

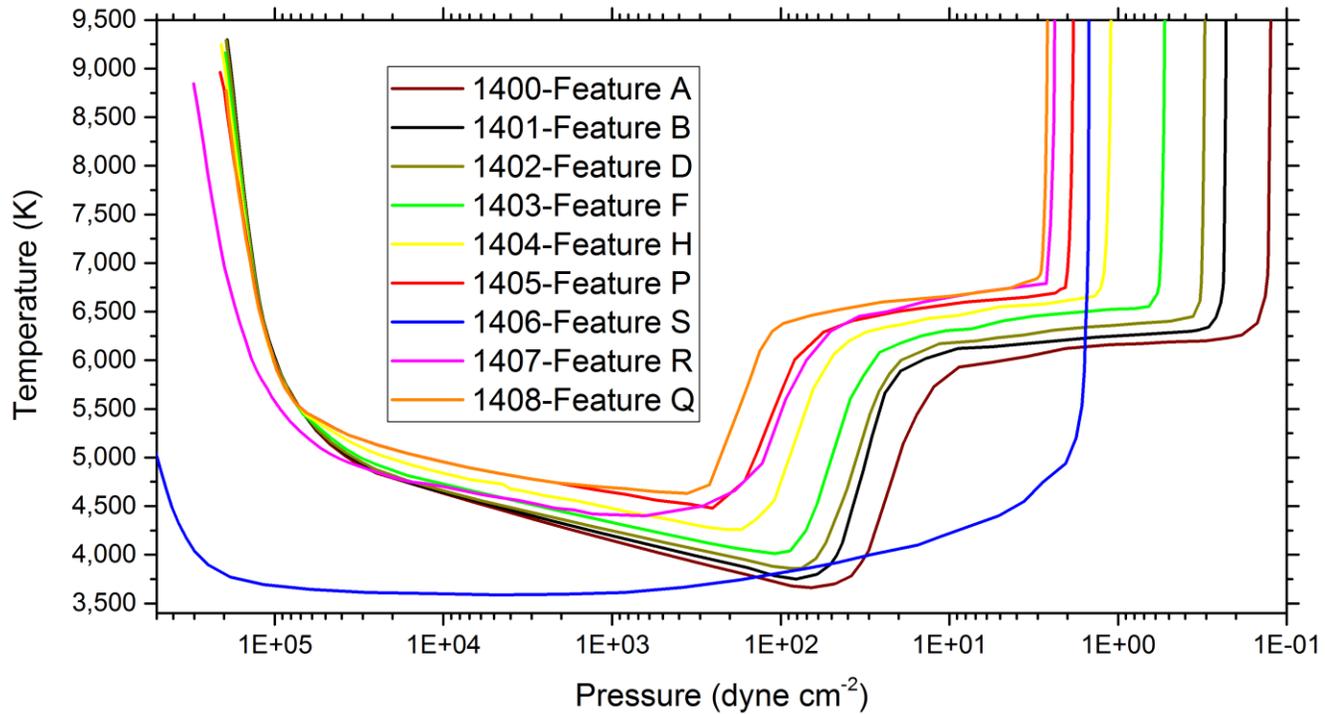
# Modeling the Solar Atmosphere Irradiance Spectra for the Period 2010-2015

(the solar corona is omitted in this presentation)

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# The nine solar feature models

