Chromospheric Magnetic field from NSO Synoptic Program

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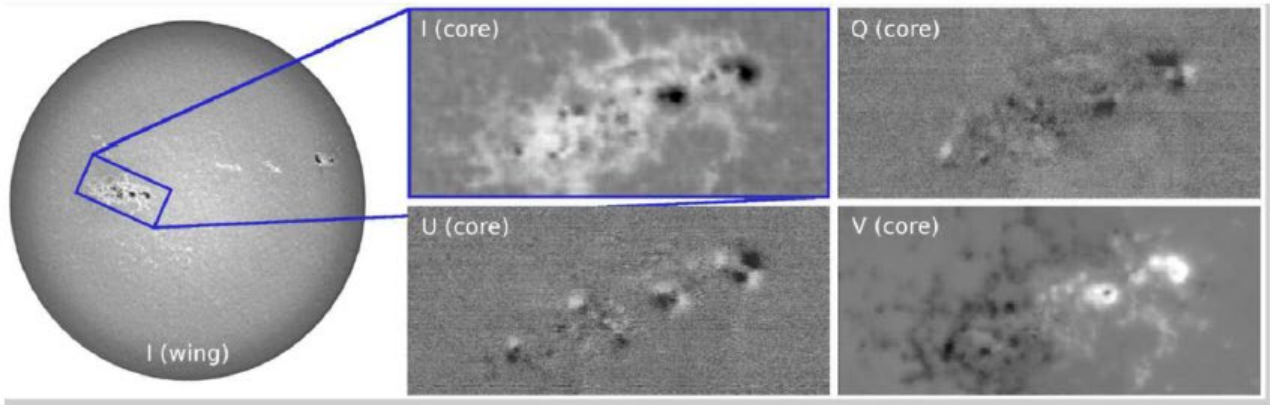
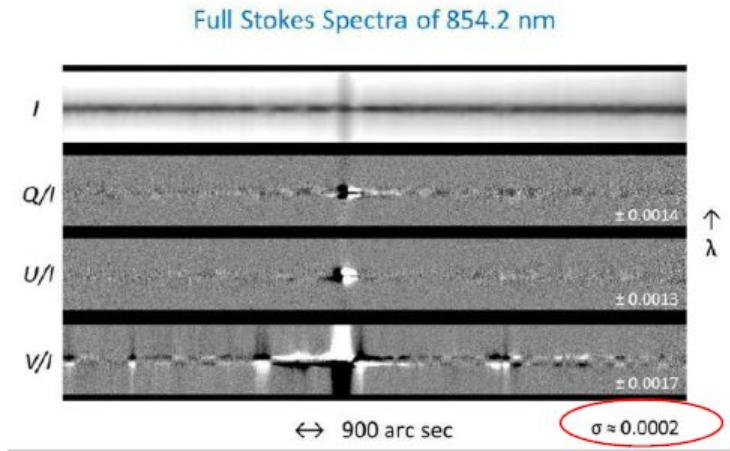
Full Stokes Observation in Ca II 854.2 nm

First Light Results



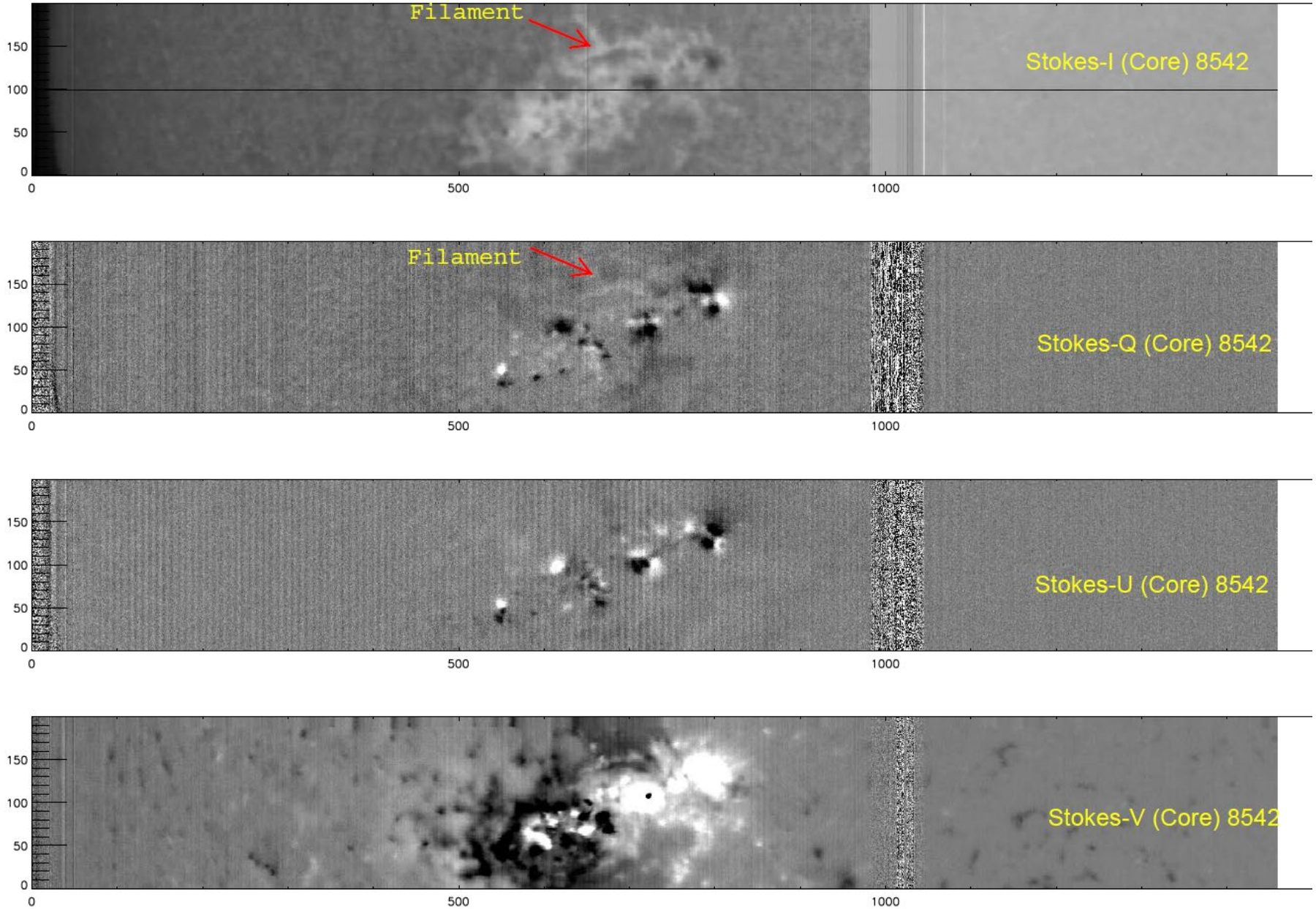
- Area scans of activity belts with SOLIS VSM
- Typical scan covering an active region , as shown on the left takes 5 minutes.

