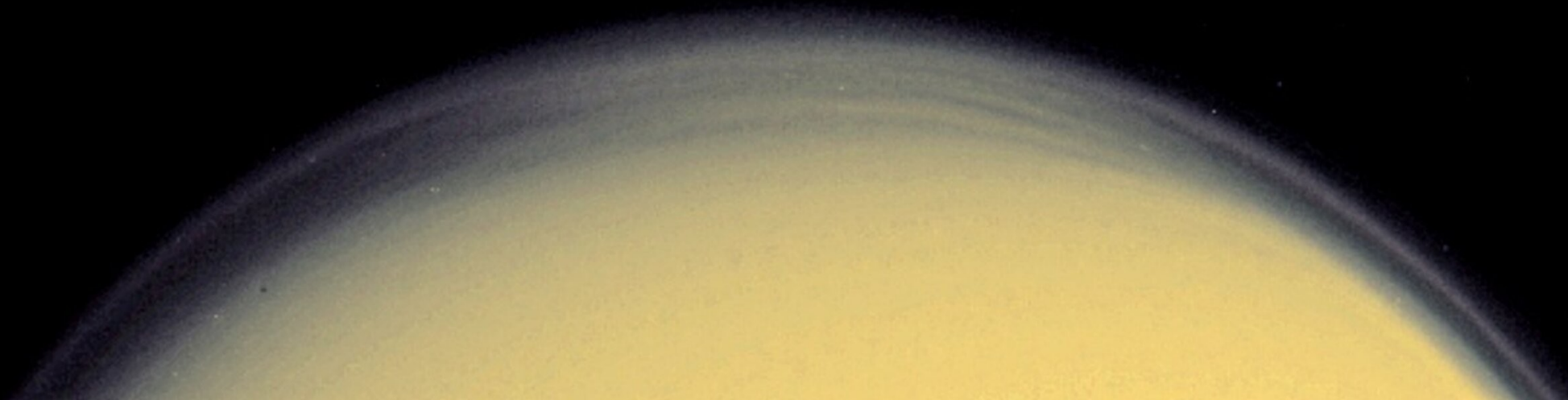
Jaziri et al. 2025b



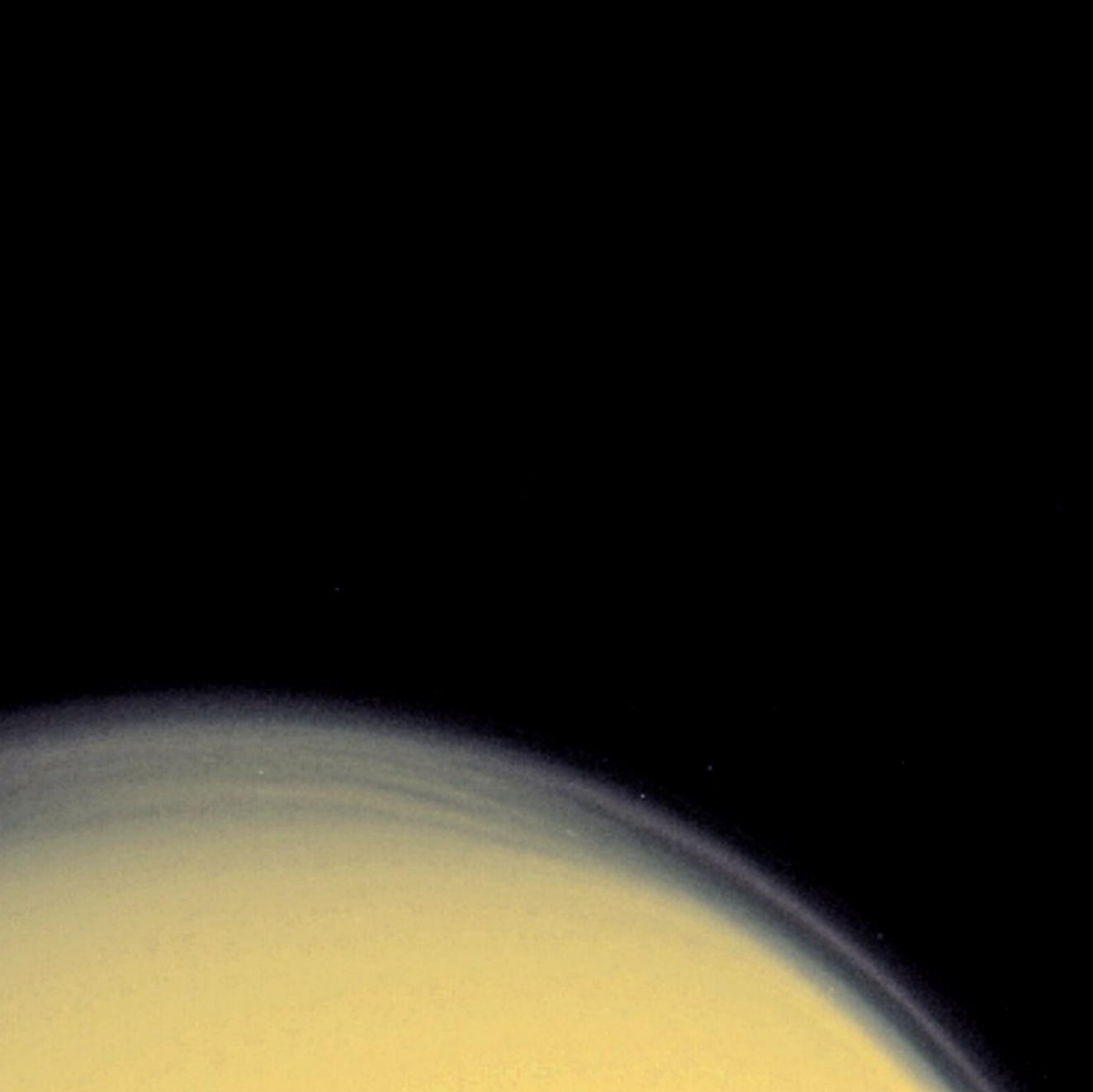
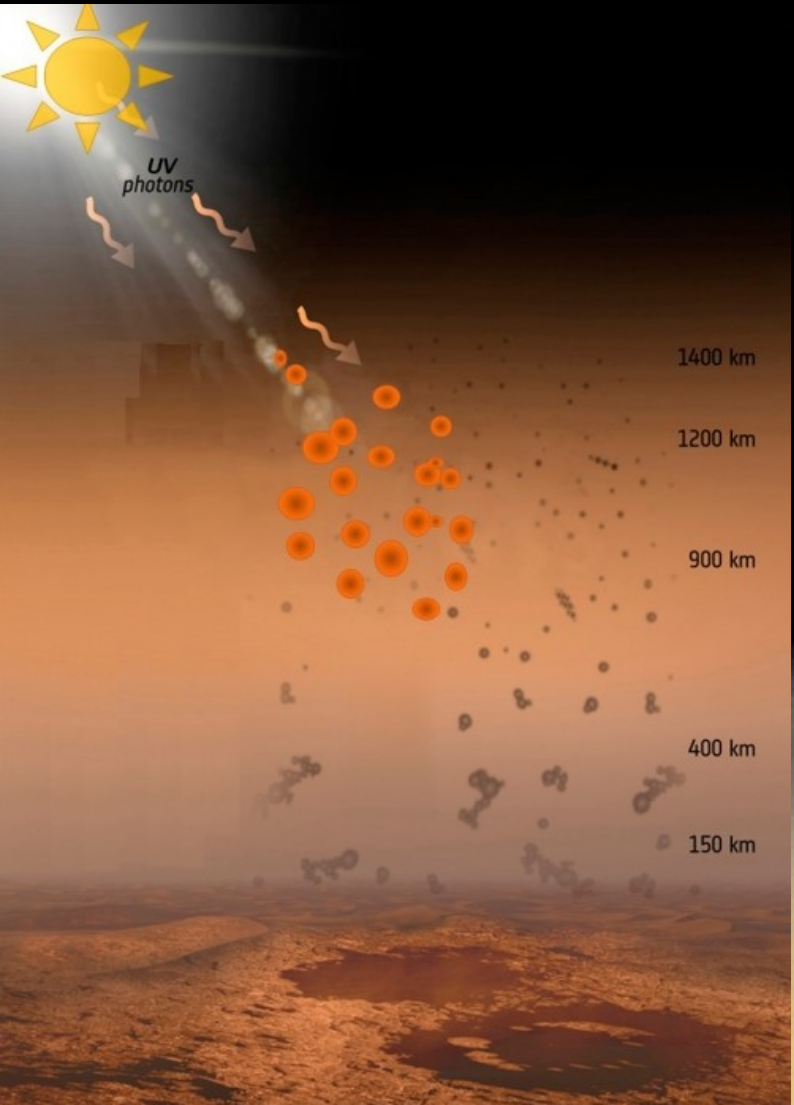
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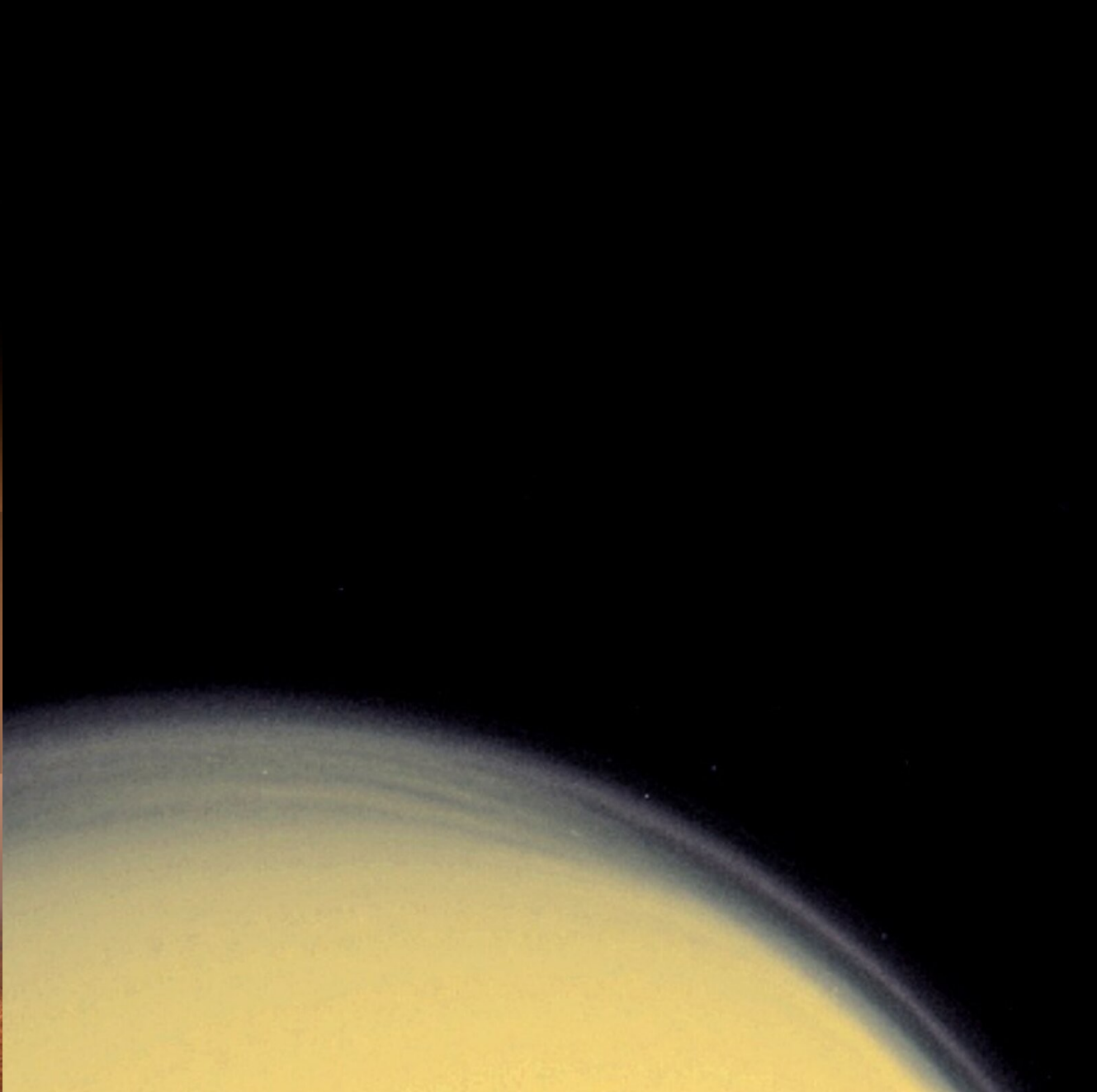
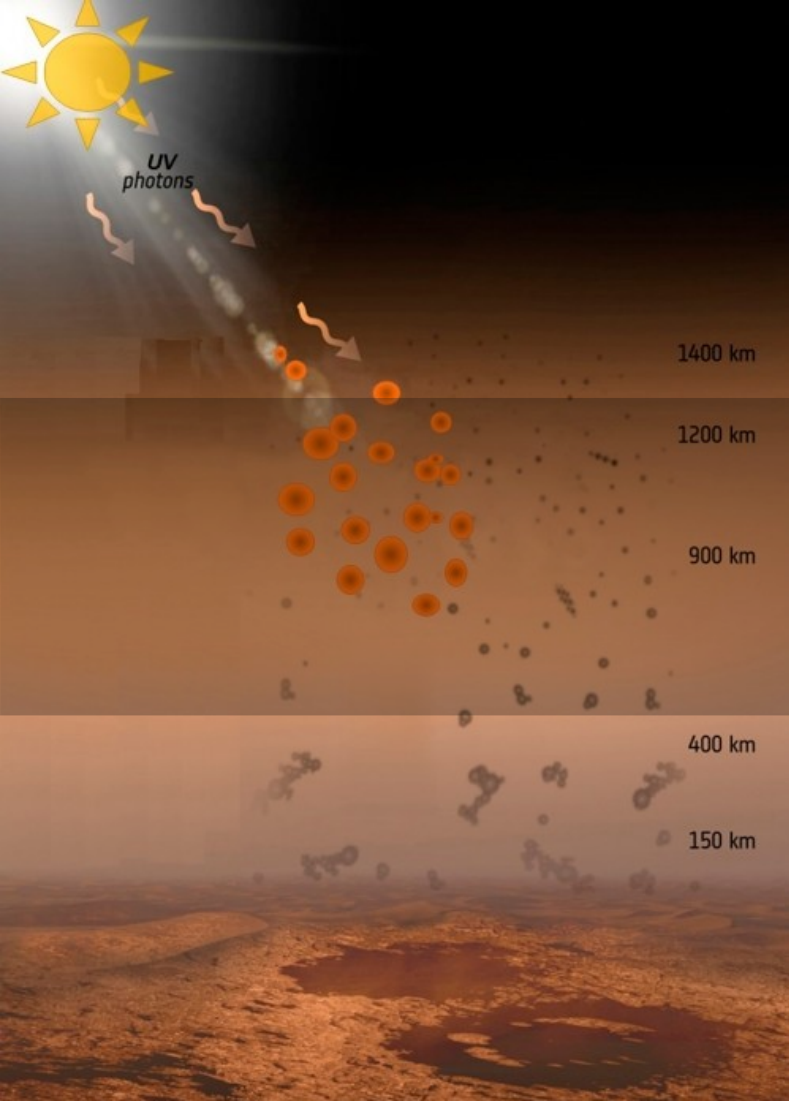
Photochemical hazes