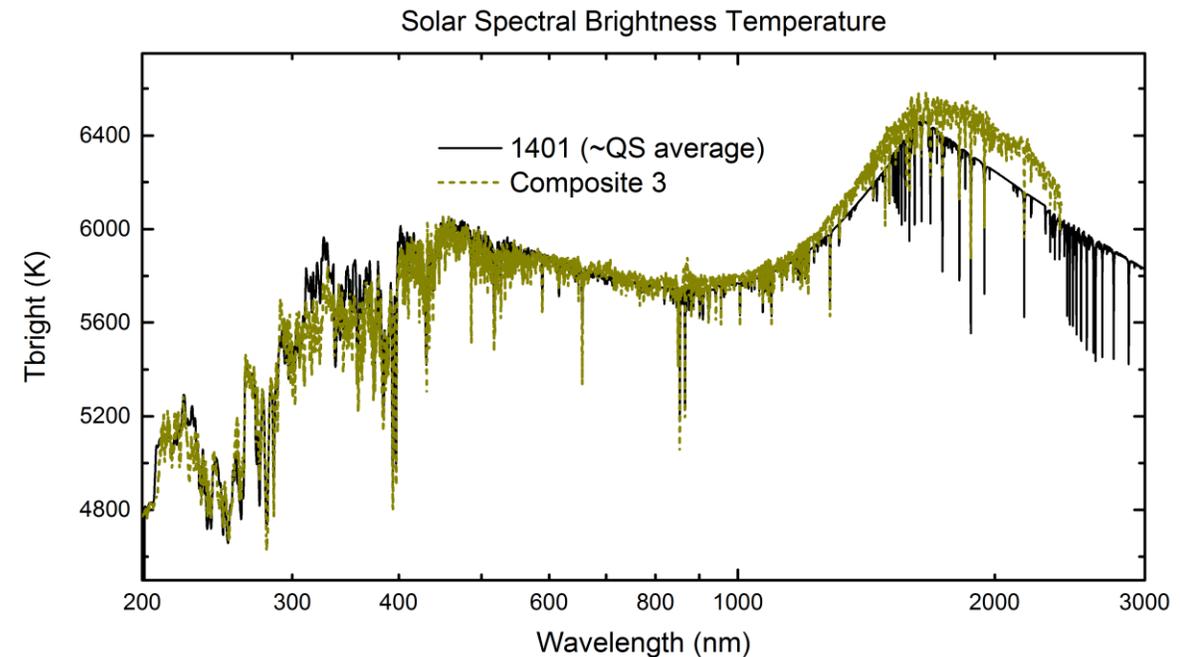
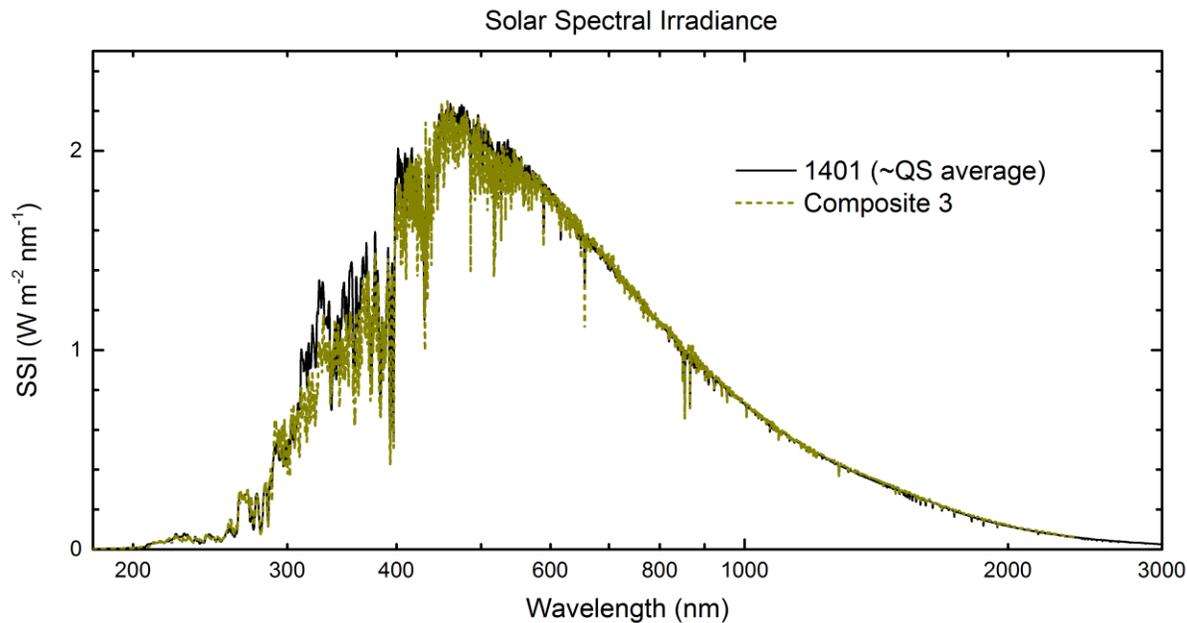
- Models have been calculated for nine component atmospheres representing different quiet and active regions which reasonably match observations for wavelengths throughout the spectrum from center to limb.



A	Dark quiet-Sun inter-network
B	Quiet-Sun inter-network
D	Quiet-Sun network lane
F	Enhanced network
H	Plage (that is not facula)
P	Facula (i.e. very bright plage)
S	Sunspot umbra
R	Sunspot penumbra
Q	Hot Facula