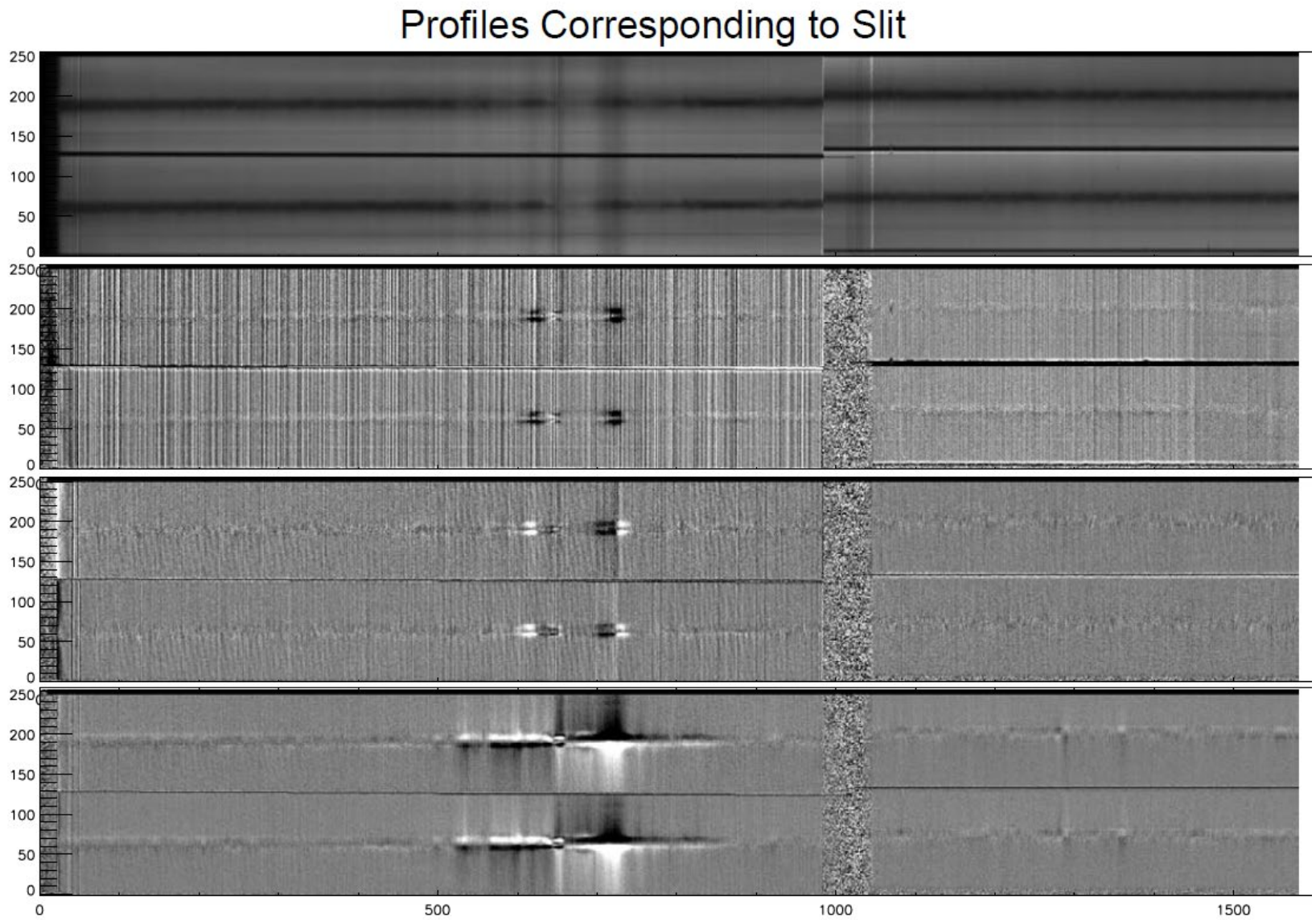


Solis VSM instrument parameters

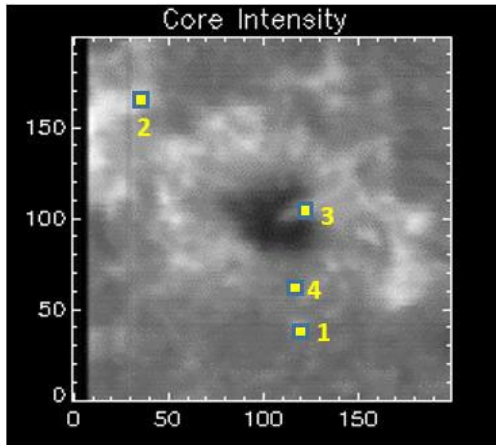
Spectral Lines: Fe I 630.2 nm, Ca II 854.2 nm
Polarimetry: Stokes I, Q, U , V
Spatial Sampling: 1 arcsec/pixel
Field-of-view: Full disk
Cadence: 22/45 min. for fulldisk (photo./chromo.)
Active Region Mode: Typical AR scan in 3-5 minutes.
Spectral Dispersion: Ca II (35 mA/pix), Fe I (25 mA/pix)

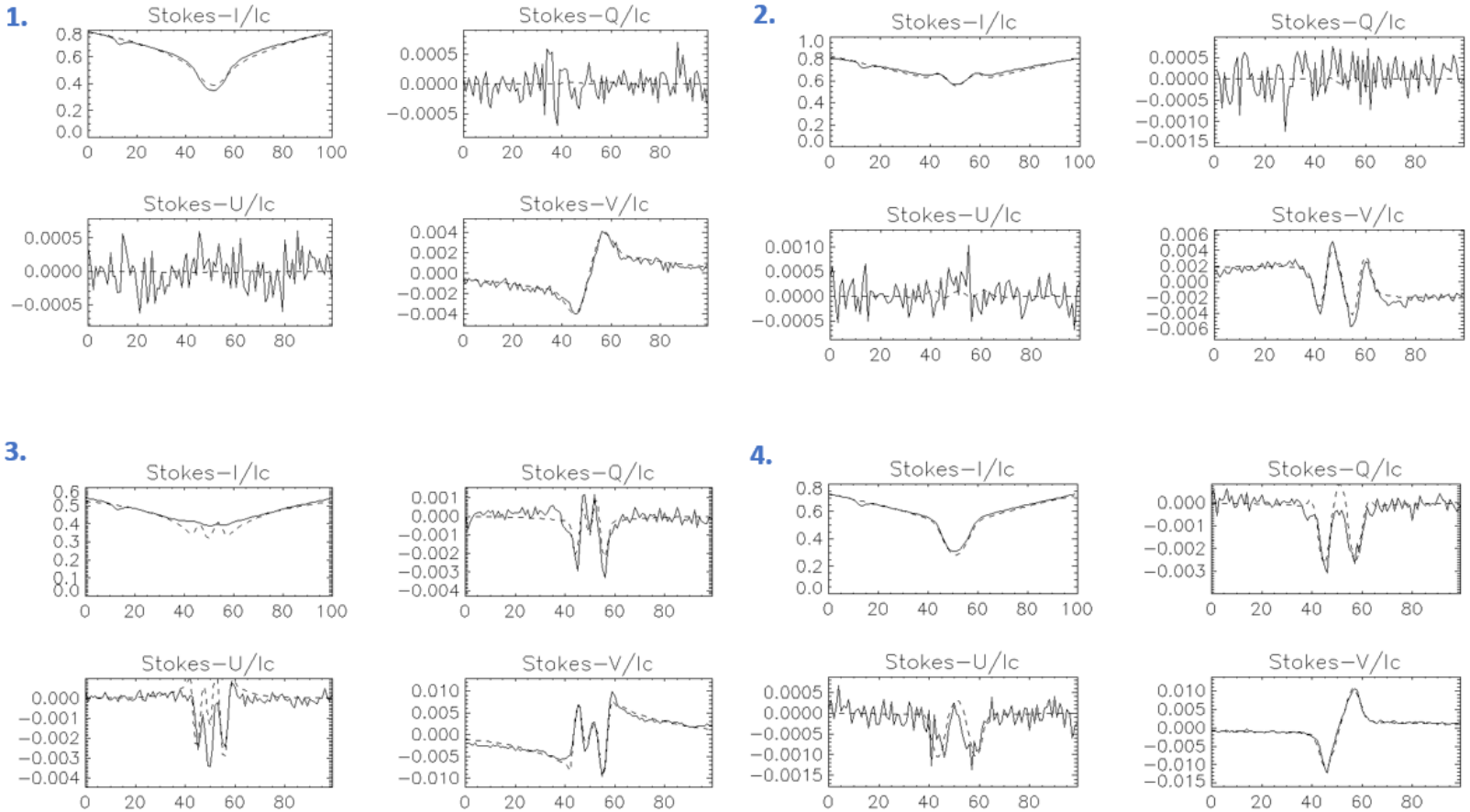
Full Stokes Ca II 854.2 nm observation taken with SOLIS/VSM on November 2nd, 2015. The above image shows results in I, Q, U, and V for an active region. Typical scan covering an active region takes about 4-5 minutes, and a full-disk scan about 45 minutes. Linear polarization mostly caused by scattering/Hanle except in strong fields, while circular polarization is from Zeeman effect. Hanle saturation field strength is roughly 0.1 gauss.

