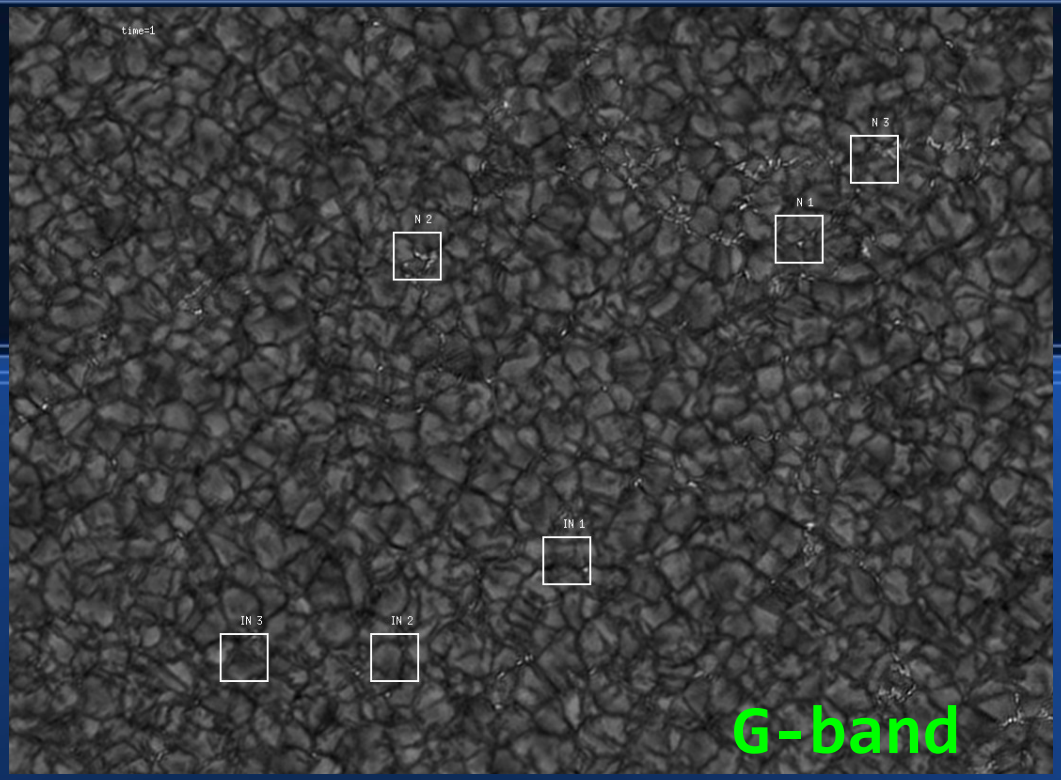
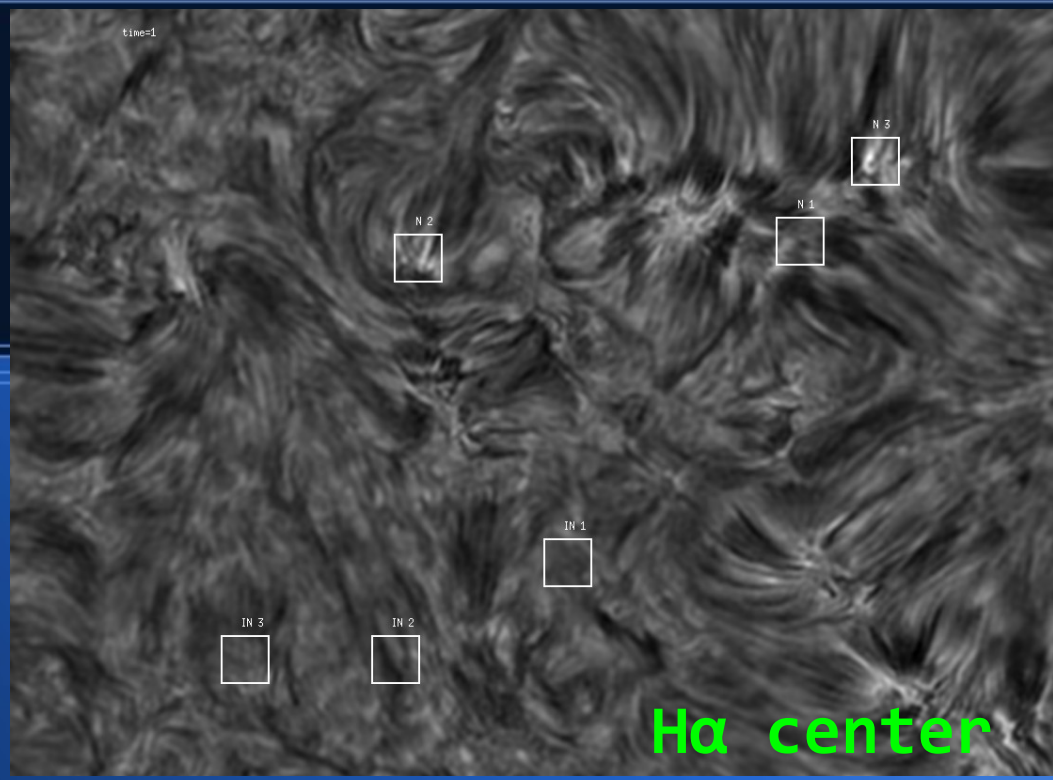
Chromospheric Response of Dynamics of Photospheric G-band Bright Points