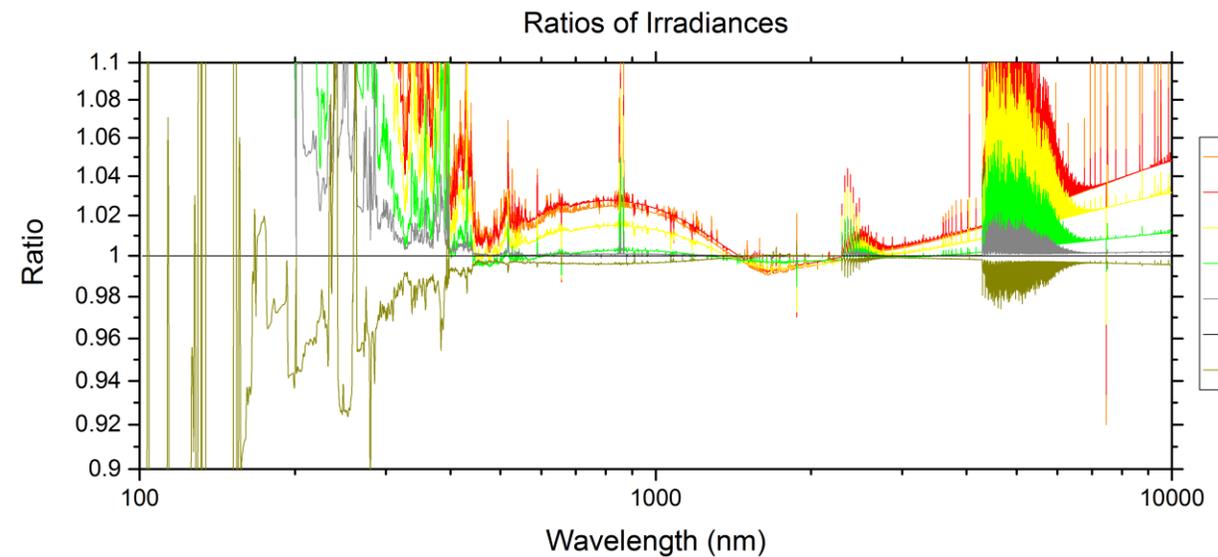
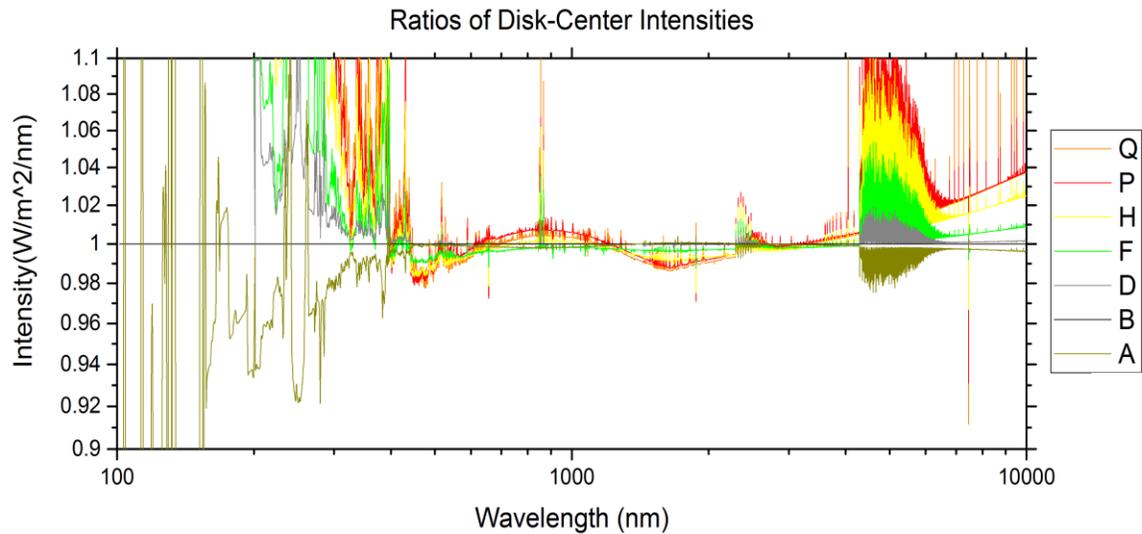
# Comparison of the most abundant feature SSI

- Most of the Sun, especially at quiet-times, display Feature B while features A and D are less common and mostly compensate each other. SO it makes sense comparing the SSI for model 1401 (feature B) with the measured SSI.