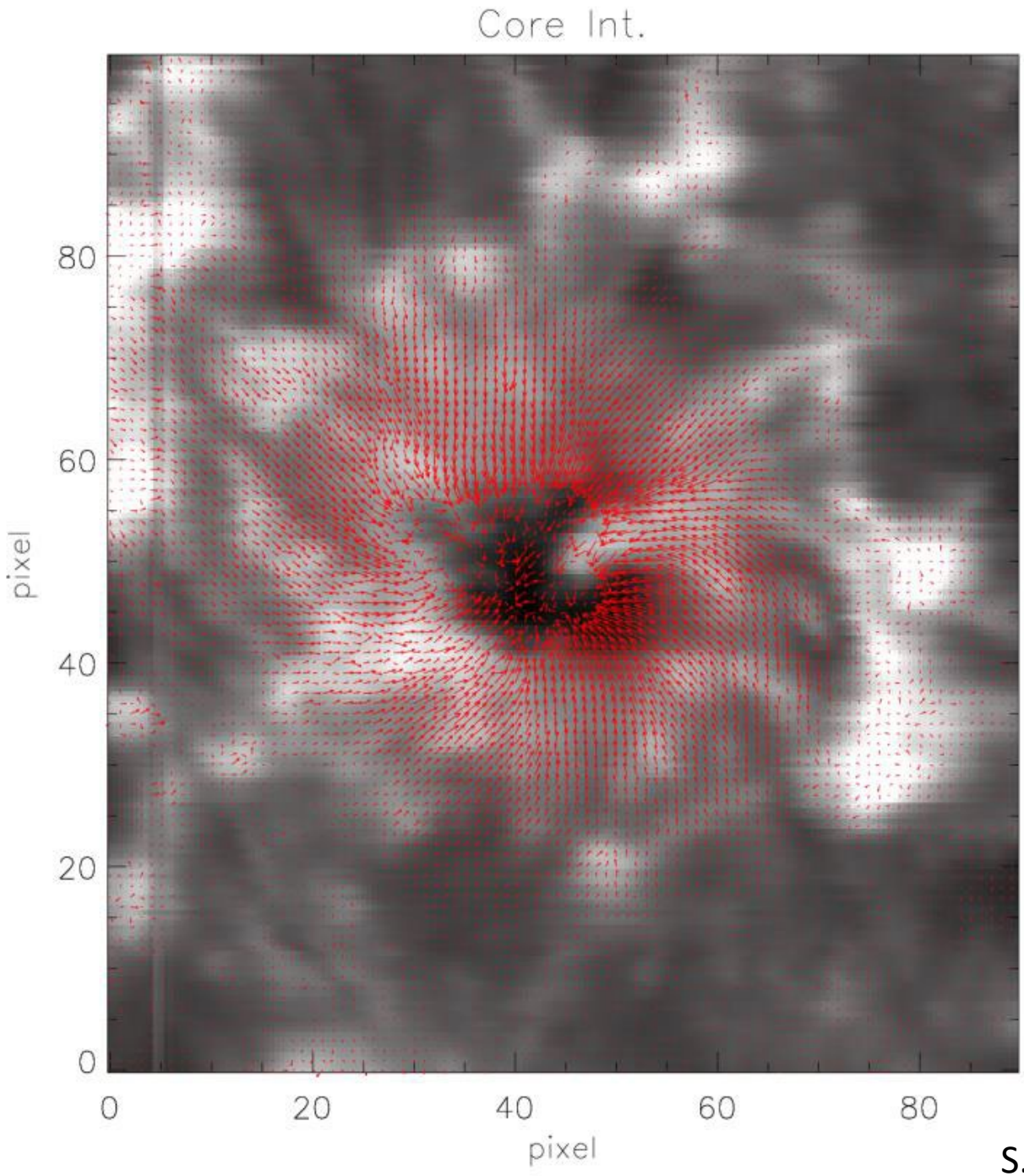

Filament
Stokes-I (Core) 8542
Filament
Stokes-Q (Core) 8542
Stokes-U (Core) 8542
Stokes-V (Core) 8542
0
50
100
150
0
500
1000