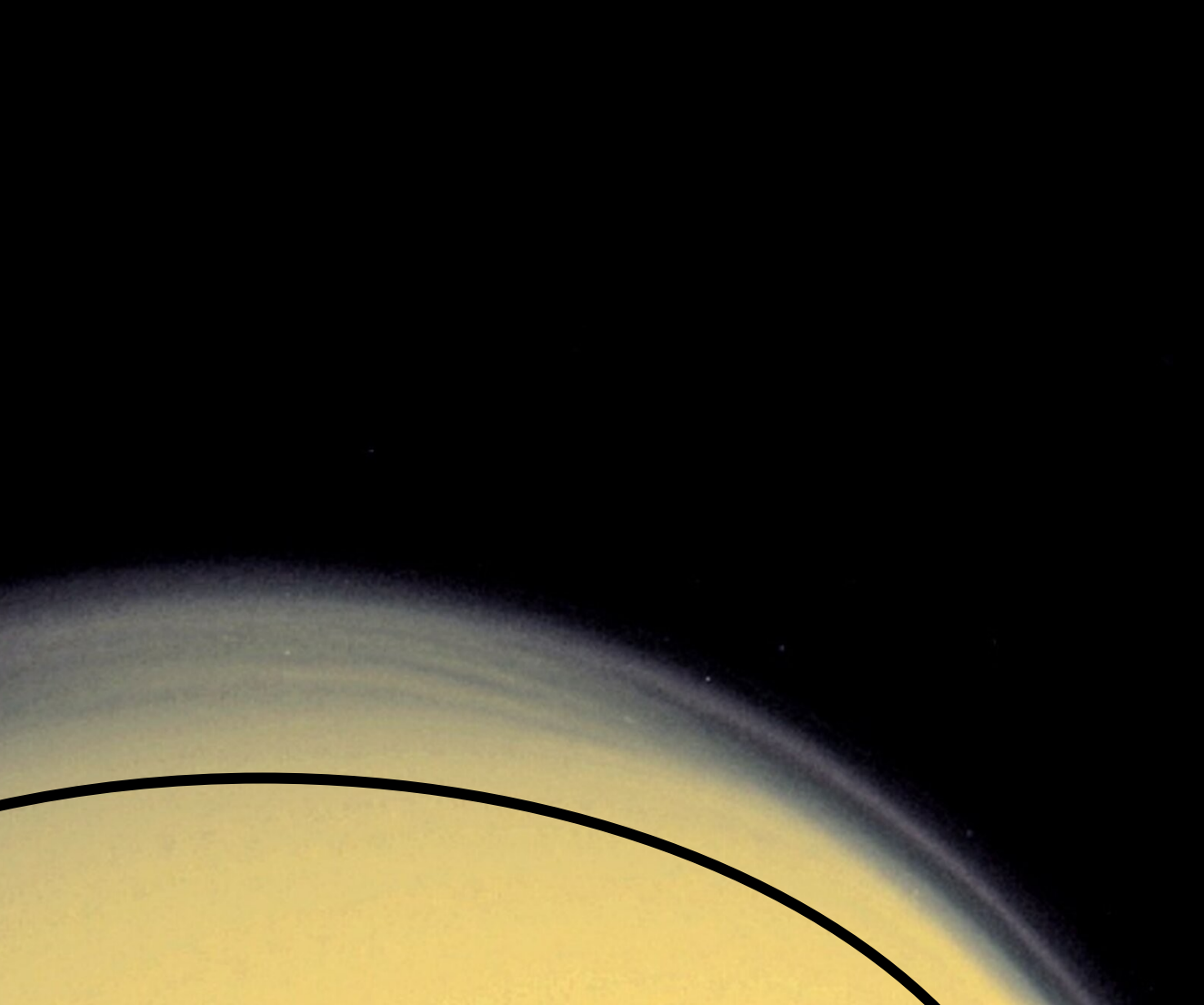
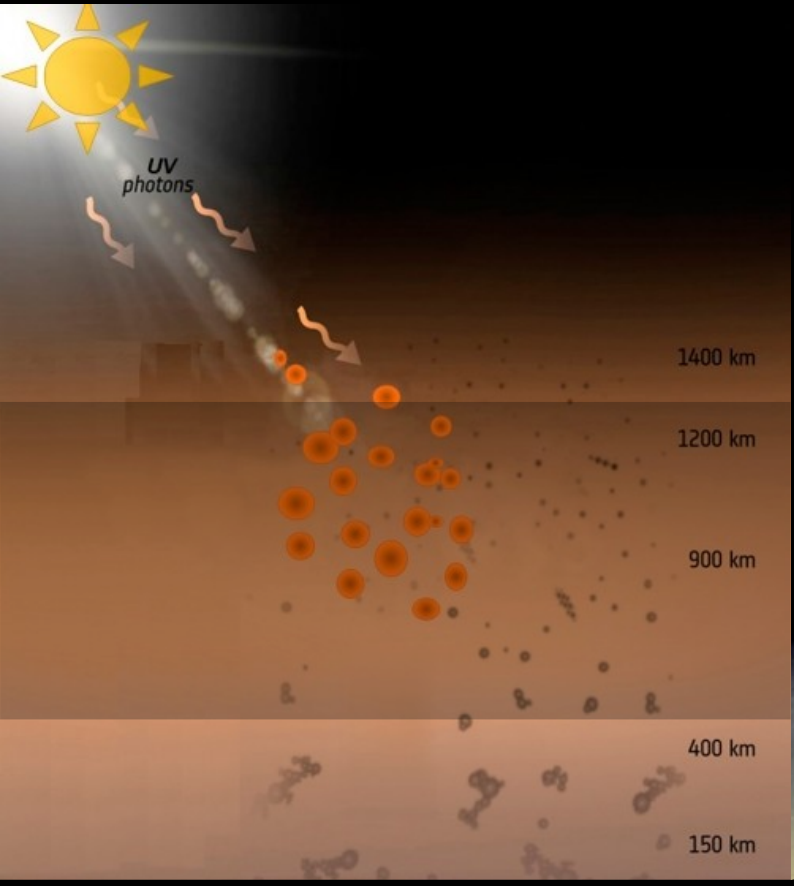
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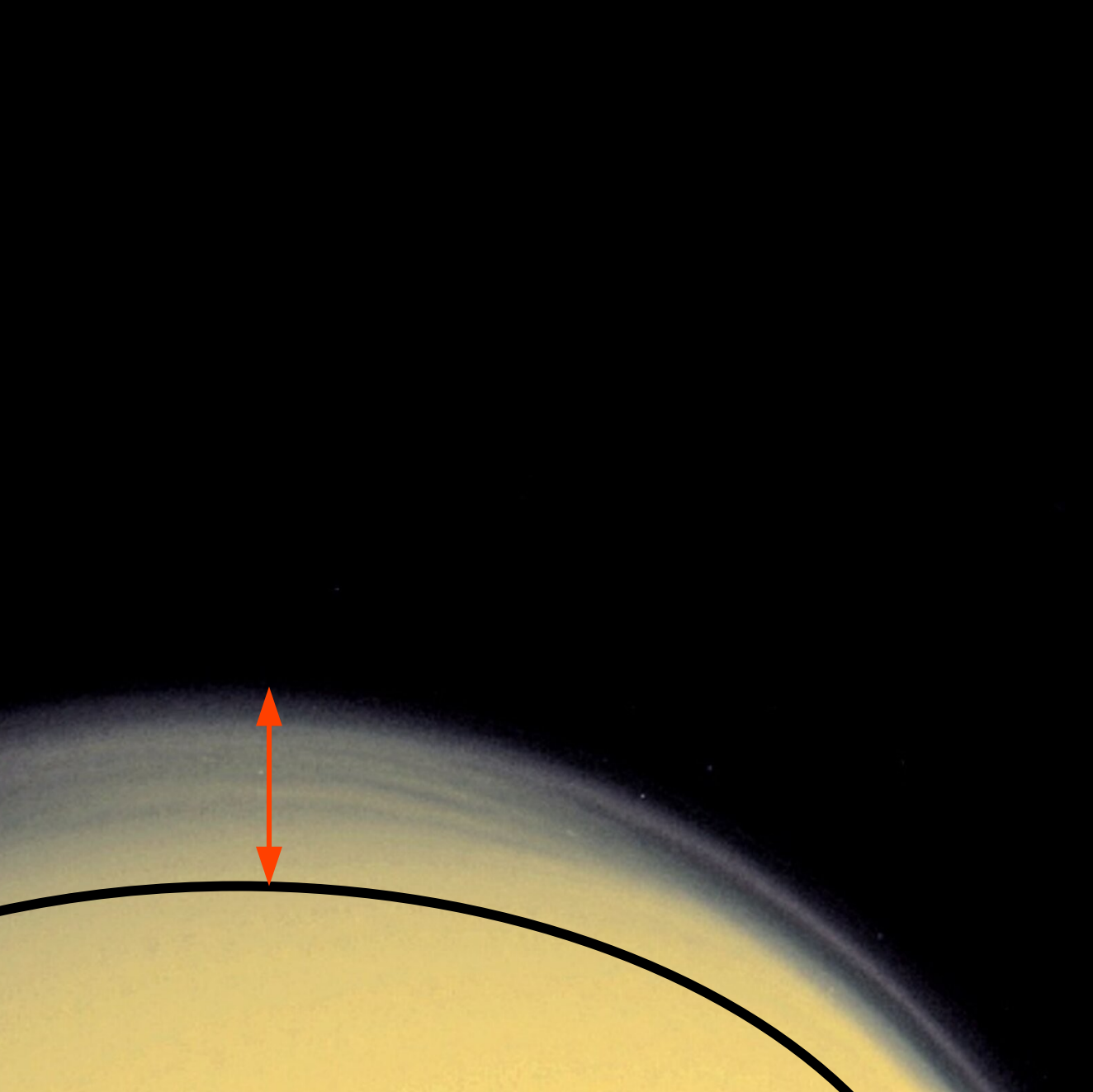