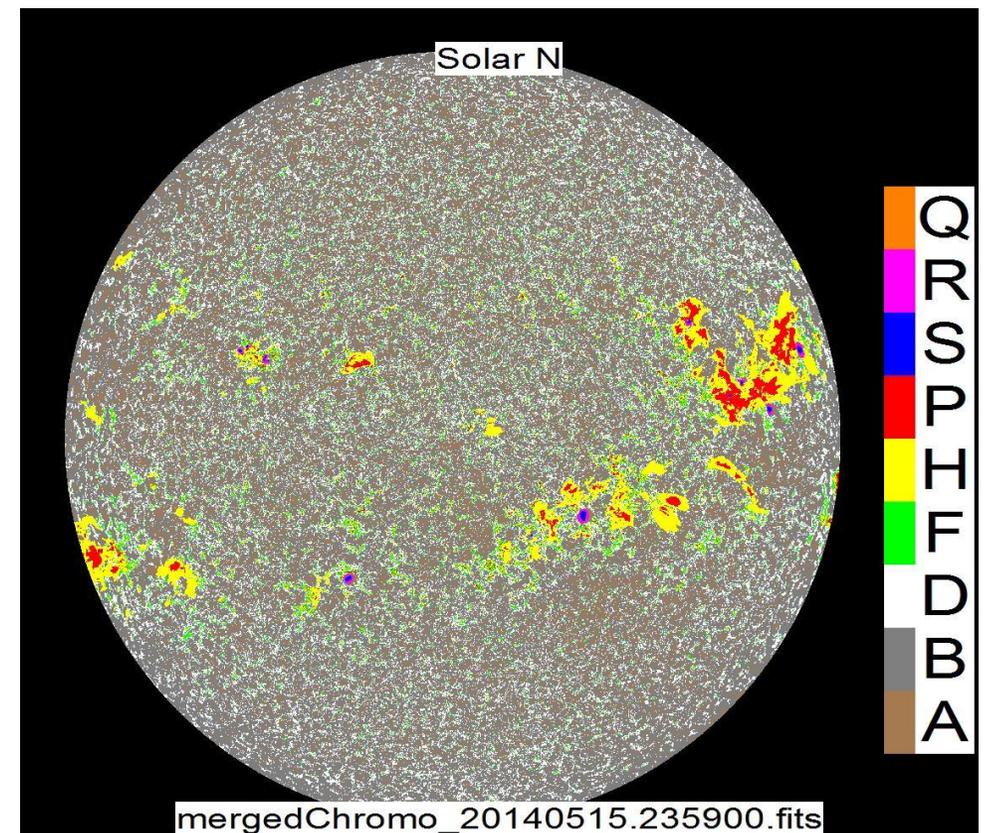
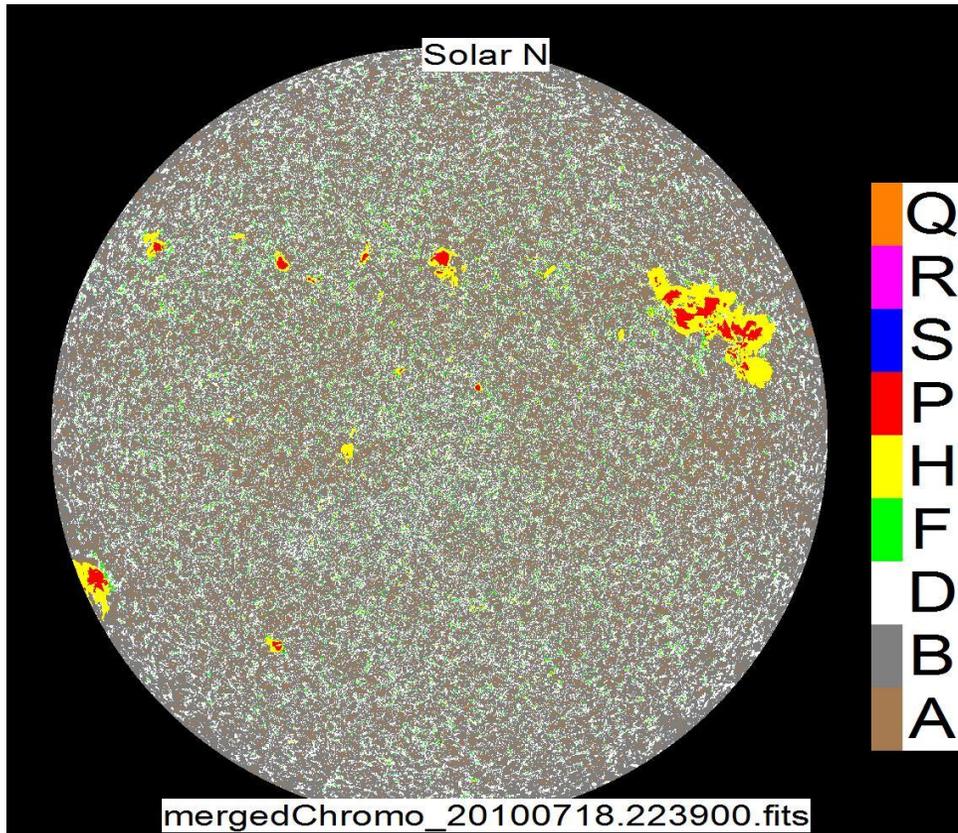
# Features Spectral Differences

- The solar surface features have different brightness temperature spectrum at disk center and over their complete angular distribution, represented by the irradiance brightness temperature.