Profiles Corresponding to Slit
250
200
150
100
50
0
0
500
1000
1500

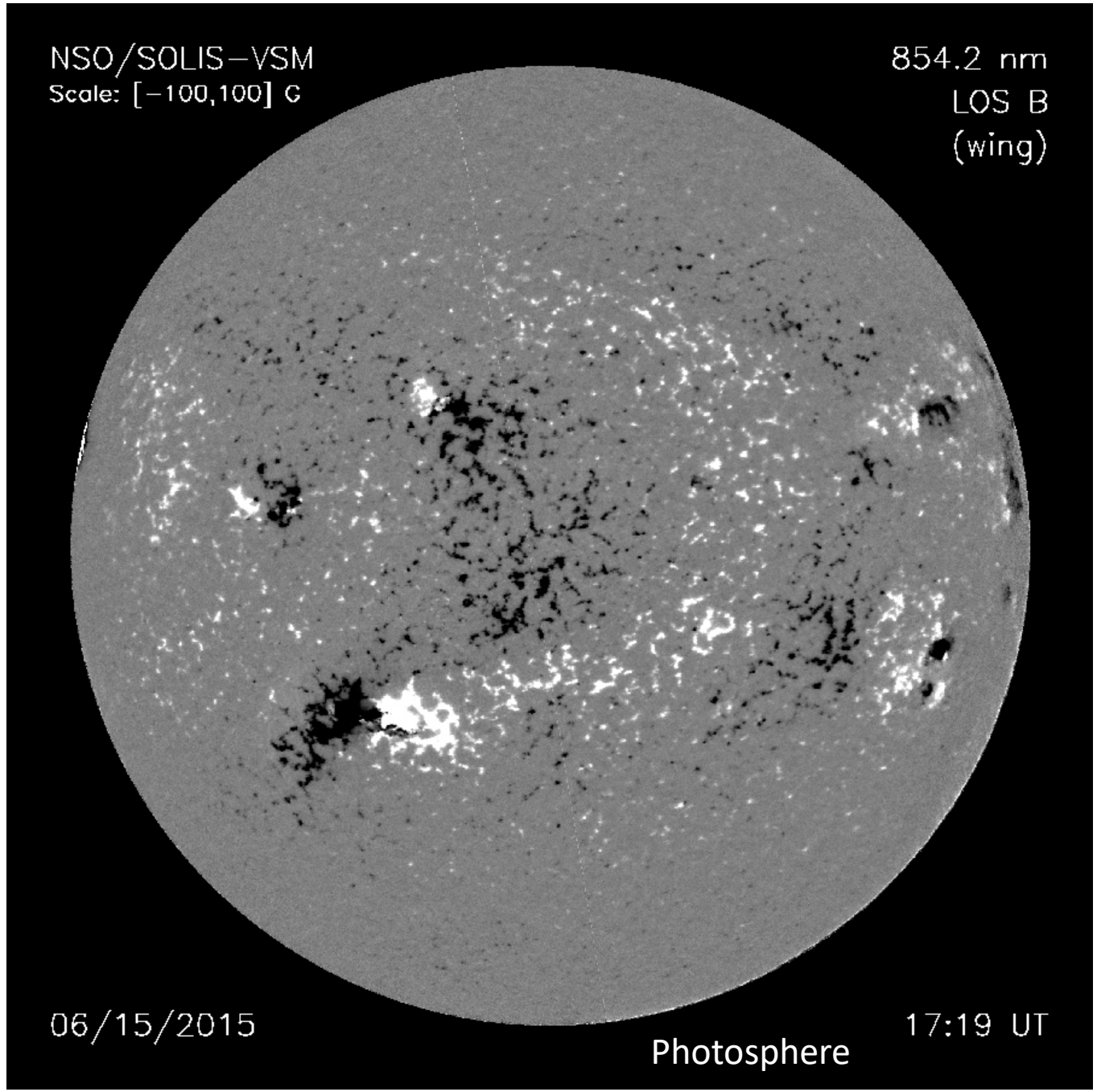
Examples of Stokes I, Q, U and V



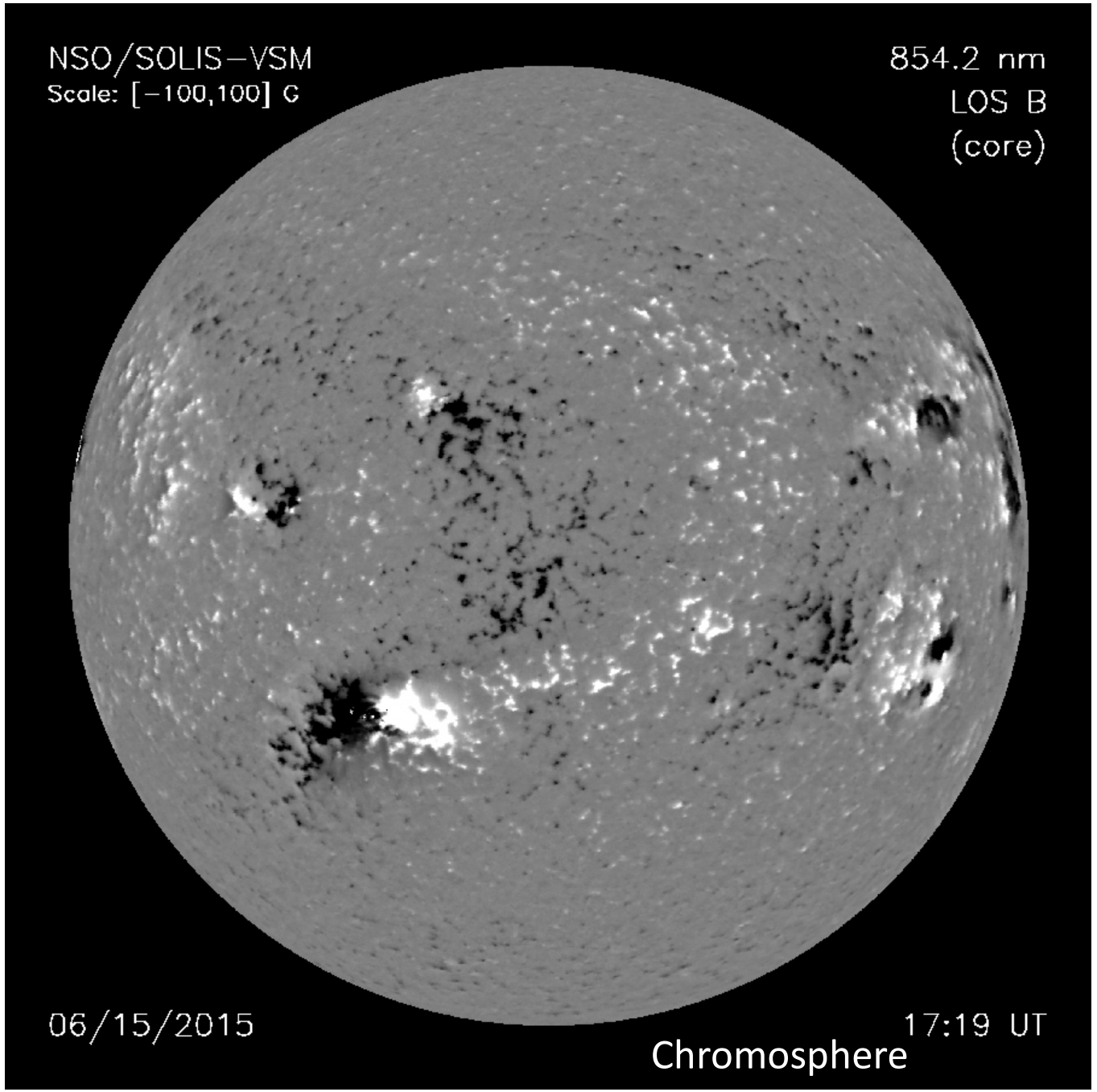




S. Gosain

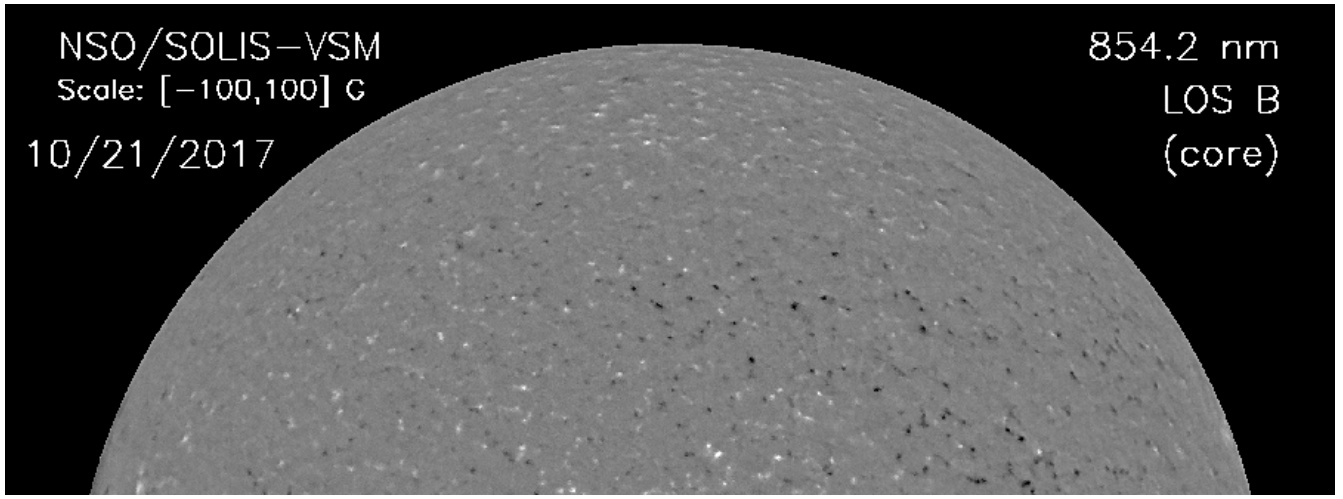