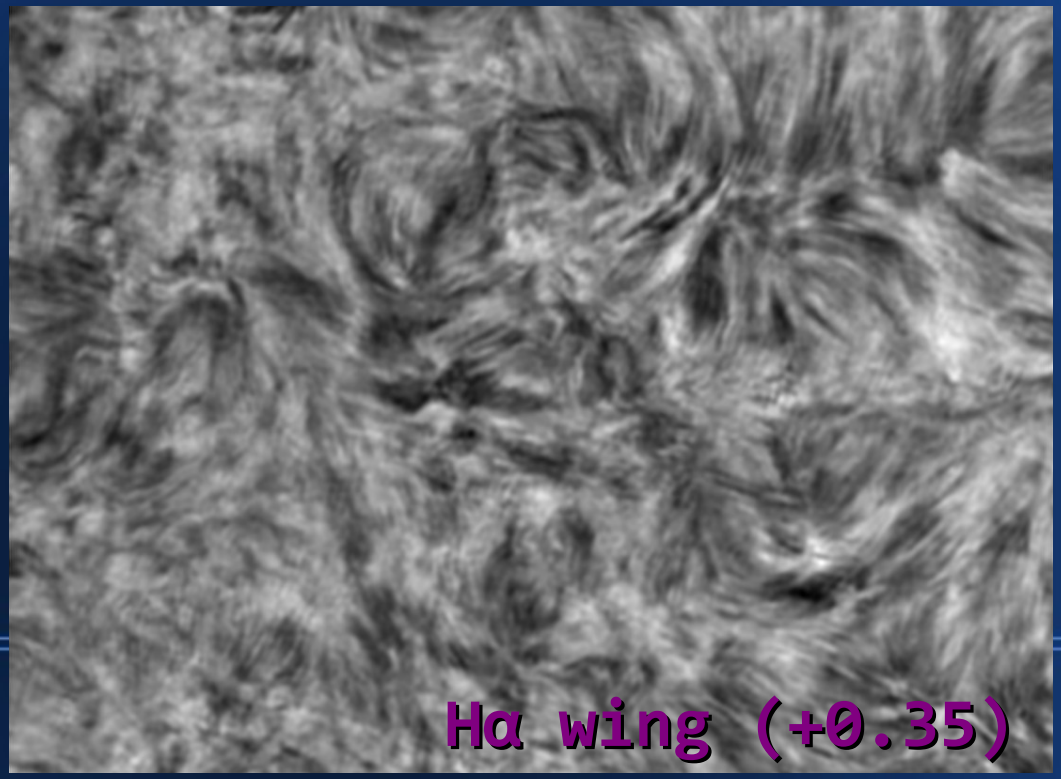
Observation and Data Processing

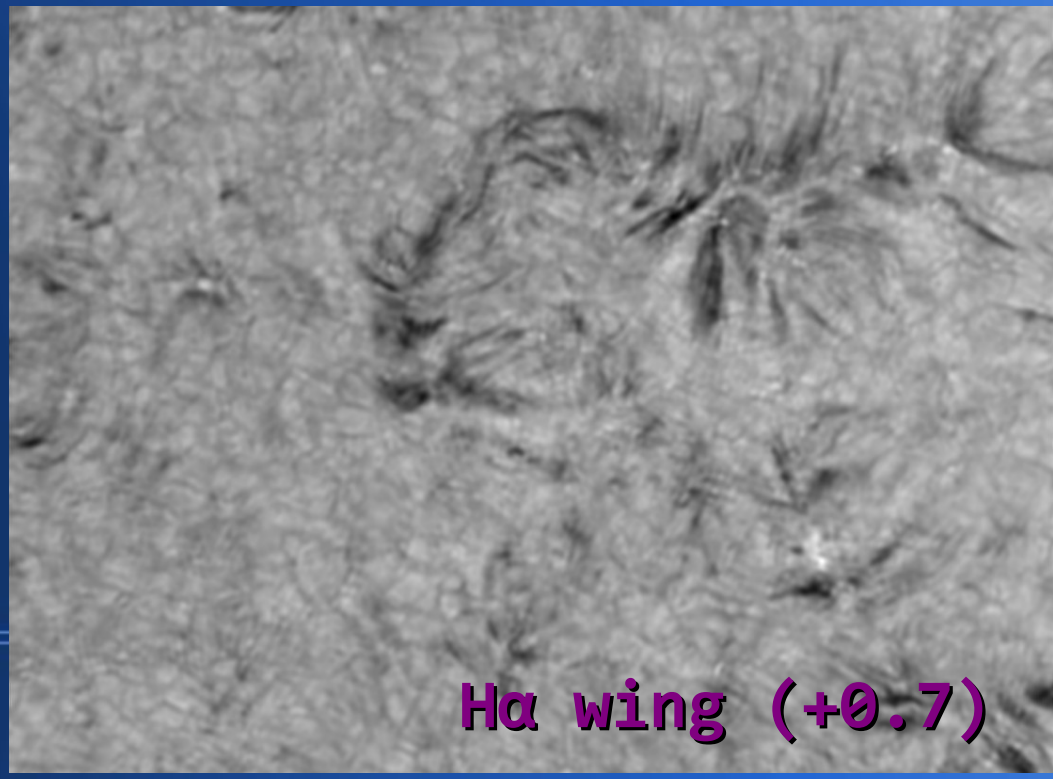
- DOT – telescop specifications
- G-band and Hα datasets description
- G-band data processing → Utz algorithm
- spectral characteristics of Hα line profile (wp, Ic, vp, vc) + Koza algorithm
- analysis of time evolution of spectral characteristics of Hα line profile → autocorrelation + crosscorelation
- PICTURES: G-band + Hα (center, wing – 2 points)