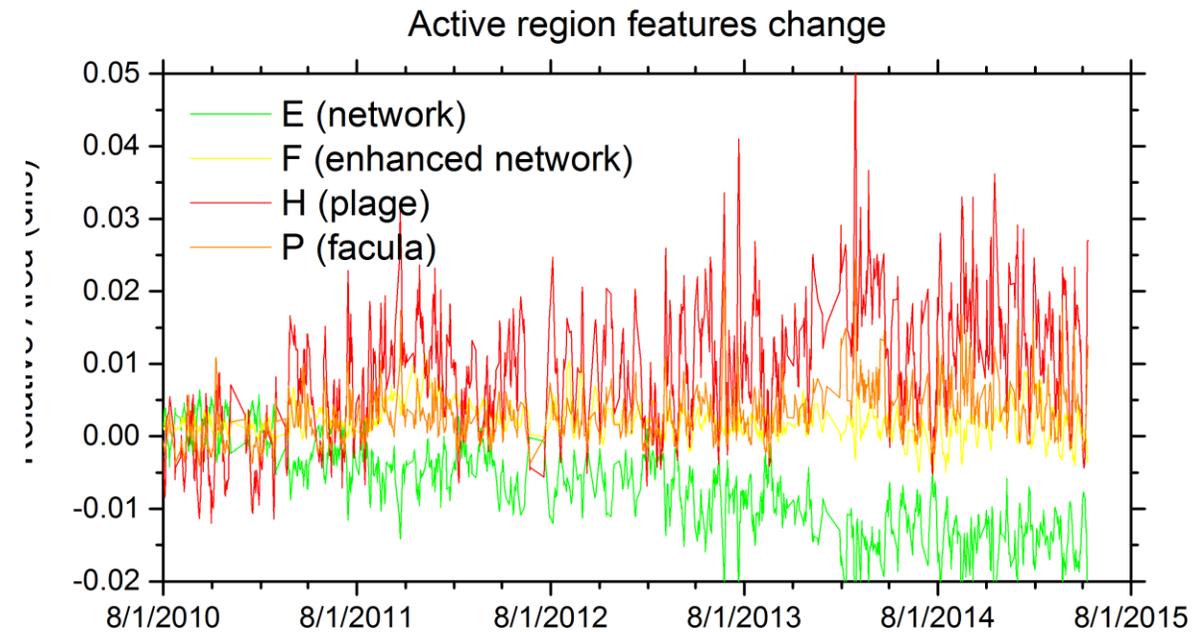
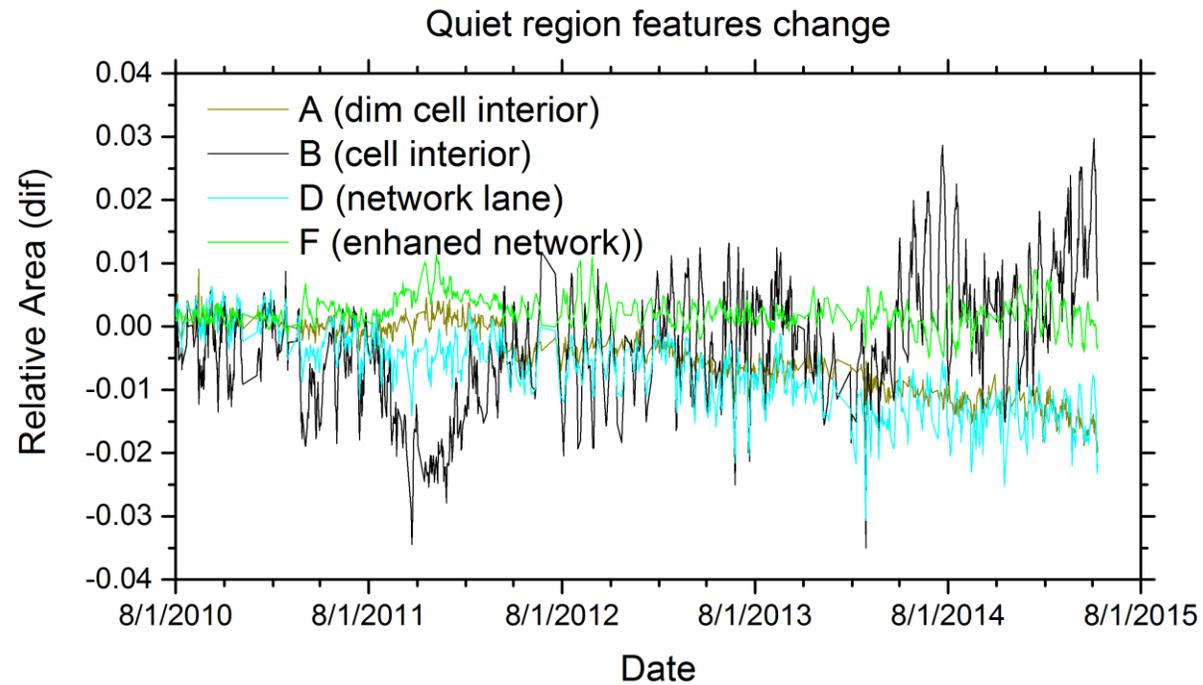
# The distribution of solar features in space and time

