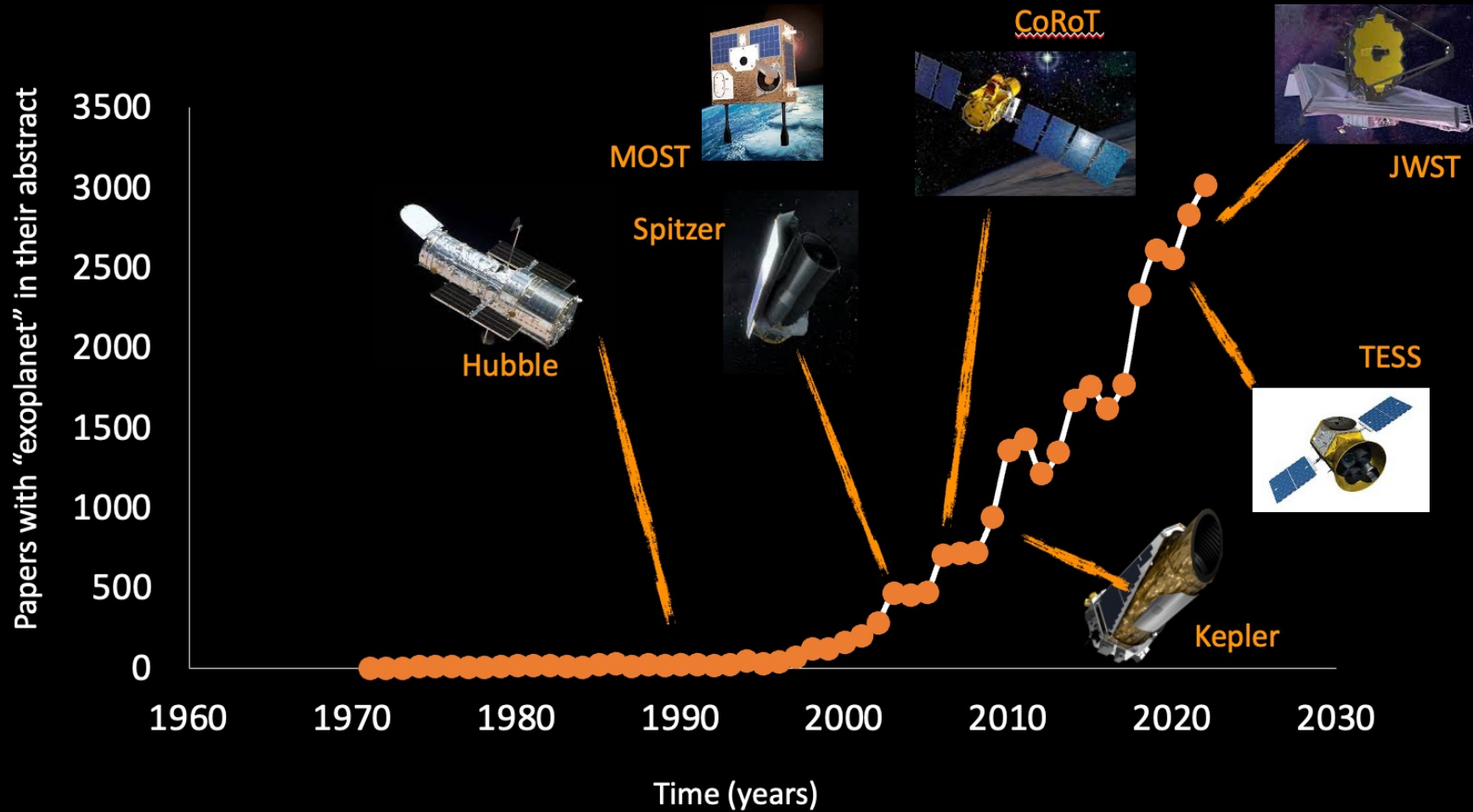


# Spectral profile of short-term irradiance variations of solar-like stars

Nina-Elisabeth Némec  
University of Göttingen

# Finding Earth's twin



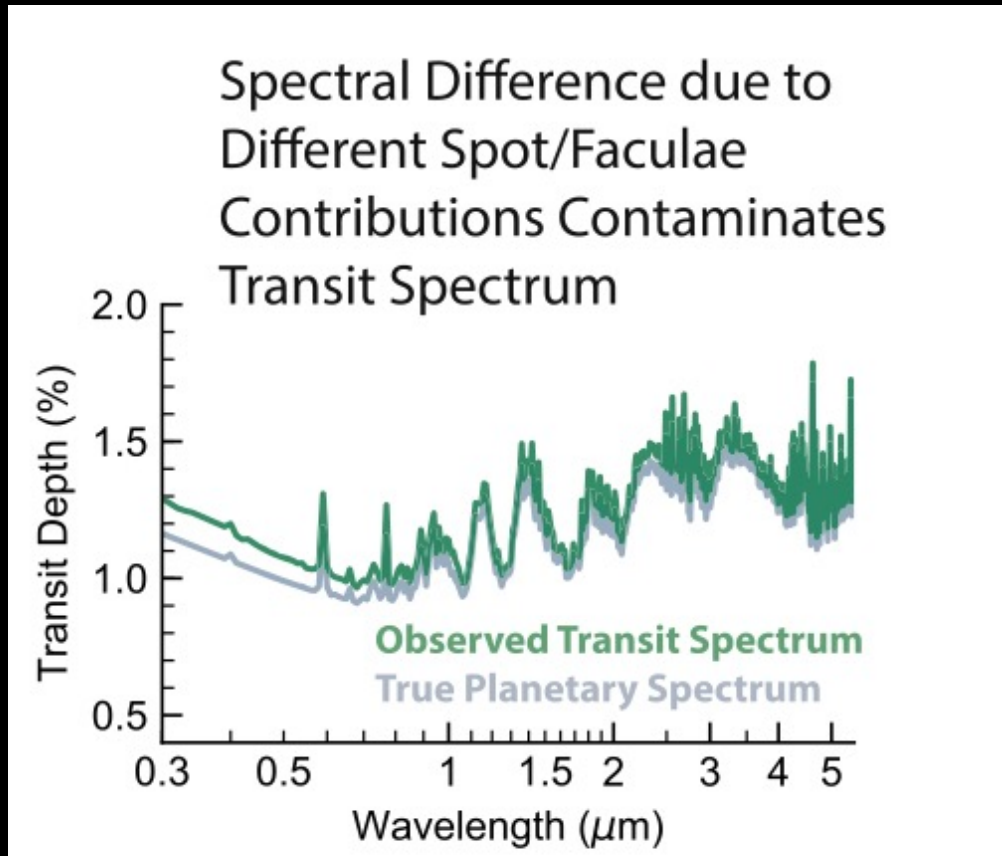