$\lambda_{H\alpha}$ + 0.35 A, $\lambda_{H\alpha}$ + 0.7 A

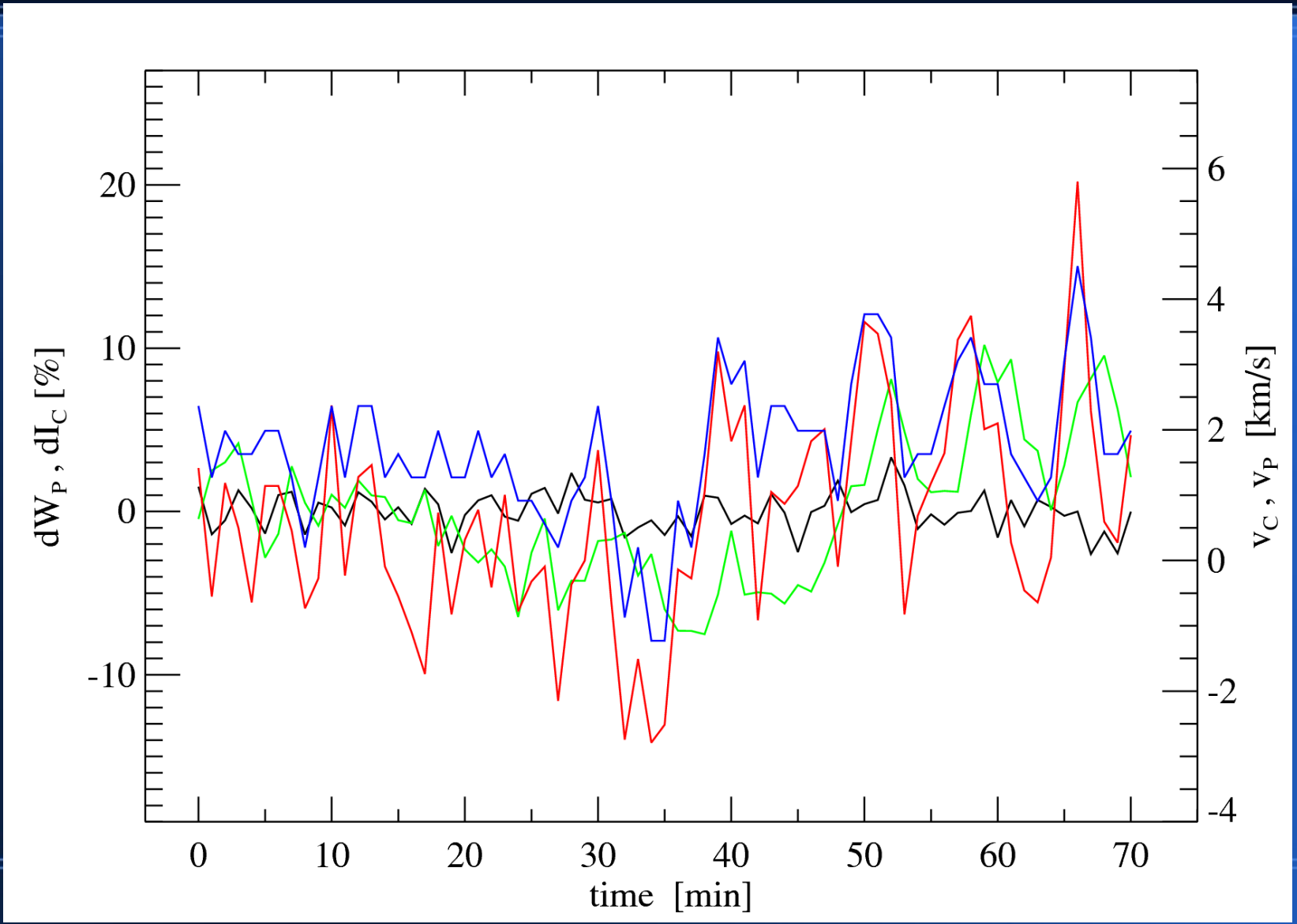

time=1
N 3
N 2
N 1
IN 1
IN 3
IN 2
G-band


time=1
N 3
N 2
N 1
IN 1
IN 3
IN 2
Hα center


Hα wing (+0.35)


Hα wing (+0.7)