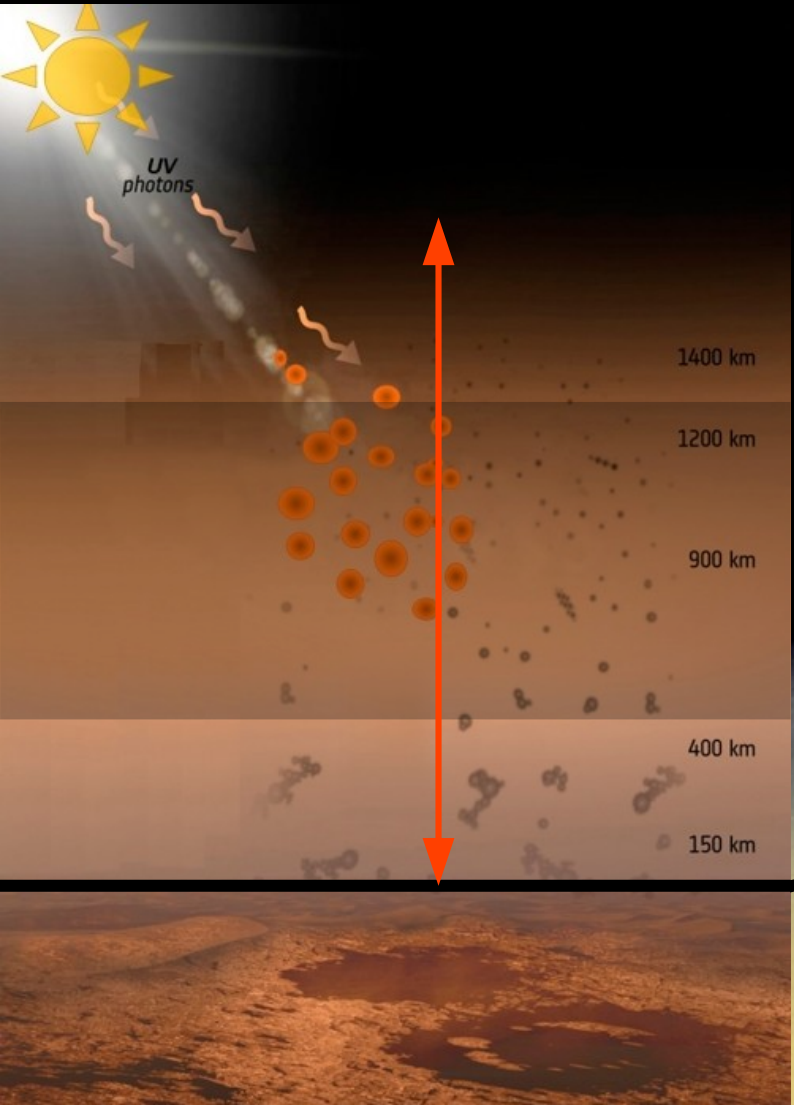
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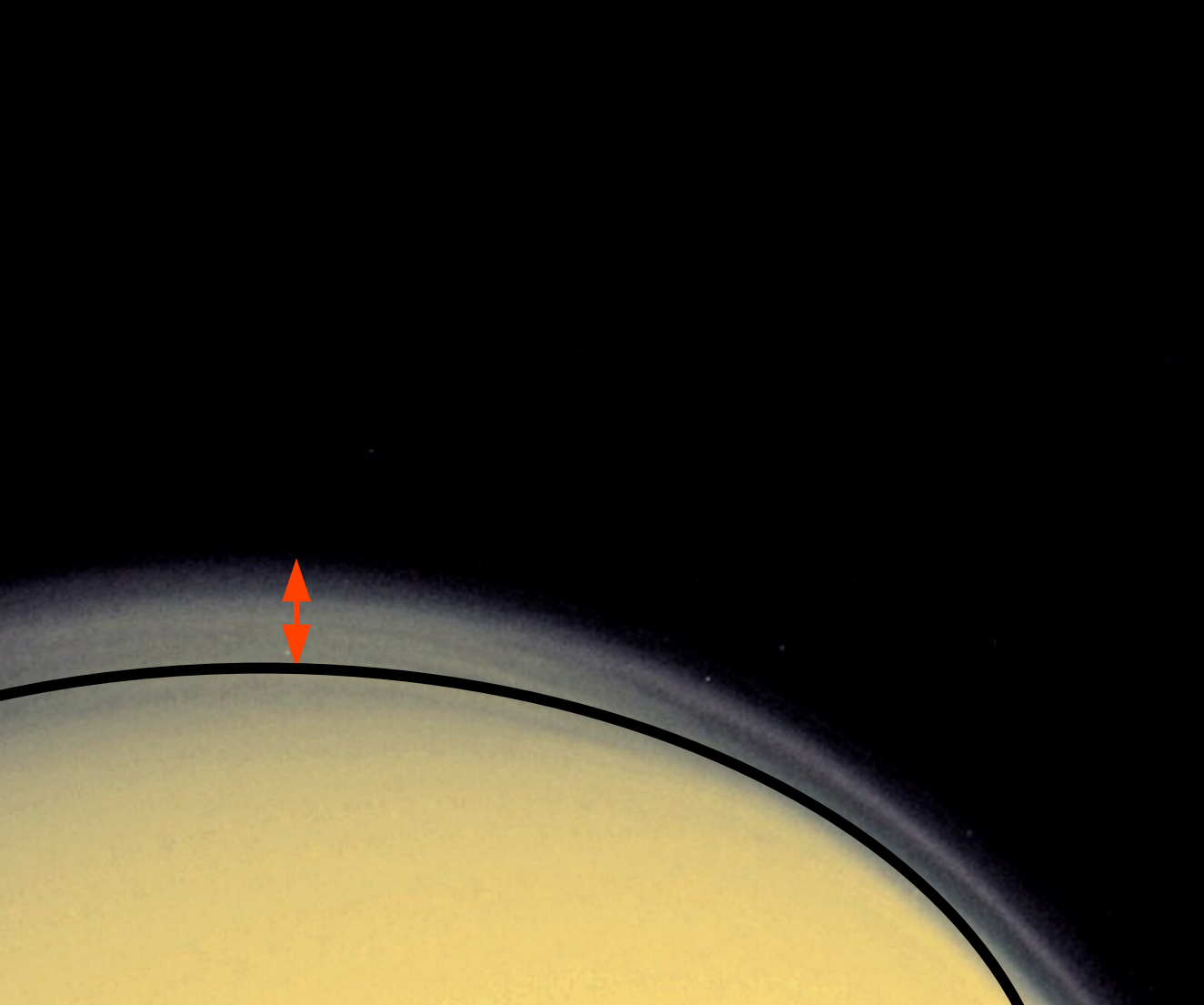
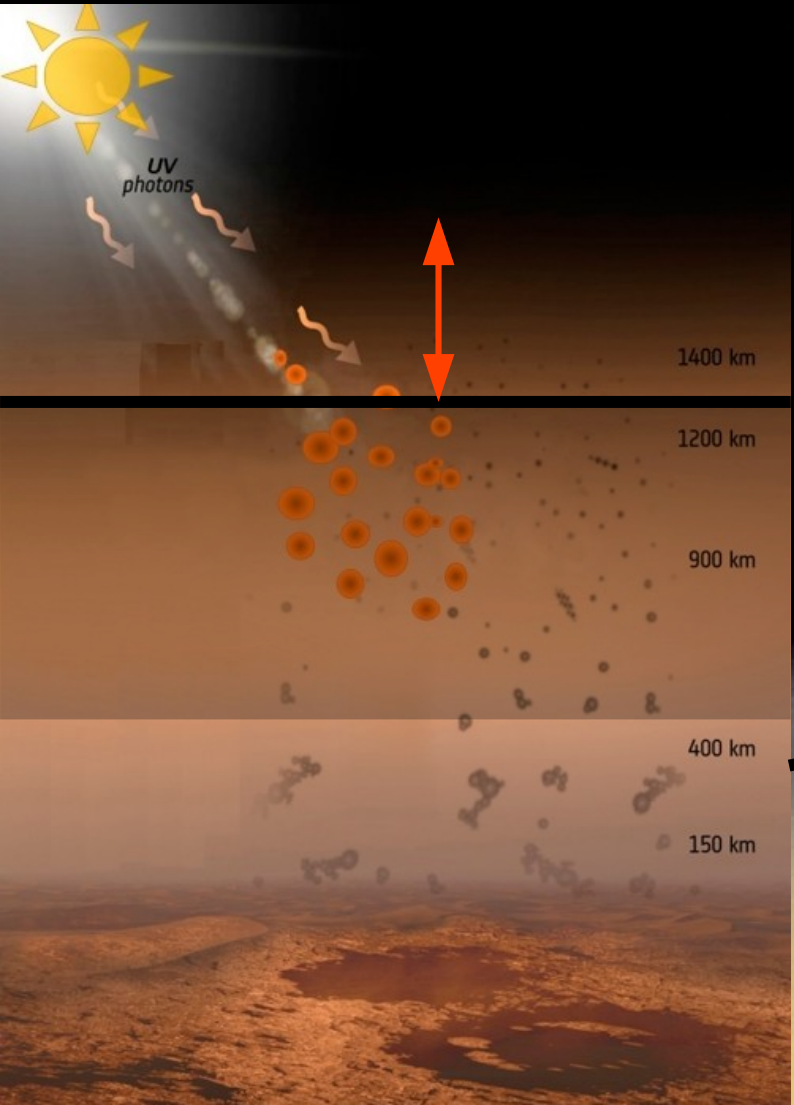
Photochemical hazes



