

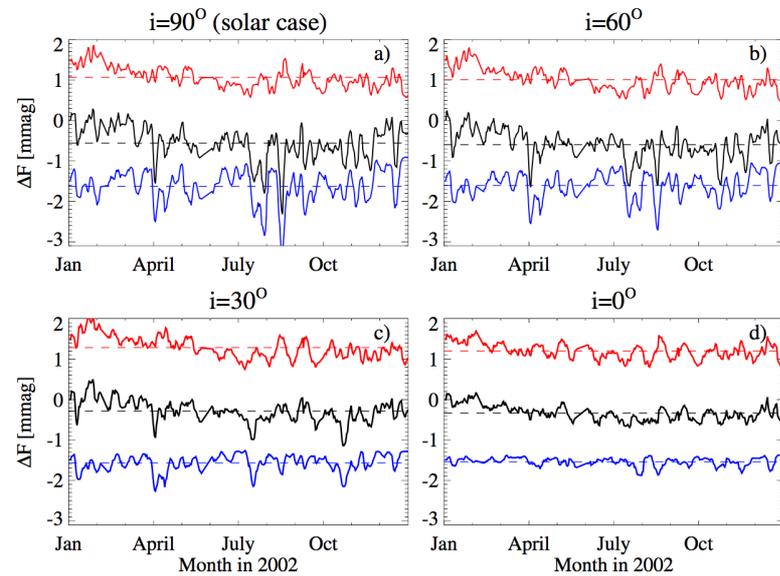
We expand SATIRE (Spectral And Total Irradiance Reconstruction, [1]) model of solar irradiance variability from the Sun to stars with different activity levels, surface distributions of magnetic features, and inclinations.

**Figure 1.** • Simulated: light curves of the Sun as they would be observed by Kepler;

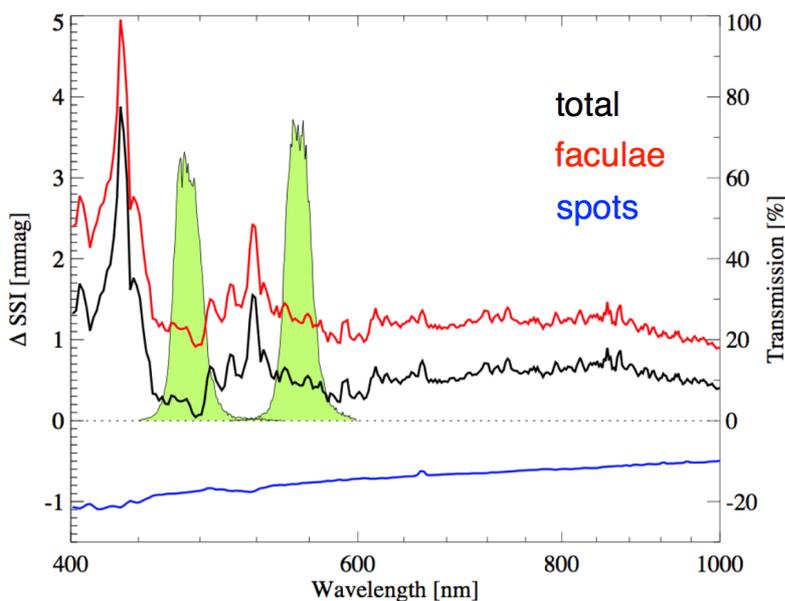
- solar brightness variations “measured” by Kepler from a near ecliptic plane are essentially driven by spots (Figs. 1a-b);
- the variations observed at low inclinations are driven by faculae (Figs. 1c-d).

**Figure 2.** • Reproduced the observed trend: while the variability of Sun-like stars with low magnetic activity is faculae-dominated, the variability of Sun-like stars with high magnetic activity is spot-dominated;

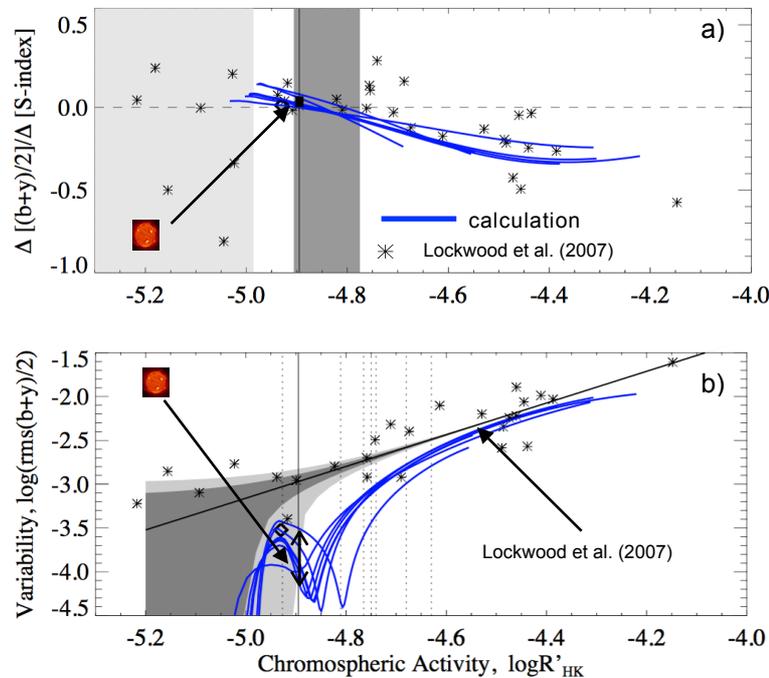
- the switch between the regimes: at activity levels slightly larger than solar (Fig. 2a);
- the measured photometric variabilities of the high activity stars agree with calculations reasonably well (Fig. 2b);
- the modelled variabilities of the low activity stars are smaller than given by the empirical correlation.



**Fig. 1.** Daily values of solar brightness variations (black curves) and their facular (red) and spot (blue) components. The light curves are plotted for four values of solar inclination: 90° (panel a), 60° (panel b), 30° (panel c), and 0° (panel d).



**Fig. 3.** The amplitude of the 11-year solar brightness variability (black curves) and its facular (red) and spot (blue) components expressed in mmag. The green shaded contours indicate the transmission curves of the Strömgren filters *b* and *y*.



**Fig. 2.** a) photometric variability normalised to the S-index and b) photometric variability vs. mean chromospheric activity. The asterisks and the black lines indicate stars with observed variability and the regression from [2]. The dark (light) shaded areas indicate estimated 1 $\sigma$ (2 $\sigma$ ) uncertainty in the Lockwood et al. (2007) data. The diamond indicates 18 Scorpii (HD 146233) from [3]. Blue curves are our calculations for different stellar inclinations and distributions of magnetic features on stellar surfaces. The thin vertical lines show the mean level of solar chromospheric activity. The thick vertical lines confine the range of possible variabilities for stars with solar activity.

**Figure 3.** • Compensation of the spot and facular contributions to the variability in Strömgren *b* and *y* filters leads to the low photometric variability of the Sun and stars with near solar level of activity (Fig. 3);

- such a compensation might not occur for stars with effective temperatures and metallicities different from those of the Sun.

References:

- [1] Krivova, N. A., et al. 2003, *Astron. Astrophys.*, 399, L1
- [2] Lockwood, G.W., et al. *Astrophys. J. Supp.*, 171, 260
- [3] Hall, J. C., et al. 2009, *Astron. J.*, 138, 312