Box B1 - Time variations of spectral characteristics of Hα



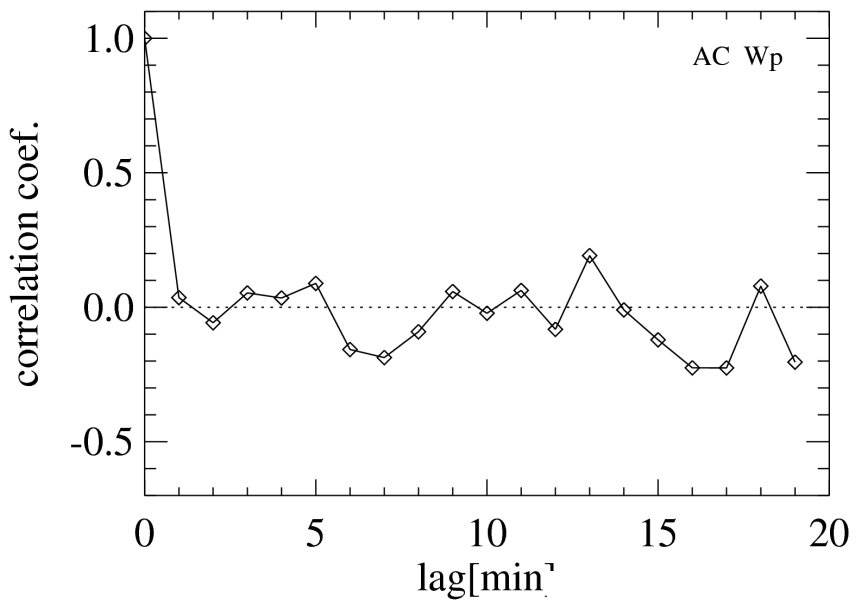
Black - wp

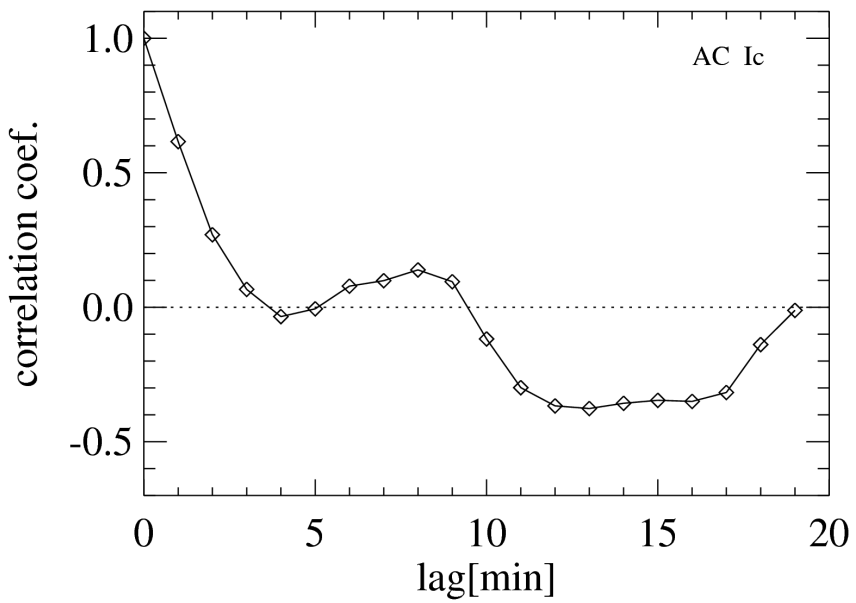
Green - Ic

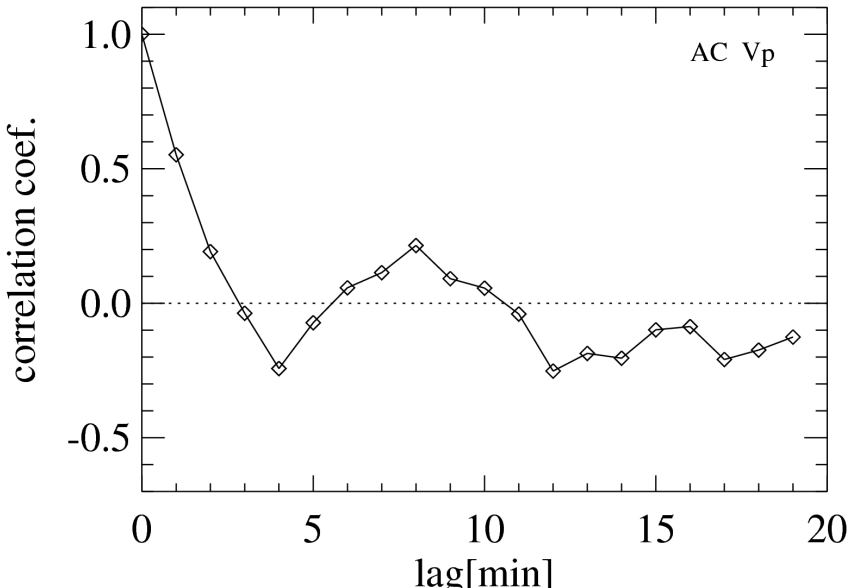