Photochemical hazes



Photochemical hazes



Effect of hazes on the transmission spectra

Experimental photochemical haze production

Drant et al. 2026

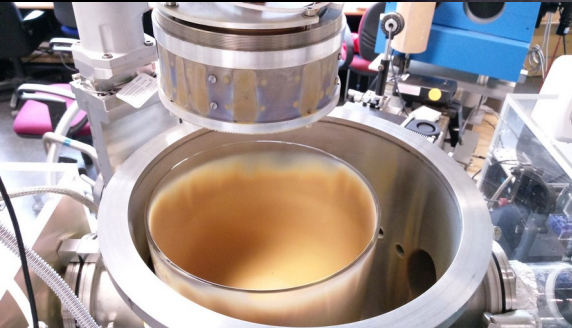
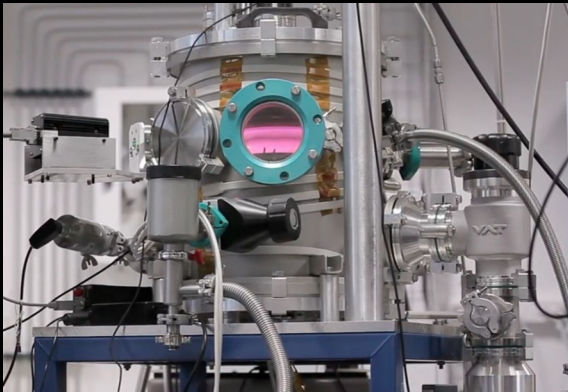


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Experimental photochemical haze production