- The observed solar disk at any one time is resolved into these component regions using nine different masks, each showing the extent and location of each region. Currently using SDO/AIA images.



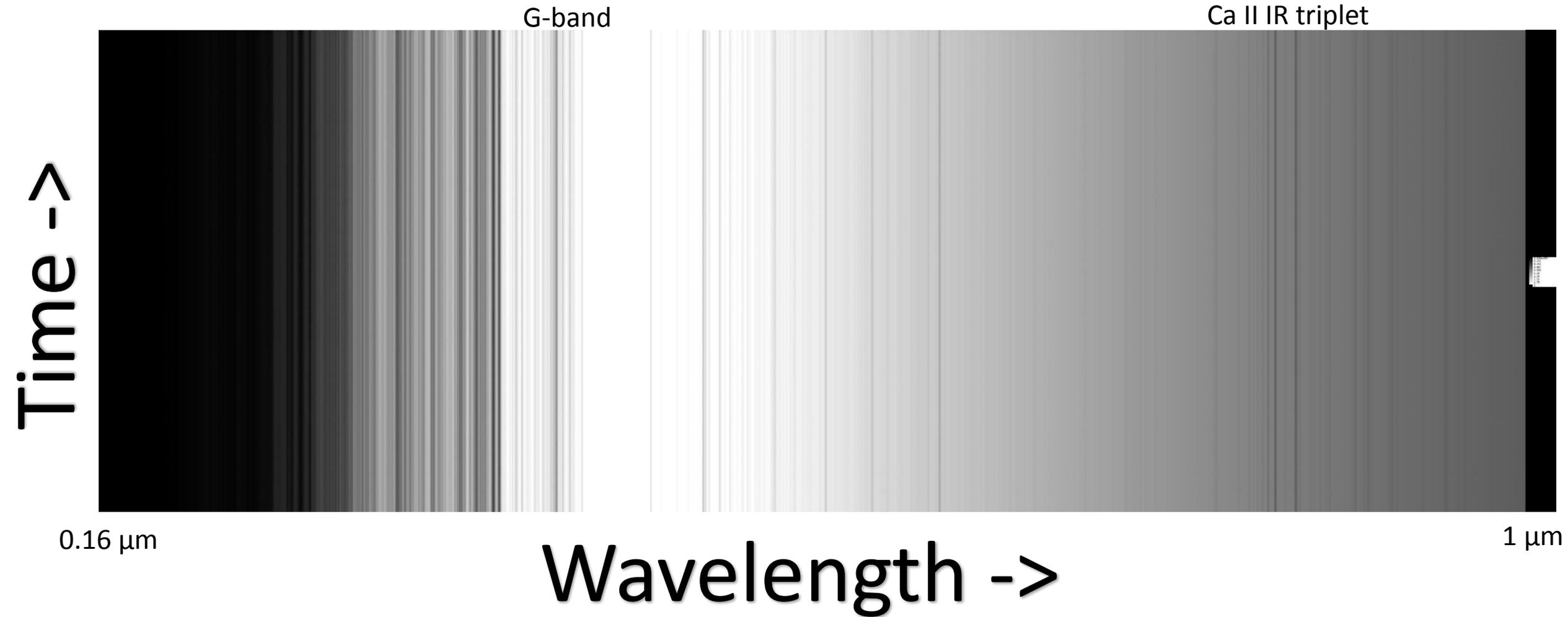
# Features global areas change over the Solar Cycle 24

- As expected the total areas of the various features relative to the area of the solar disk varied in time. Coarsely, network cells became brighter, i.e. A evolved into B, and D evolved into F; and more magnetically active features increased brightness, i.e. F evolved into H, and P. Of course sunspots increased too at around the peak of the cycle (maybe in 2013 but still ongoing).