Blue - vp

Red - vc

Box B1 – full time span - autocorrelations

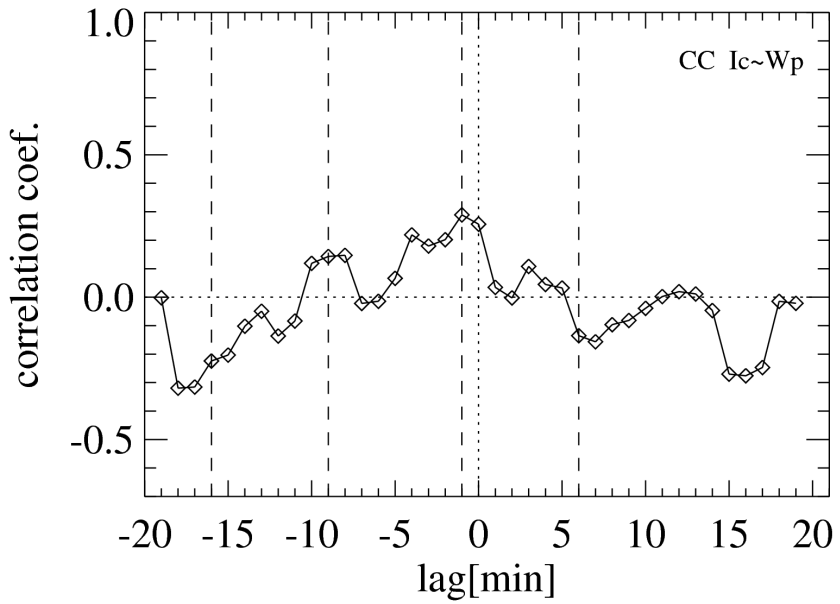


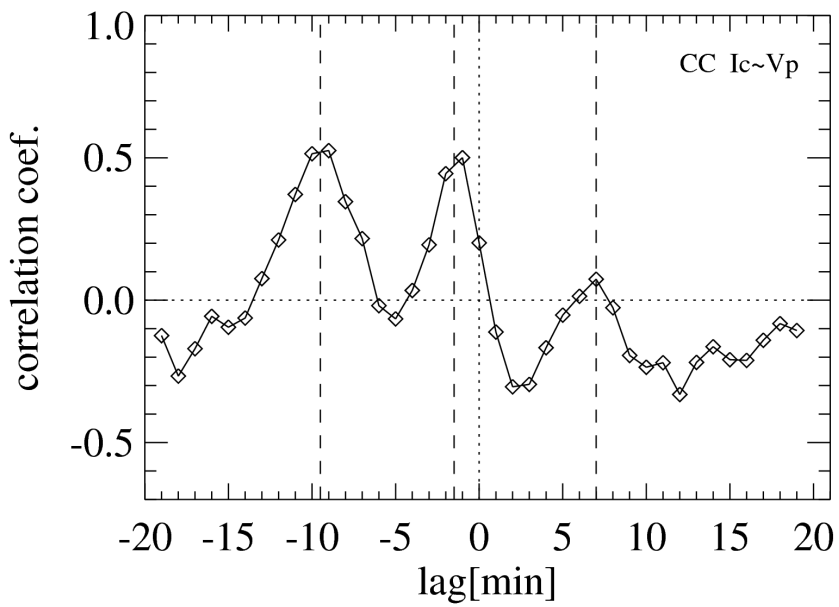




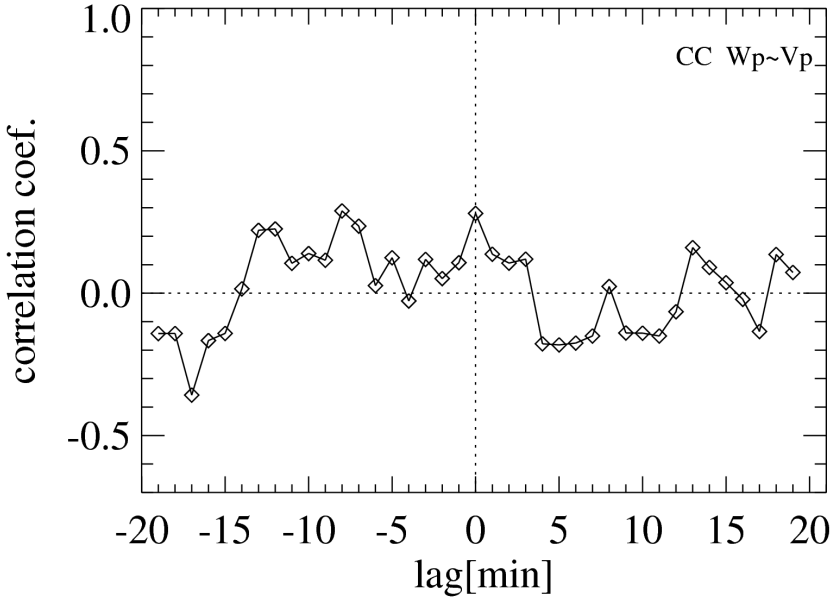