Drant et al. 2026

PAMPRE

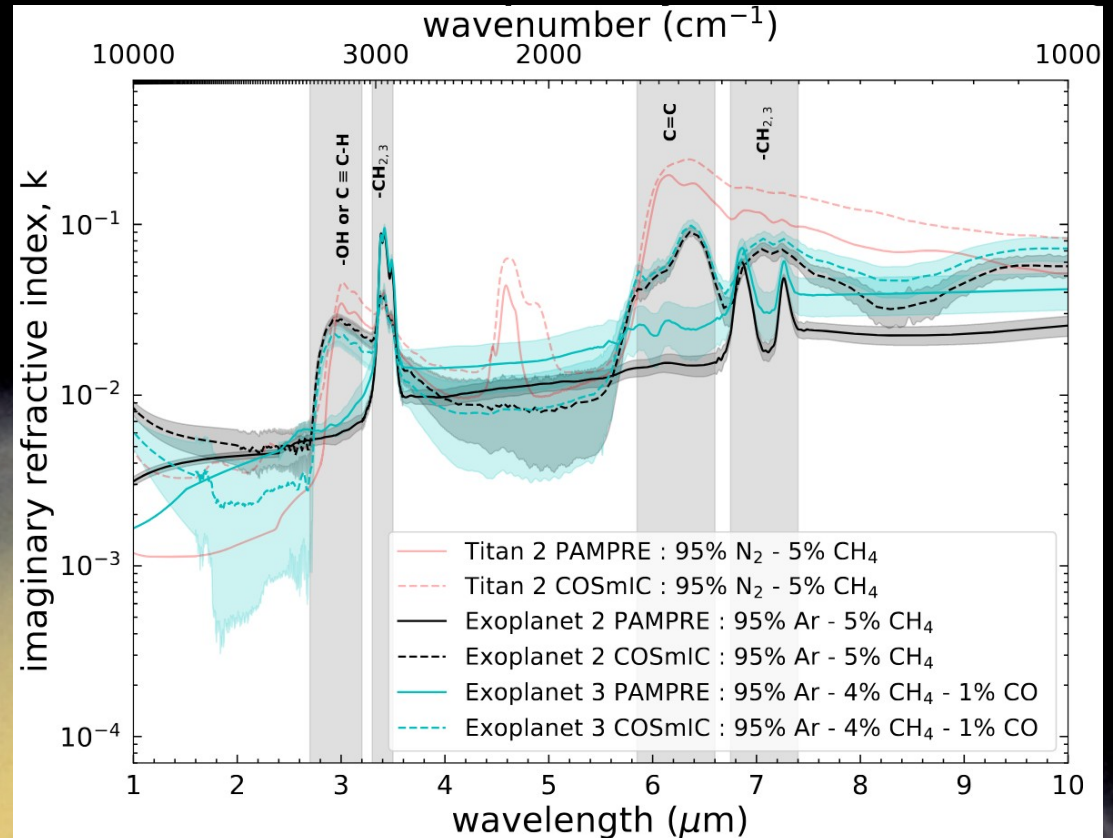
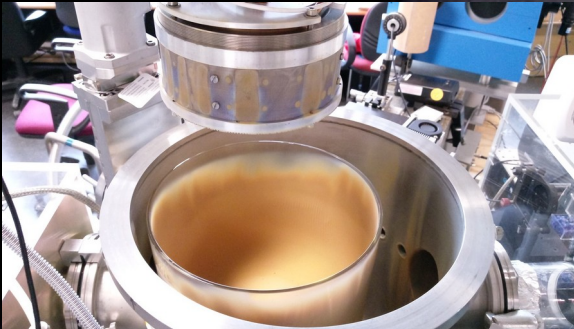
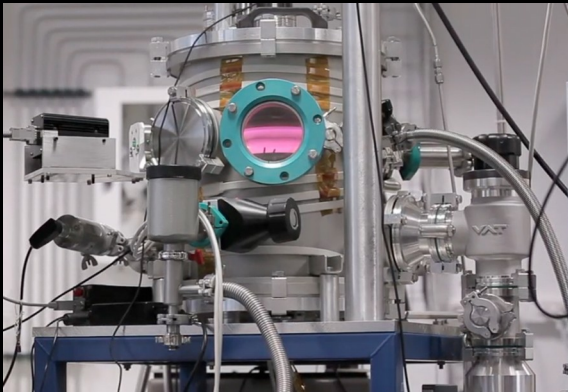


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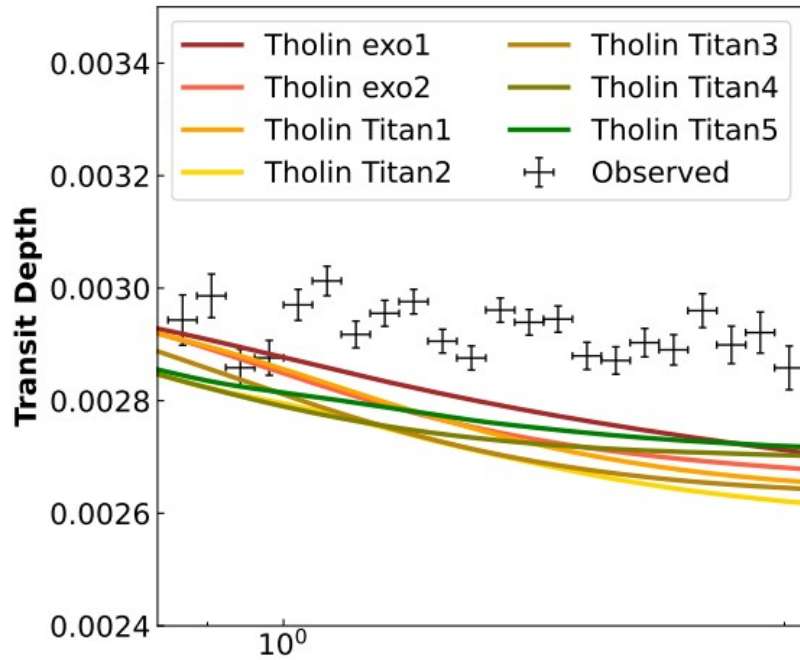
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Effect of hazes on the transmission spectra

Haze contributions to the spectra

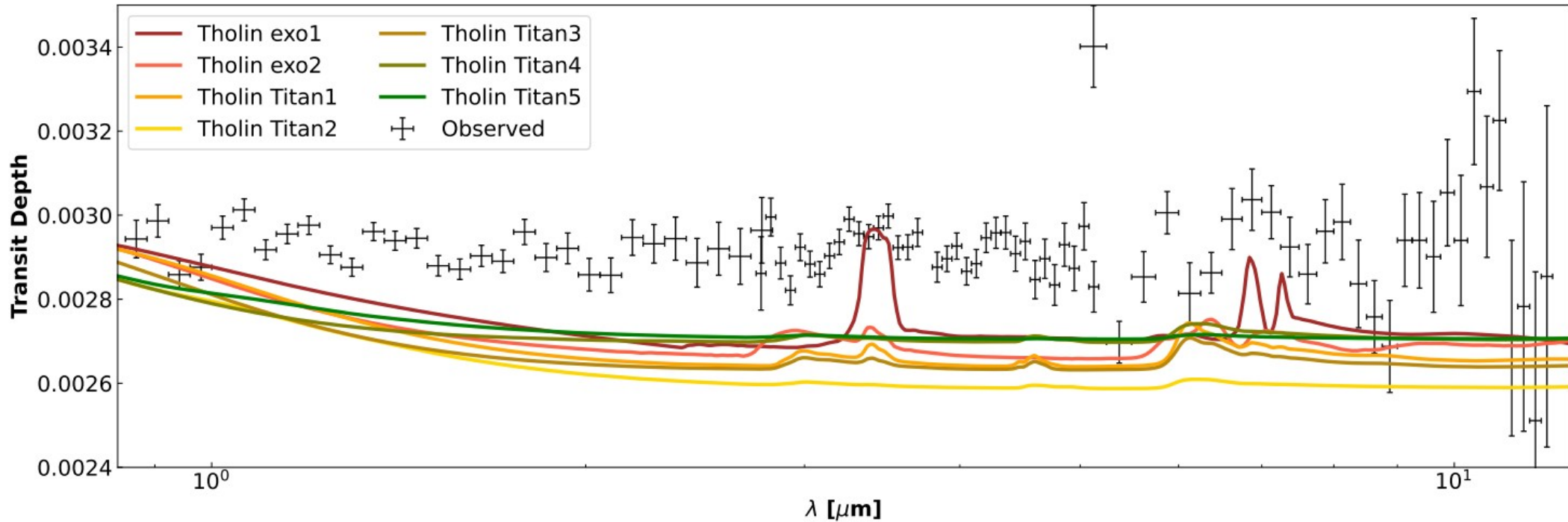
Jaziri et al. 2025b



Effect of hazes on the transmission spectra

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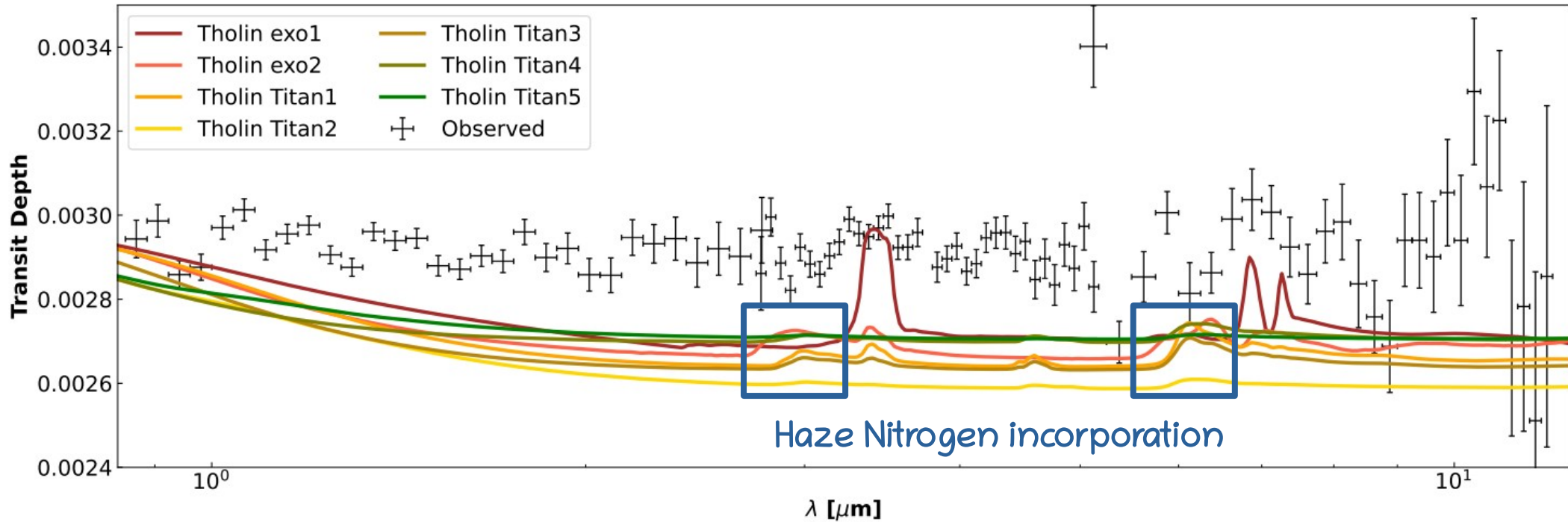
Jaziri et al. 2025b