Radial velocity: stability of around 10 cm/s

Transmission spectroscopy: precision of around 10 ppm

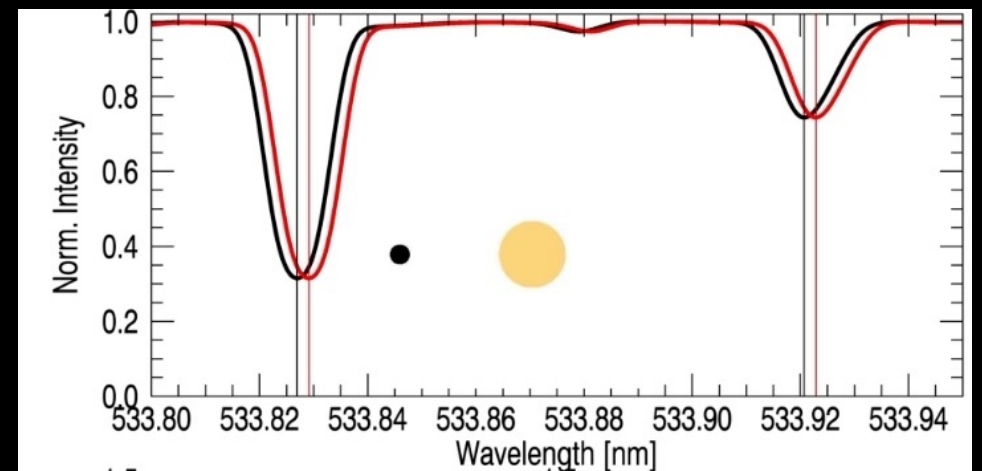
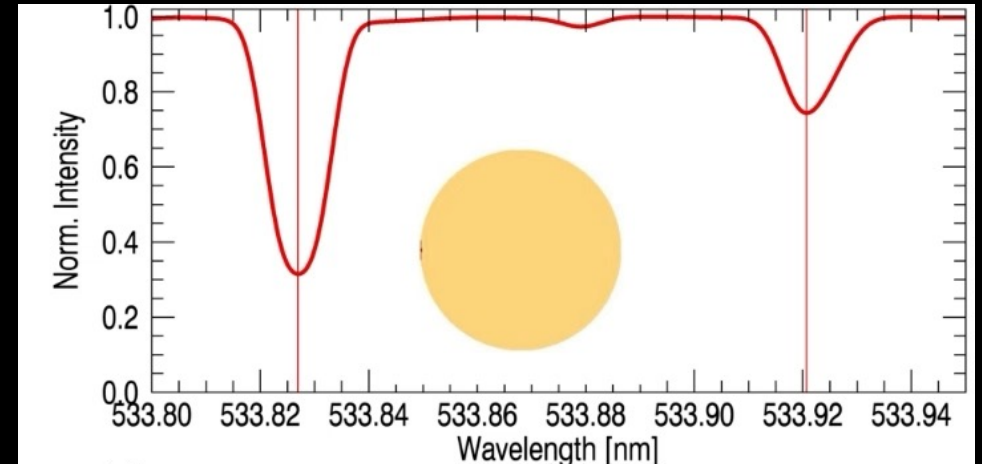
From a technical perspective, we are achieving this!