~8 min period in Ic and vp

Box B1 – full time span - crosscorrelations



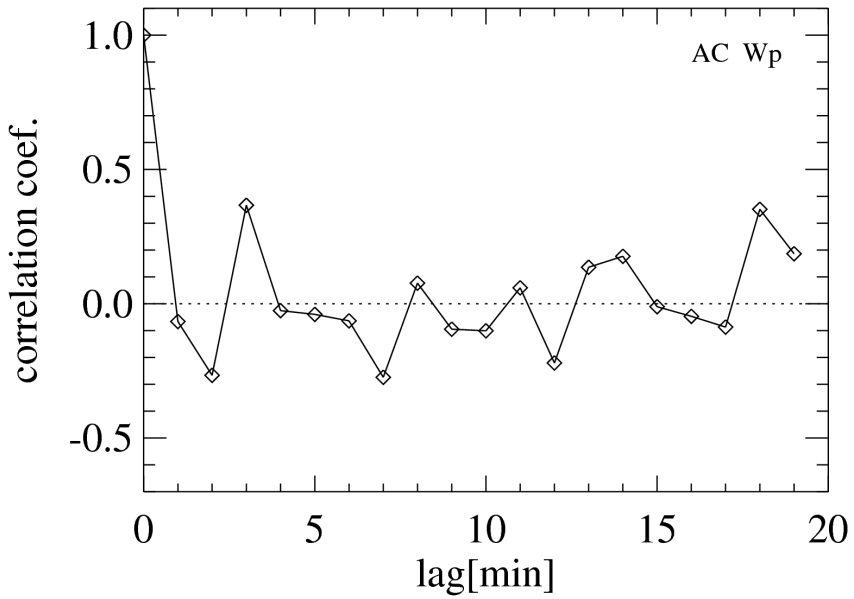


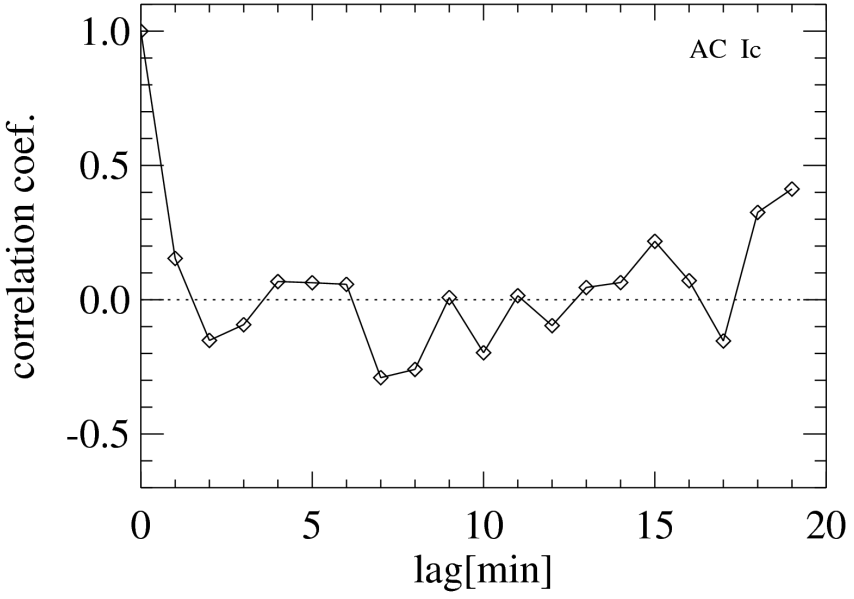
statistically significant correlation between Ic and vp