Effect of hazes on the transmission spectra

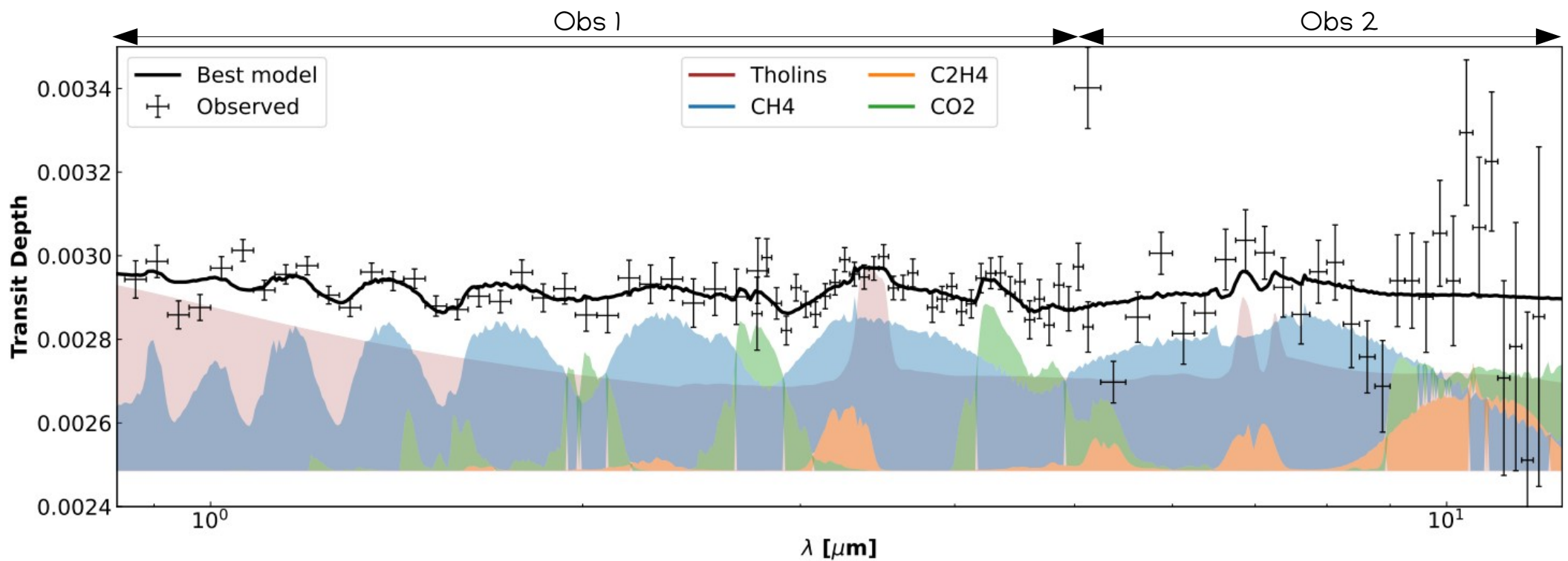
Haze contributions to the spectra

Jaziri et al. 2025b



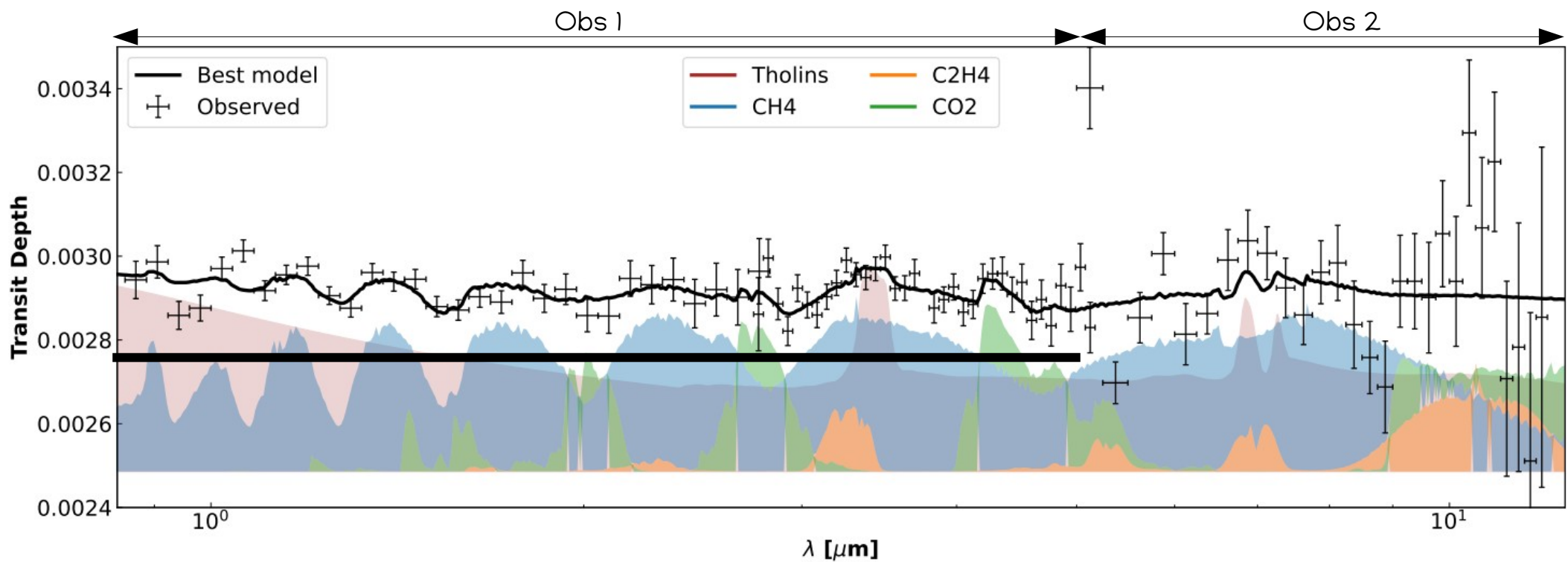
Fitting to observation with full range

Jaziri et al. 2025b



Fitting to observation with full range

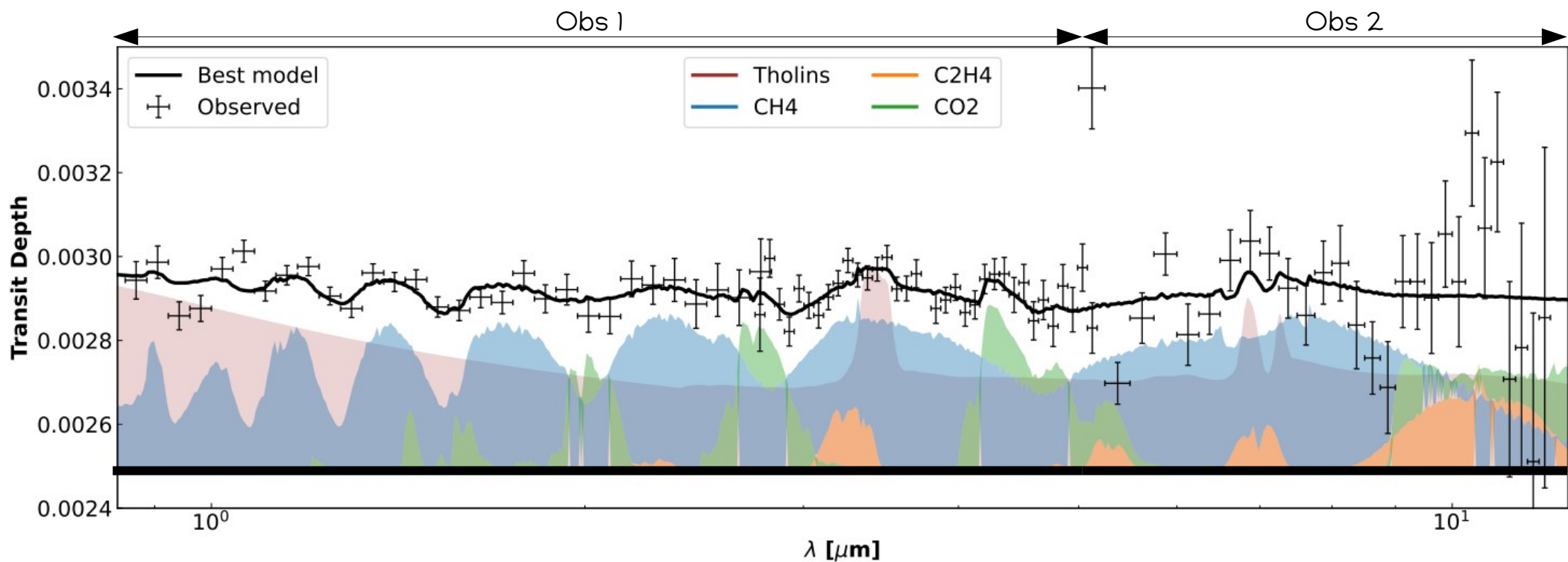
Jaziri et al. 2025b



Fitting to observation with full range

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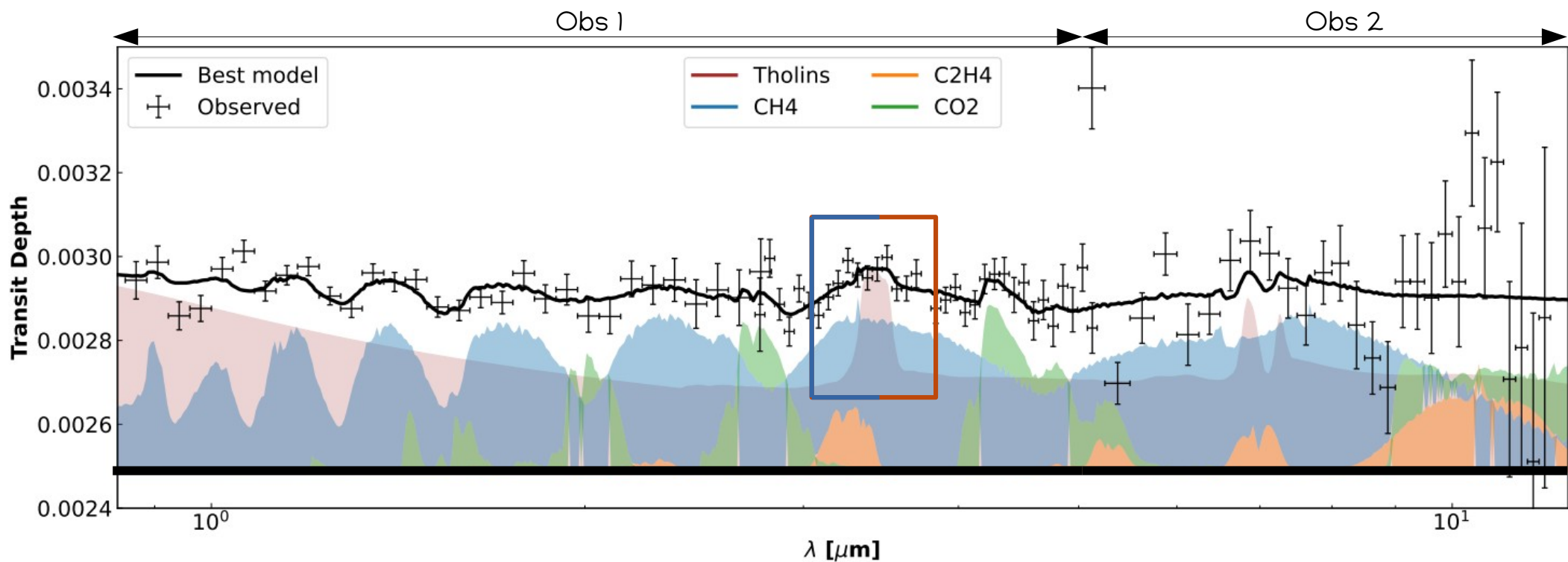