# Stellar contamination conundrum!

Courtesy A. I. Shapiro, A. Collier-Cameron

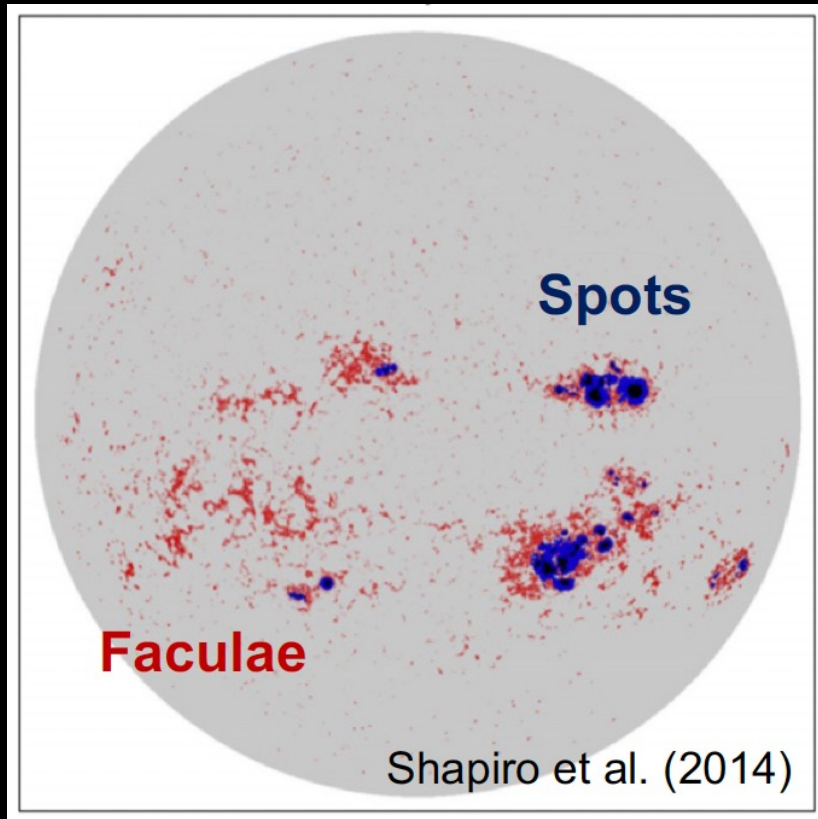


Rackham et al. (2018)