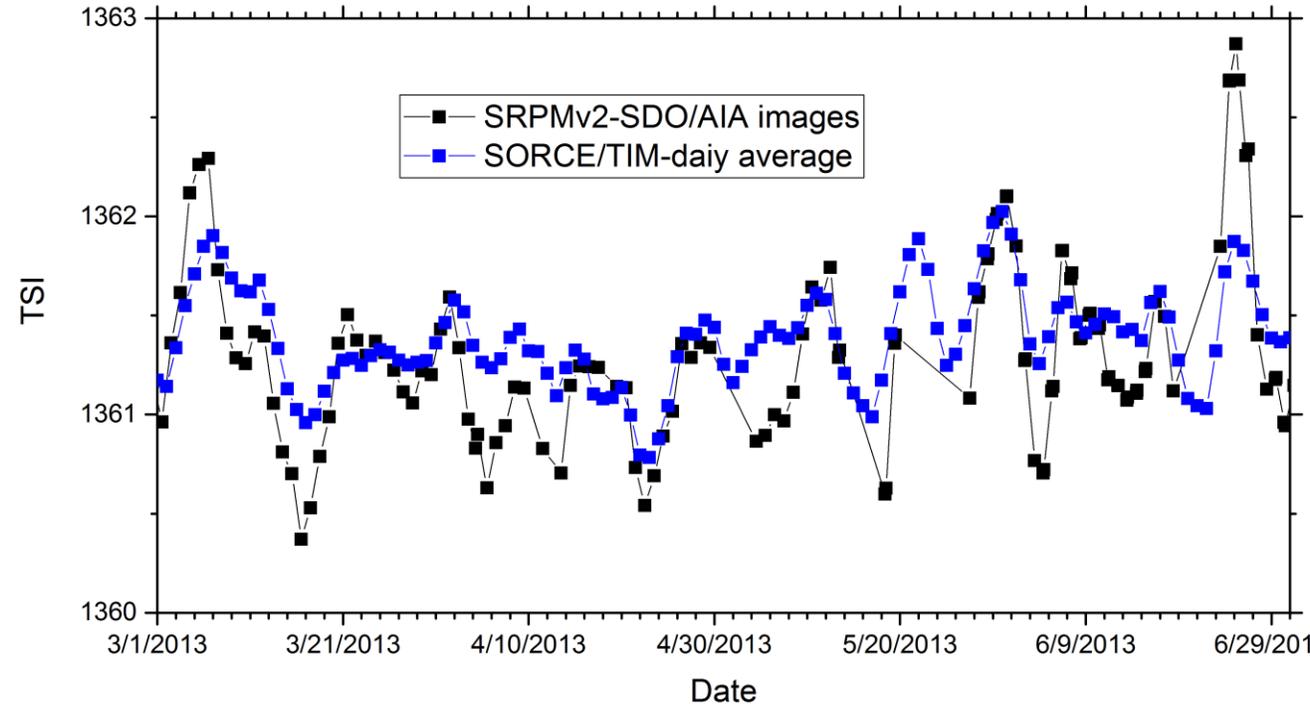
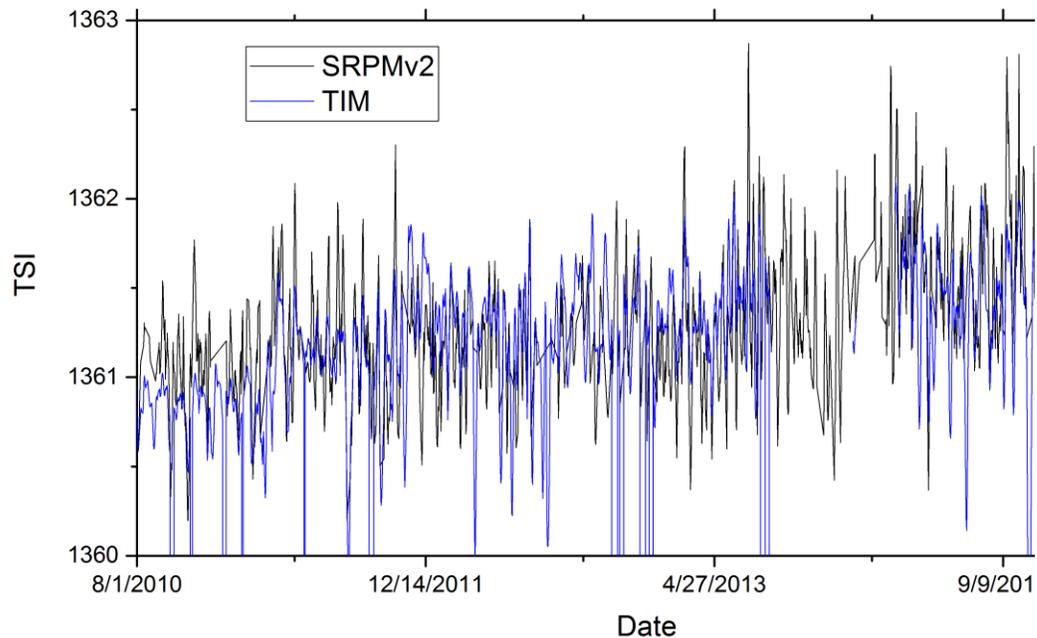
# The Solar Spectral Irradiance as function of time

- These masks, along with the models, are then used to compute the spectrum from the disk at the given time at any wavelength.