Lower metallicity: CH_4 \searrow CO_2 \searrow



Fitting to observation with full range

Jaziri et al. 2025b

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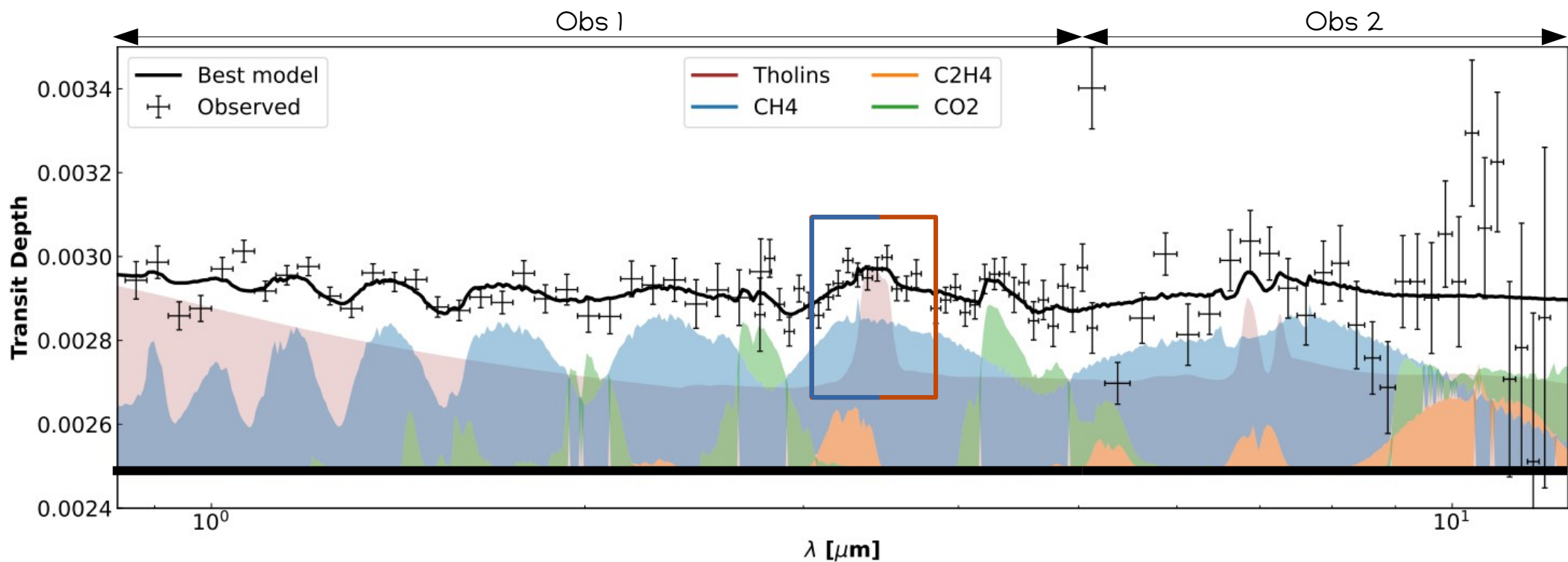


Fitting to observation with full range

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Strong degeneracy

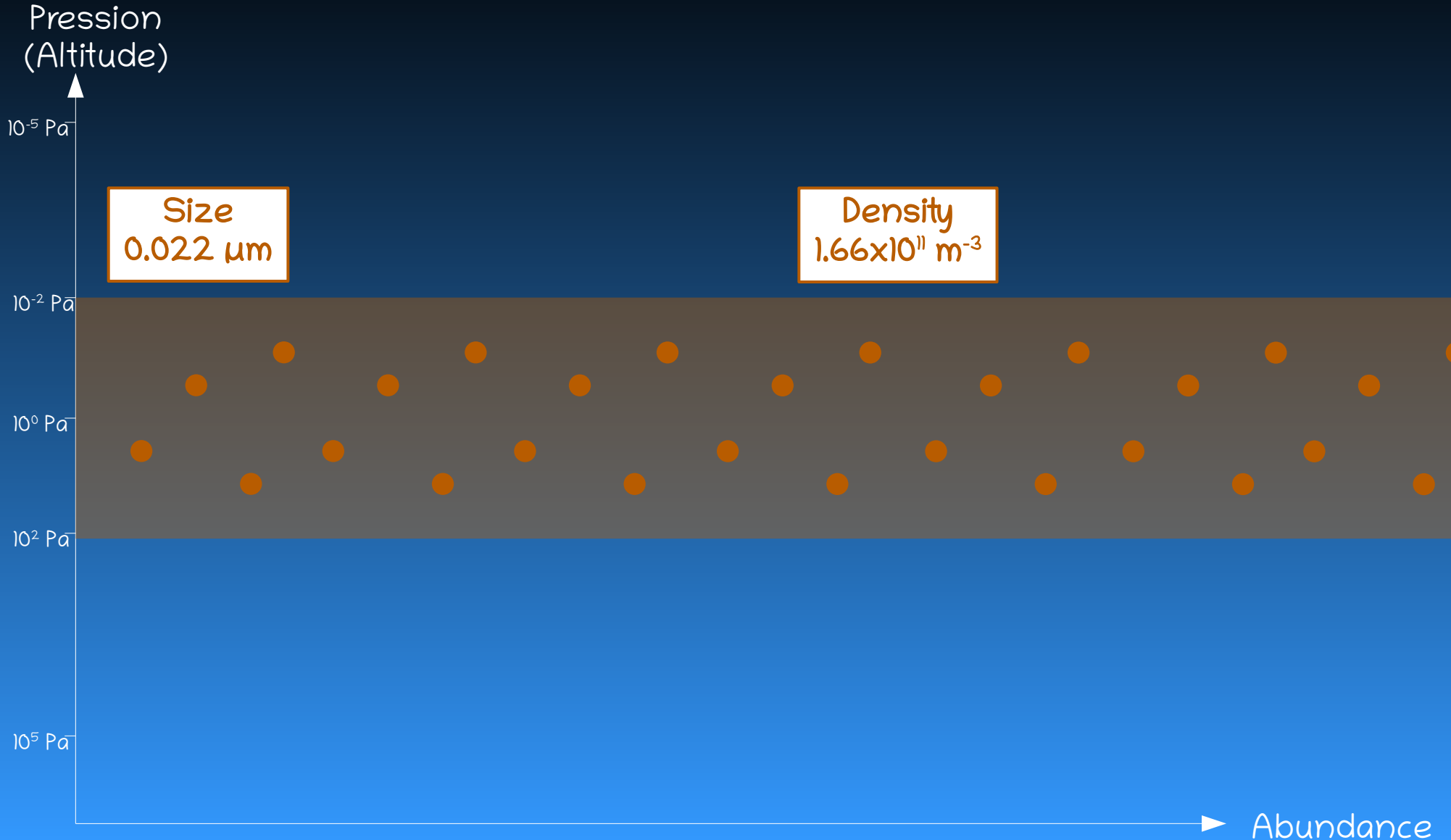
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Retrieved haze layer