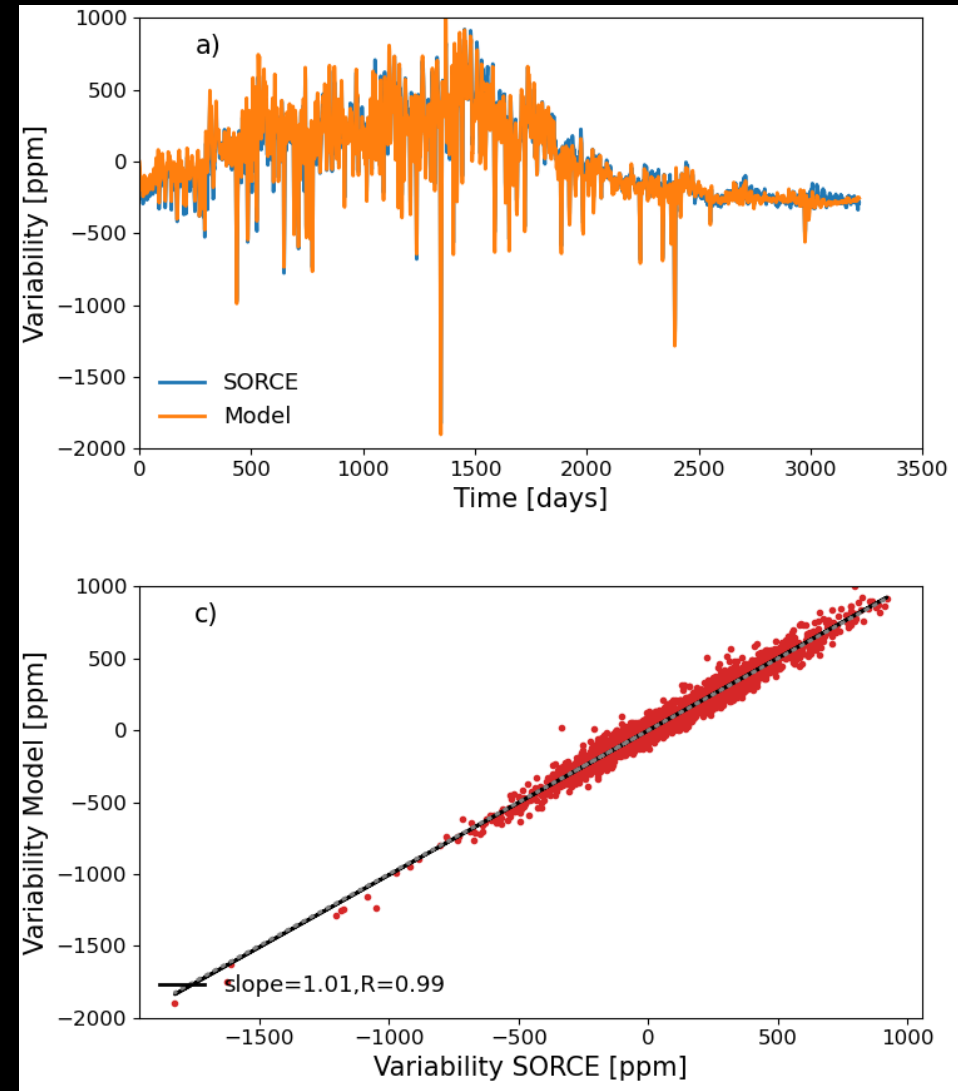
# Model – Magnetic Activity

Nèmec et al. in prep

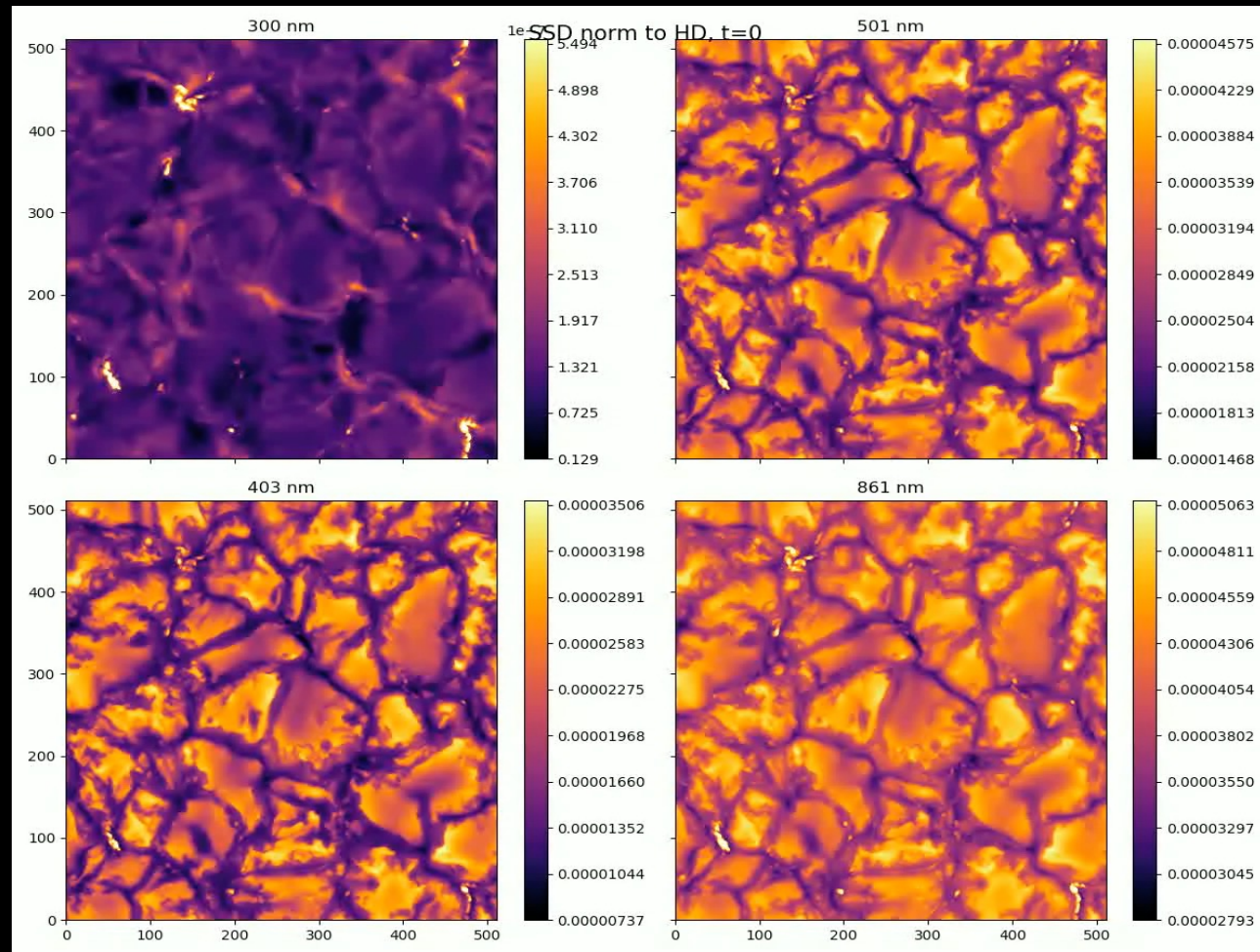


SATIRE – approach

$$\Delta Stot(t) = \Delta Sspots(t) + \Delta Sfaculae(t)$$



# Model – Convective Signal

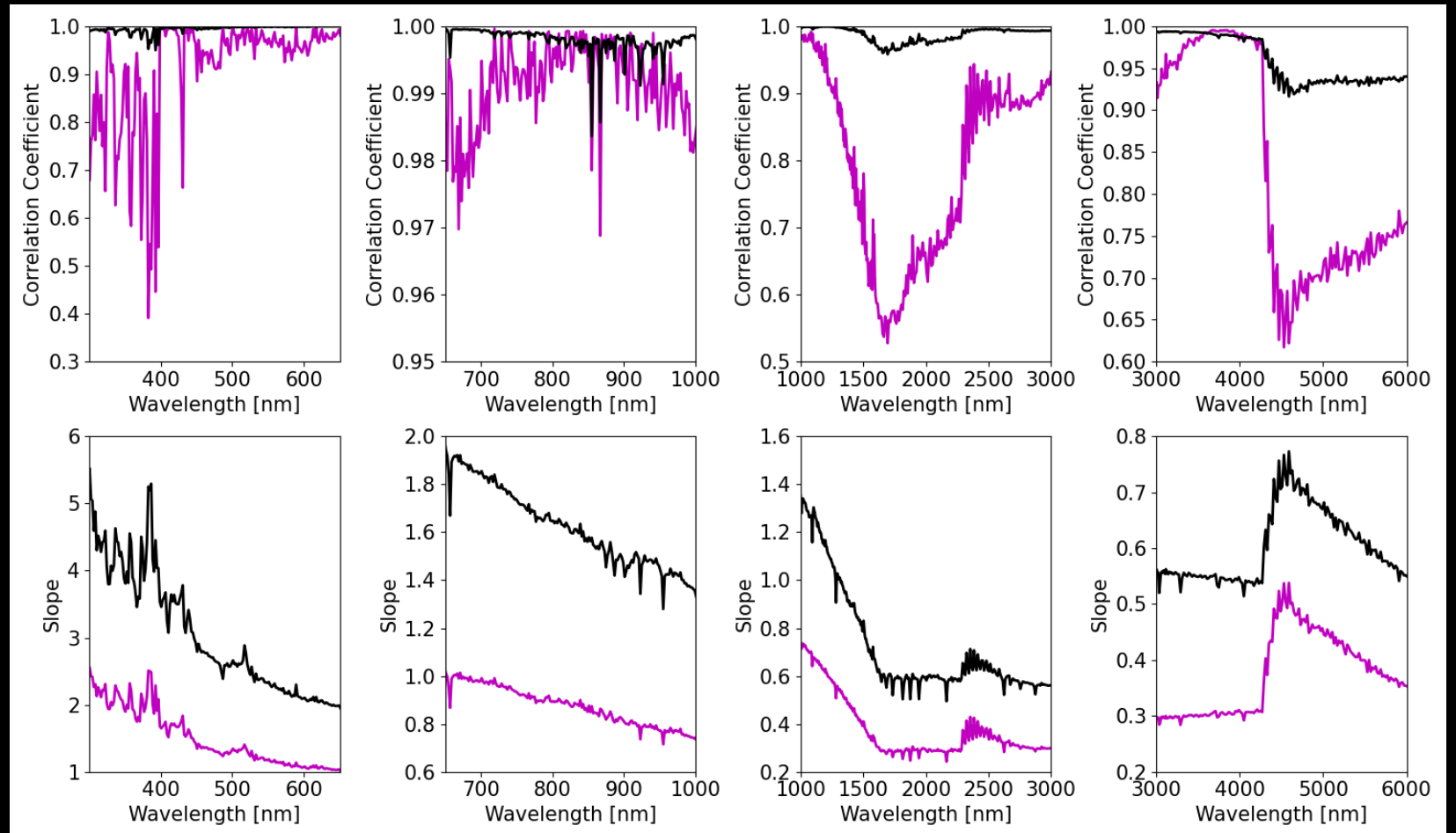