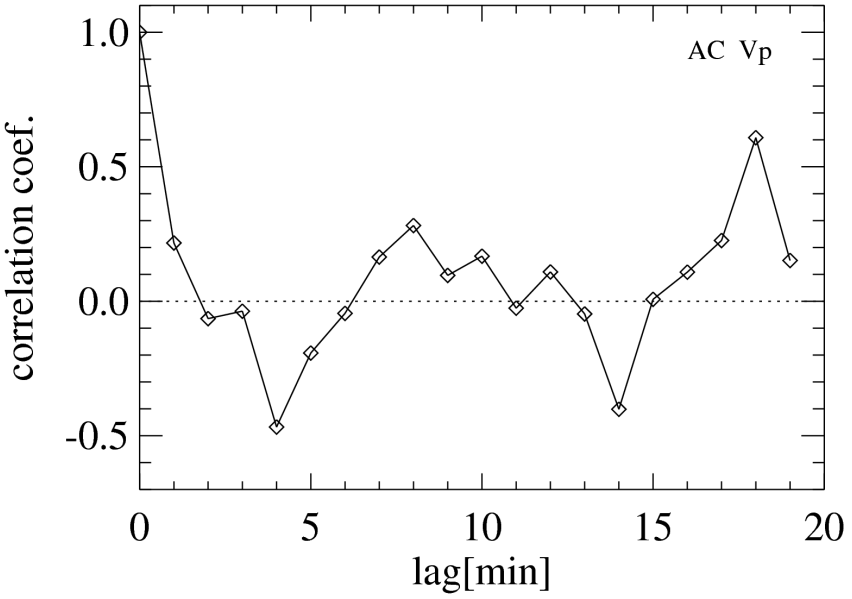


Ic behind vp ~1.5 min

Box B1 – first half (0-35 min) - autocorrelations

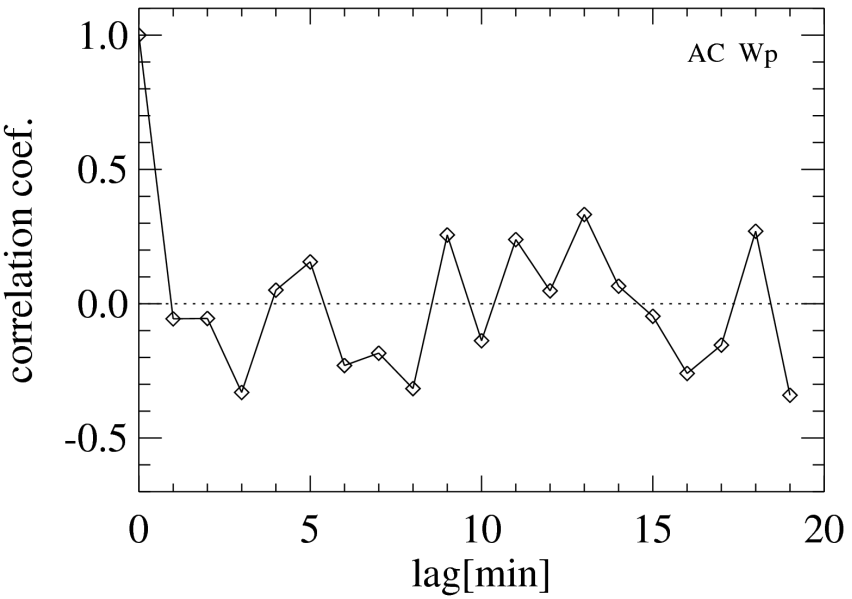