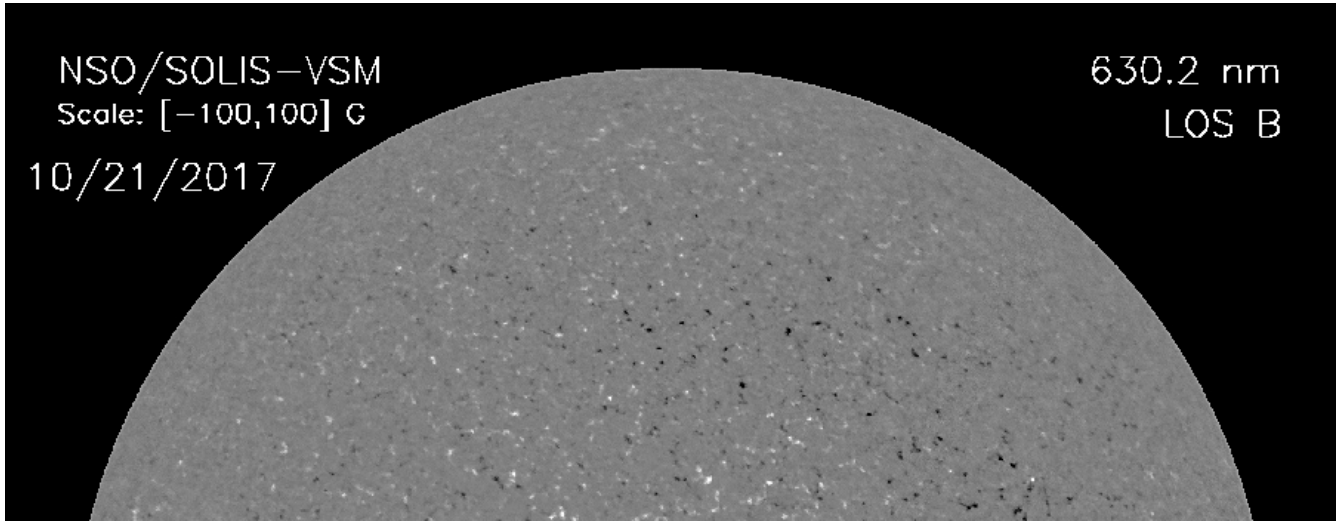
Photosphere



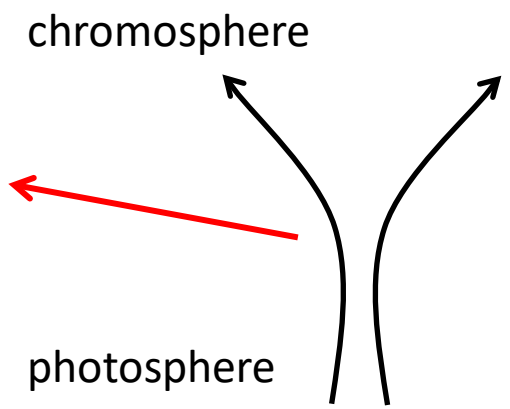
Chromosphere

IV. Pseudo-radial from chomospheric observations

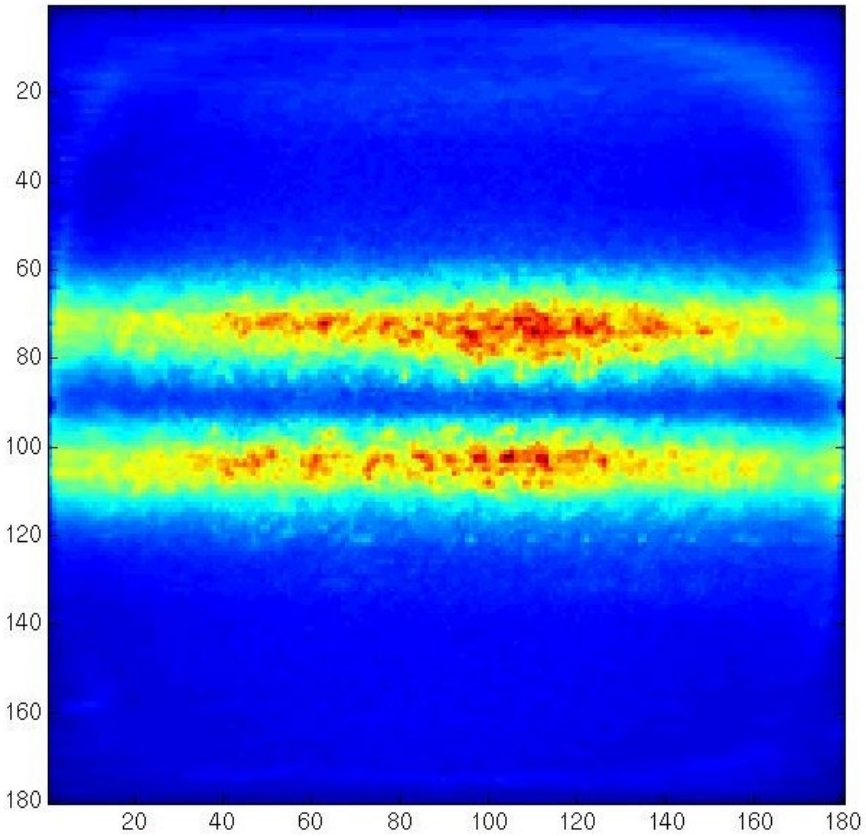