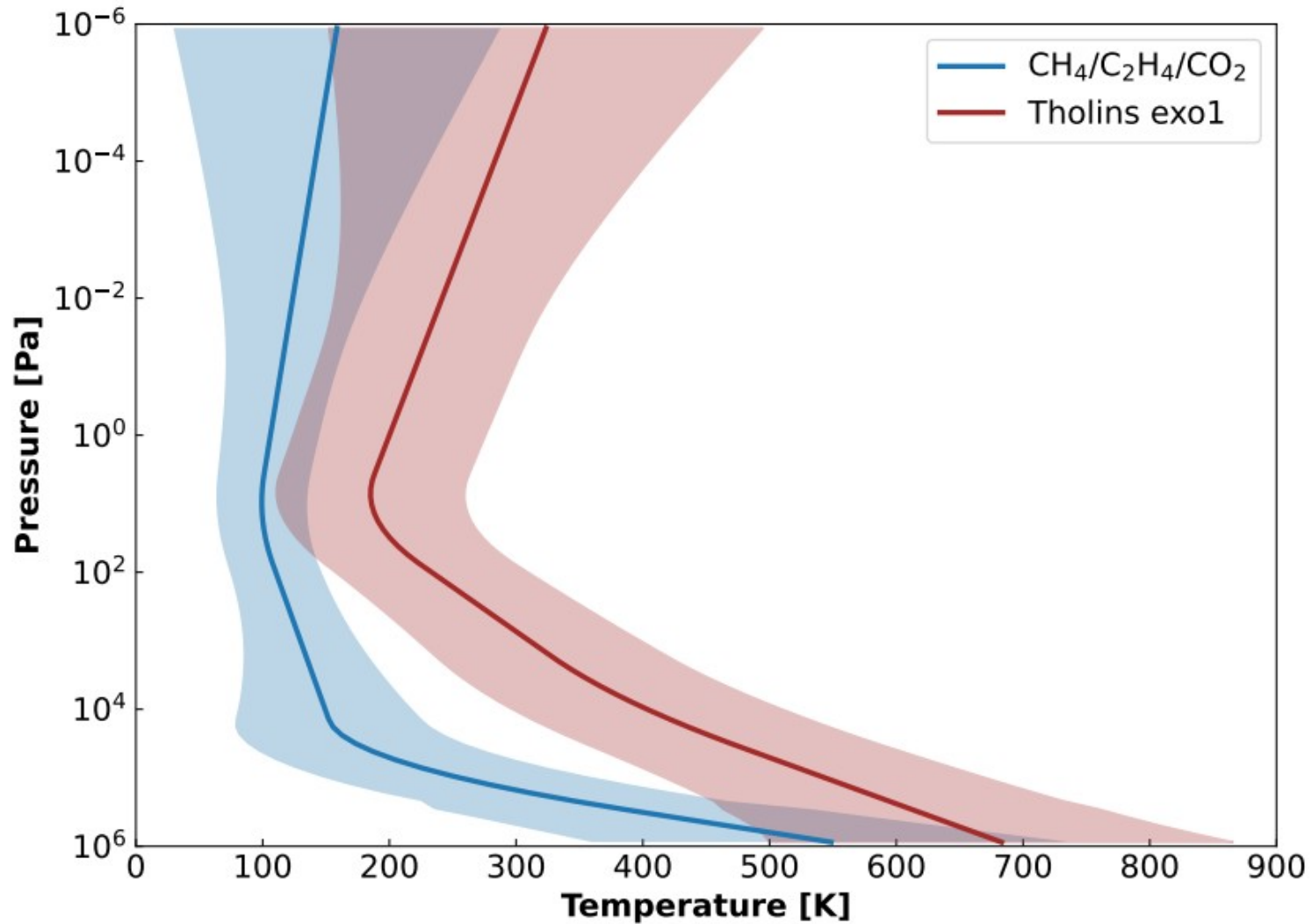


Retrieved haze layer



Temperature haze effect

Jaziri et al. 2025b



What can we learn from K2-18 b JWST observations?

There are CH₄ and CO₂ in the atmosphere

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High metallicity?

High C/O ratio?

Presence of hazes?

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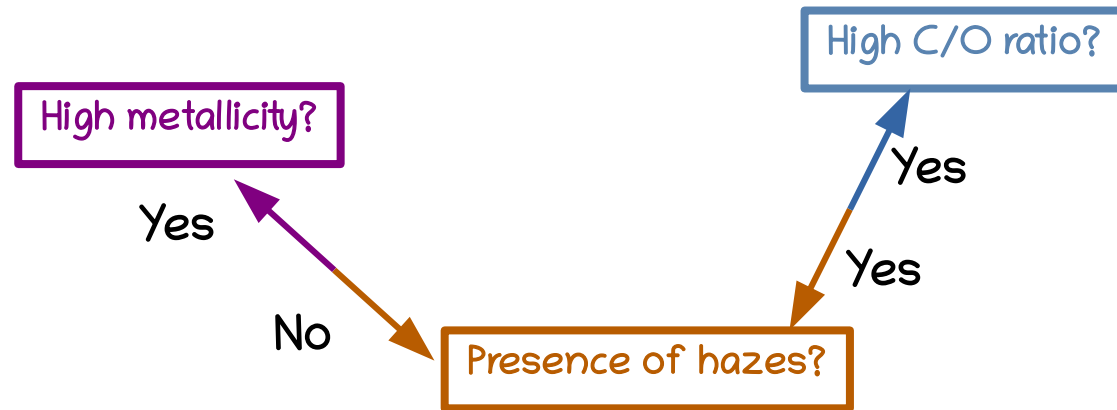
Yes

Yes

Presence of hazes?

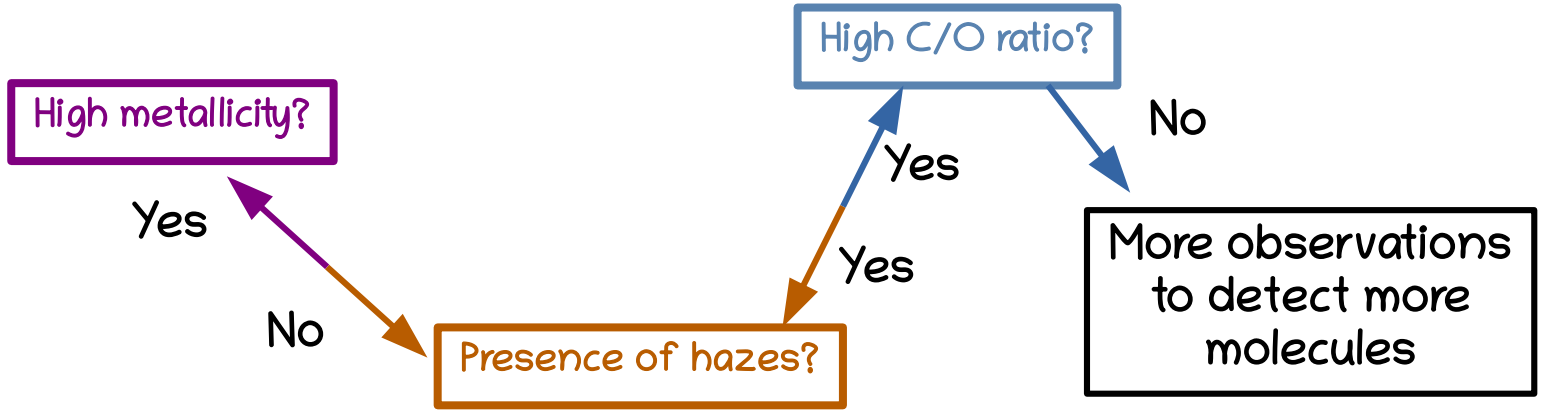
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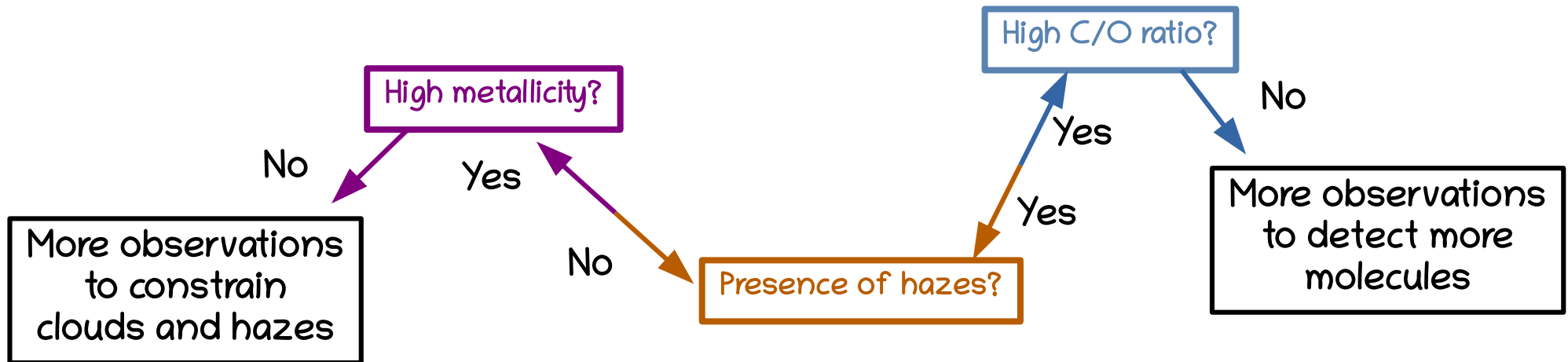
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Thank you