# Correlations – Magnetic vs convective signal

Regressions of variability in SSI against the TSI, for both the **magnetic activity** and the **convection calculations**

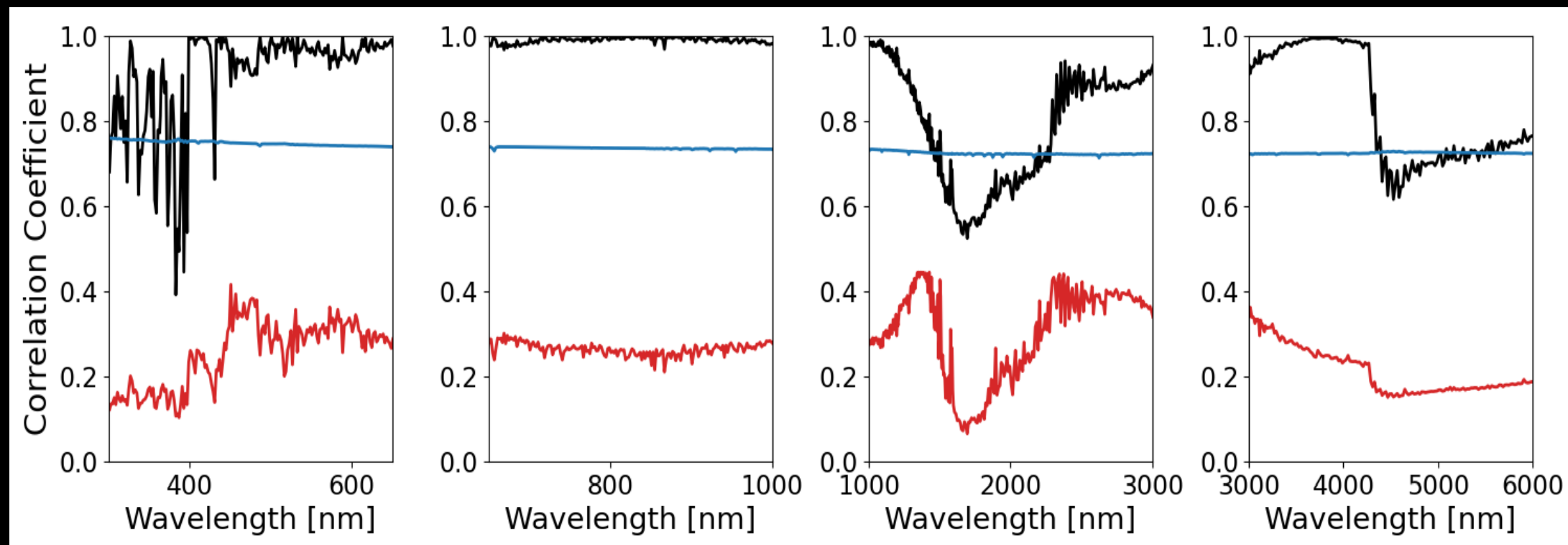
Convection signal is far better correlated between SSI and TSI