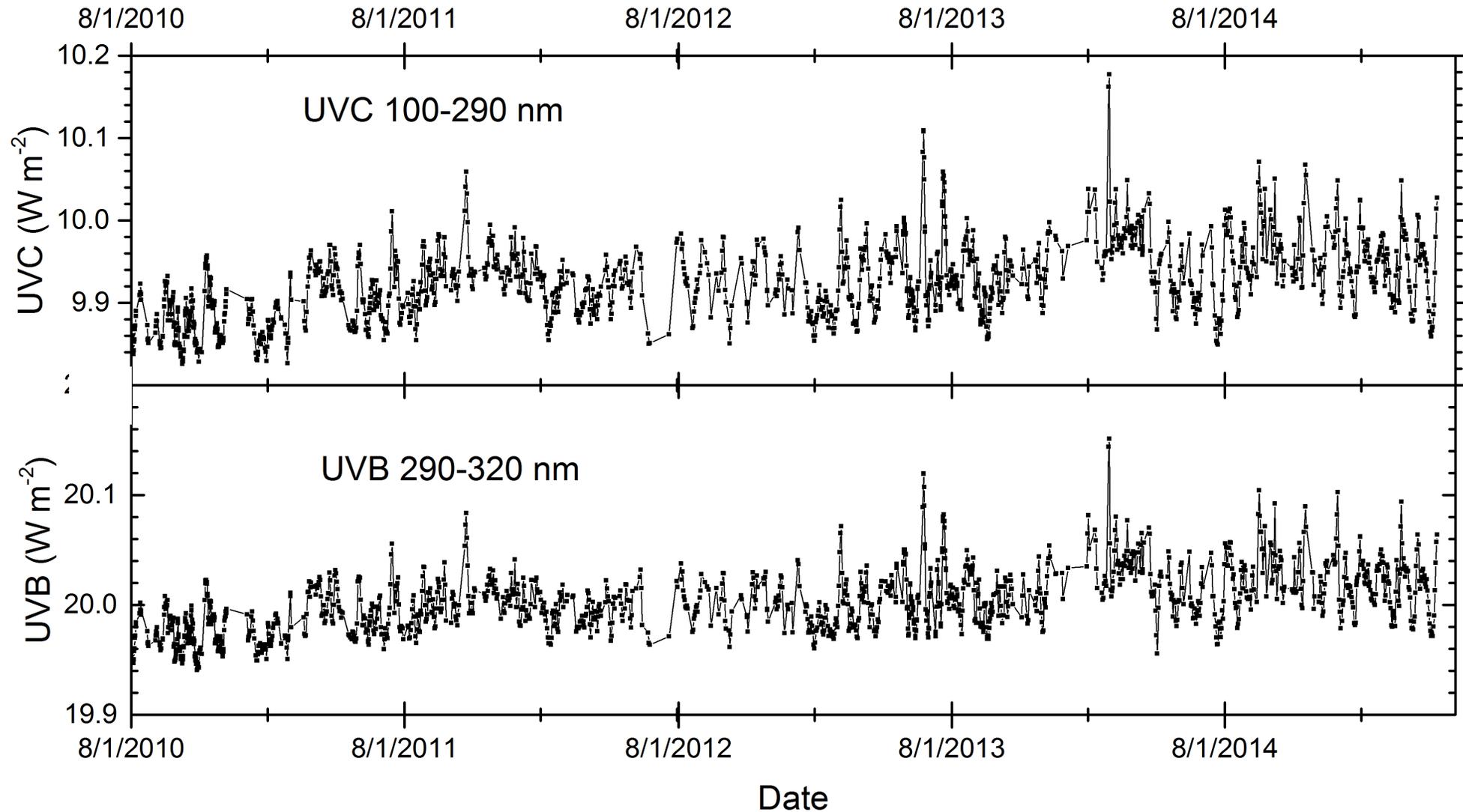
# Results for Solar Cycle 24

- The newly calculated models and masks resolve earlier discrepancies, and the resulting SSI and TSI fit the observations reasonably on rotational and cycle timescales



# Near-UV Spectral Bands

- Longer than the FUV, the NUV displayed the largest variation. We have not yet compared with SORCE data in these bands.



# Visible and IR Spectral Bands

- We were able to compare some bands with recent SORCE/SIM data.