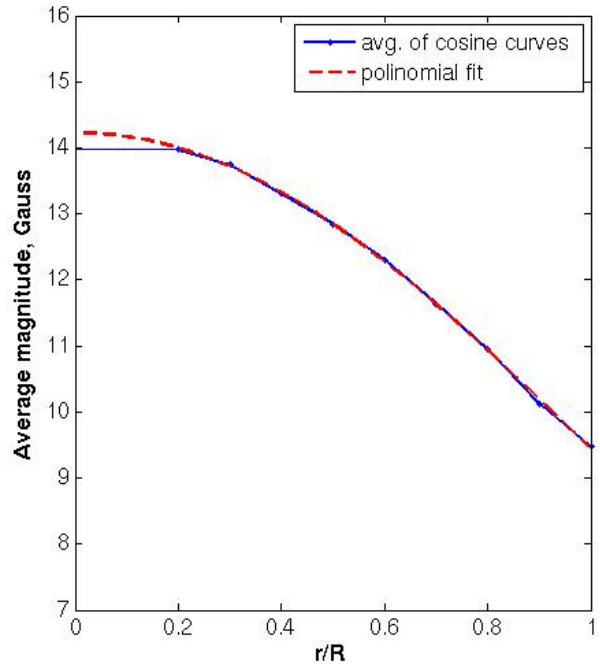


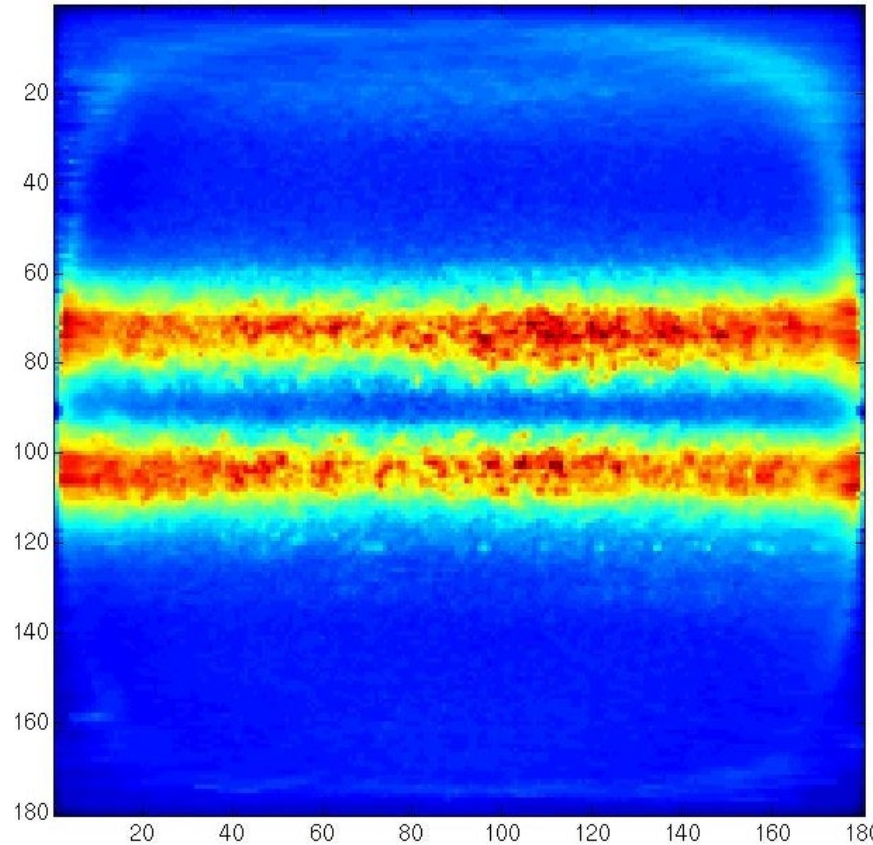
$B_{rc} \sim B_{LOS}\, f(\varphi)$



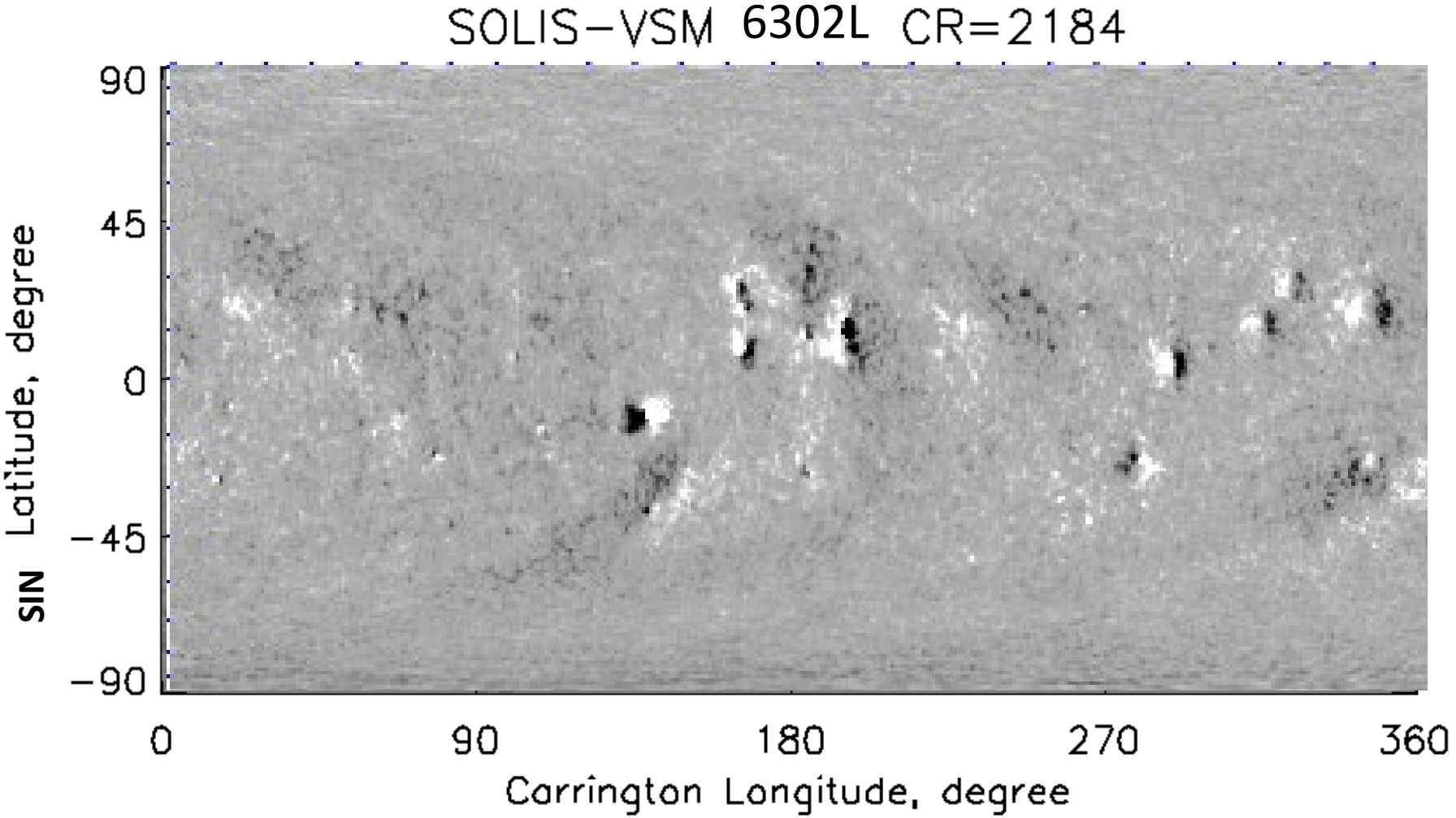
$B_{rp} \sim B_{LOS}/\cos\,(r/R)$


20
40
60
80
100
120
140
160
180
20
40
60
80
100
120
140
160
180


avg. of cosine curves
polinomial fit
Average magnitude, Gauss
r/R
16
15
14
13
12
11
10
9
8
7
0
0.2
0.4
0.6
0.8
1


20
40
60
80
100
120
140
160
180
20
40
60
80
100
120
140
160
180

LOS synoptic map



Pseudo-radial synoptic map