Poster: “Enhancing solar modes”



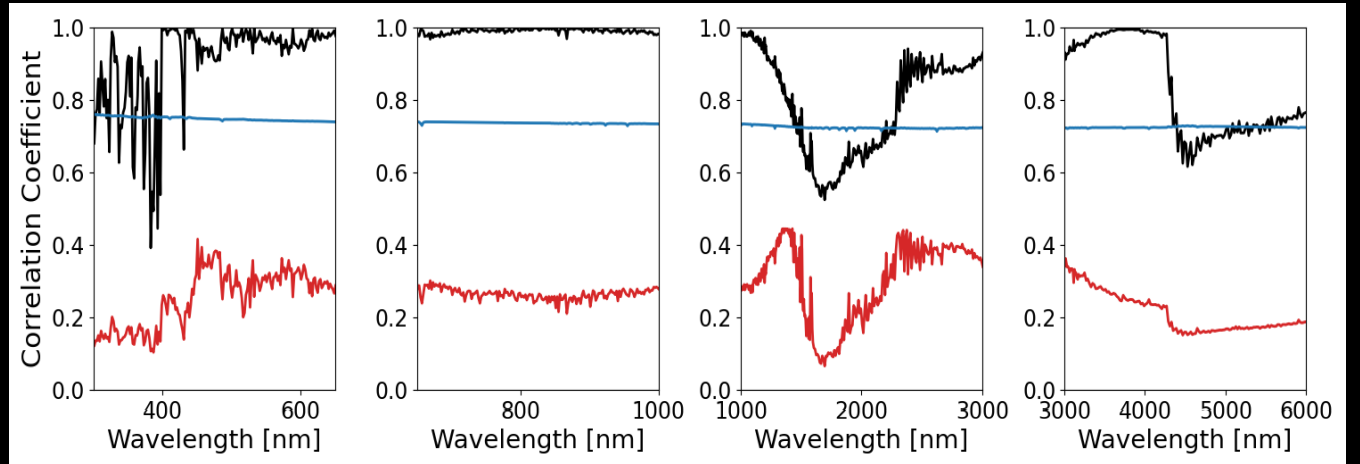
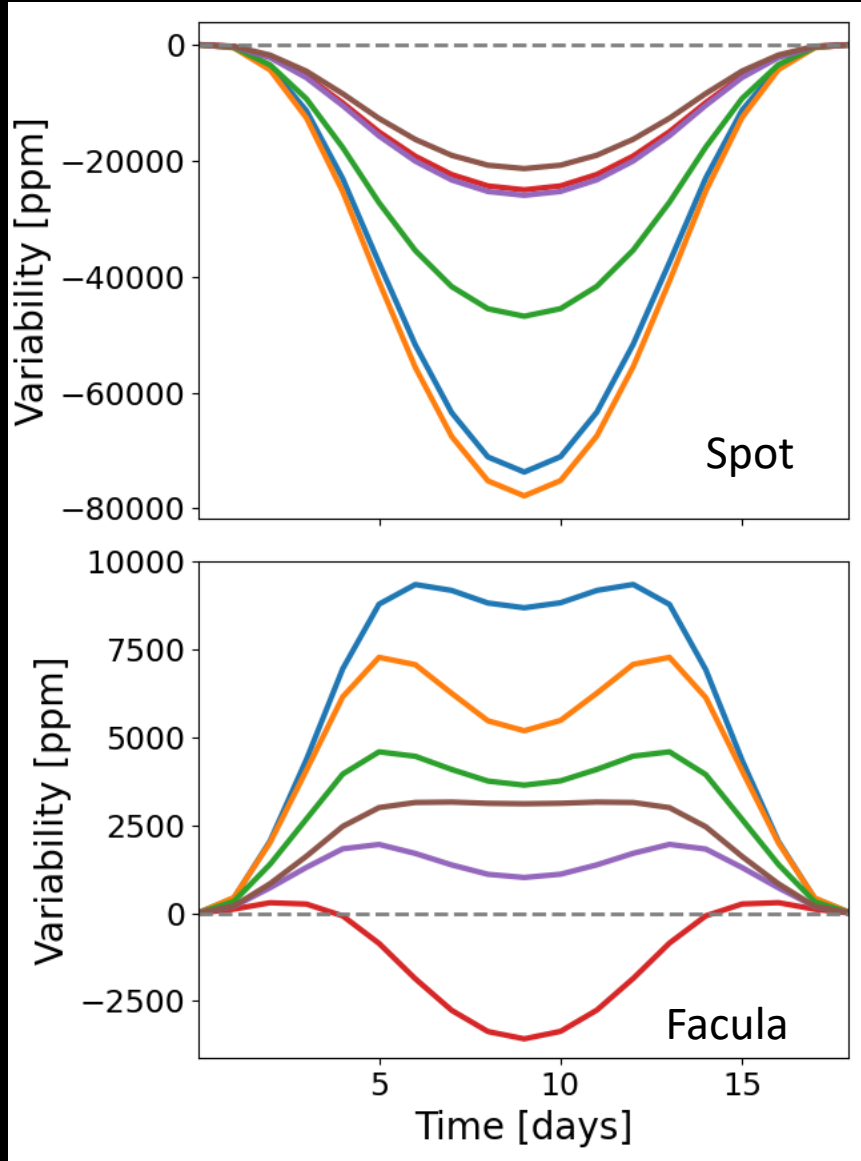
# Understanding variability across the spectrum

Total  
Spot  
Facula



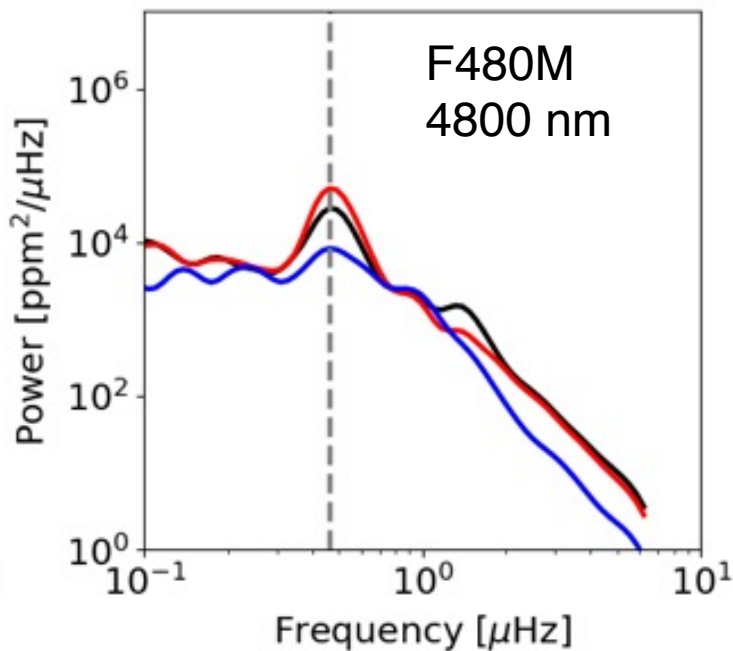
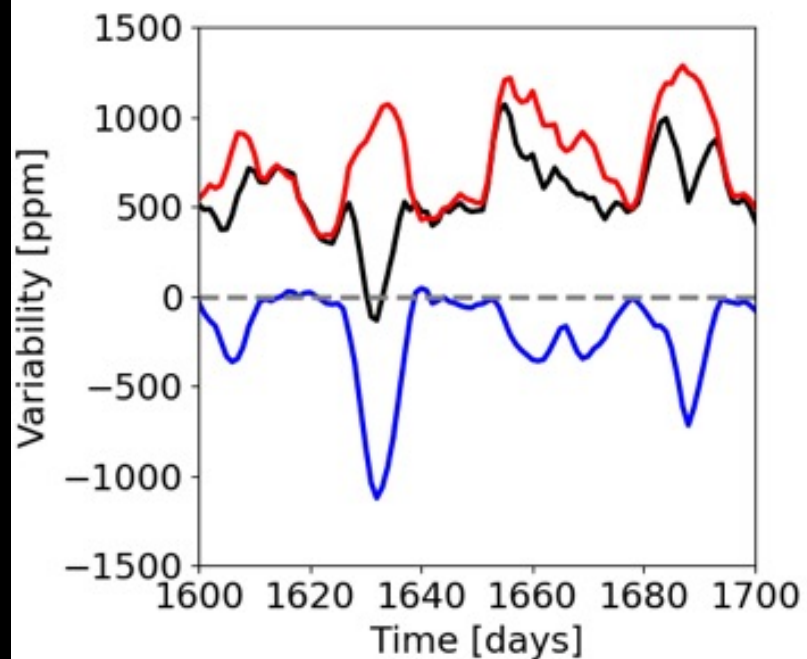
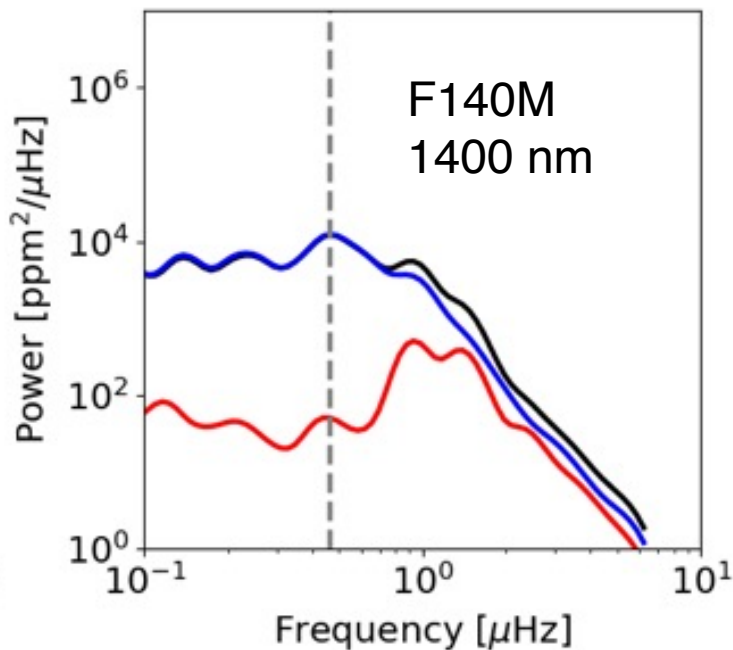
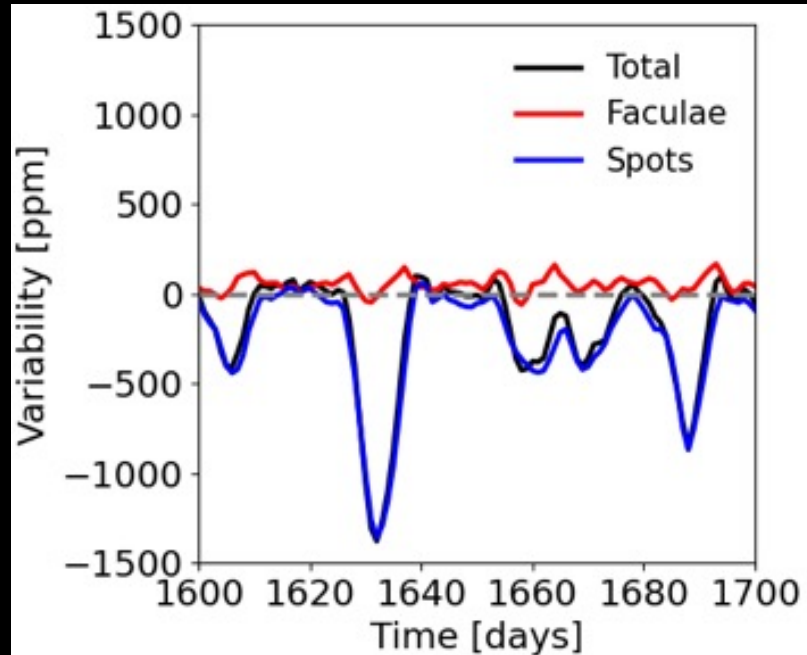
# Understanding variability across the spectrum II

TSI  
637 nm  
1092 nm  
1605 nm  
2585 nm  
3970 nm



Total Spot Facula





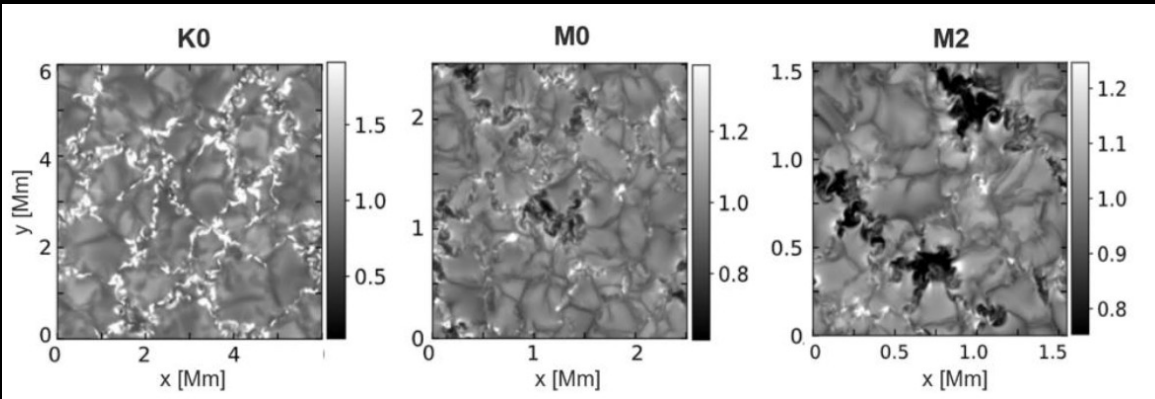
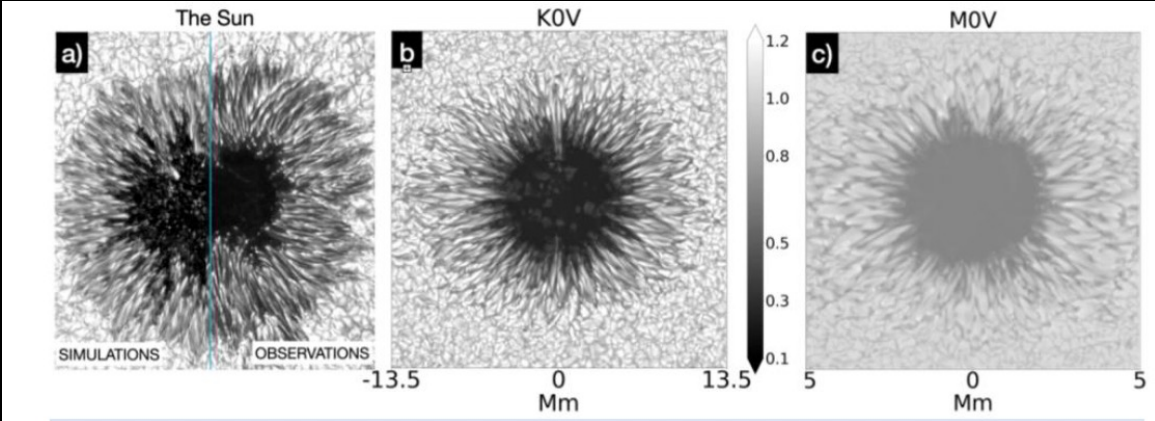
Stars like the Sun can appear faculae dominated even in the infrared!

→ Importance of proper modelling of faculae spectra for low activity stars

JWST/NIRCam filters

# What's next?

Realistic 3D MHD simulations of spots and faculae with MURaM and improved RT with MPS/ATLAS



Collaboration with I. Ribas