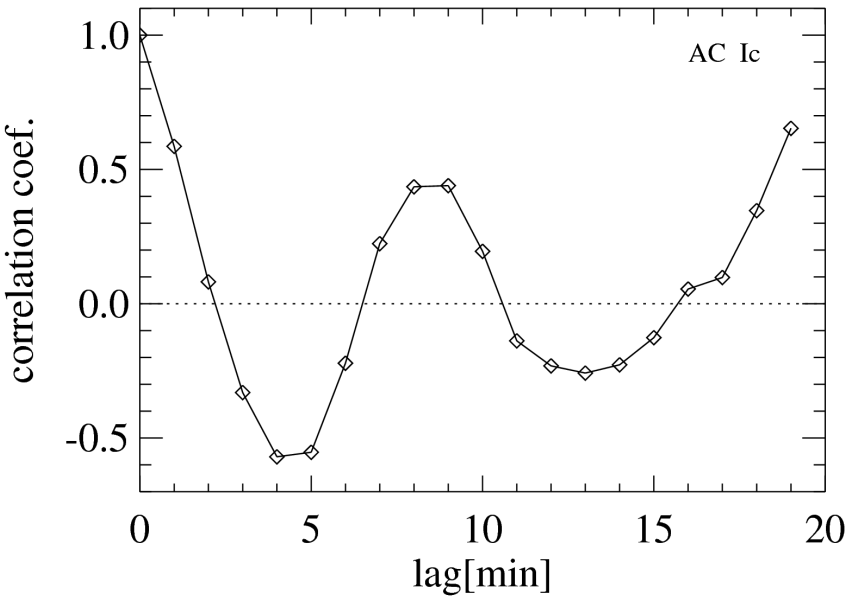




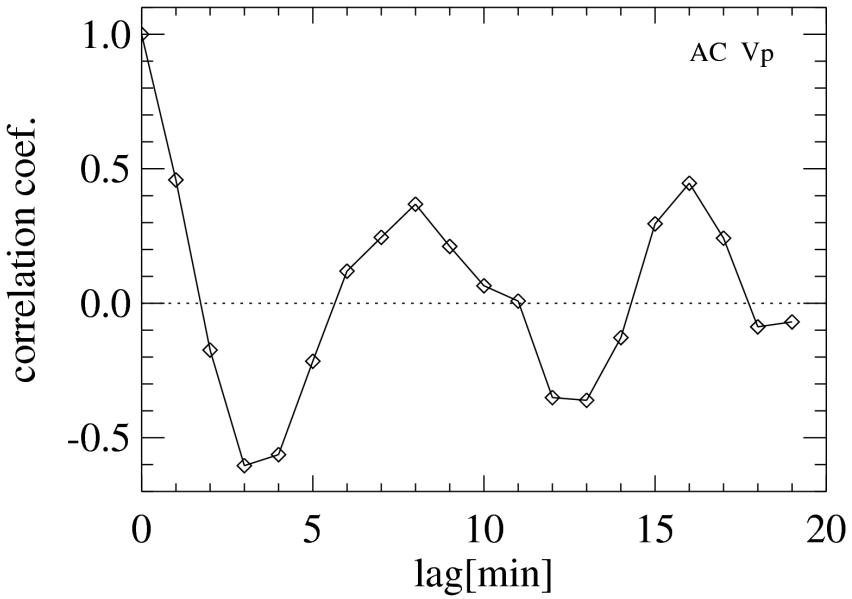
no statistically significant periods

Box B1 – second half (36-70 min) – autocorrelations

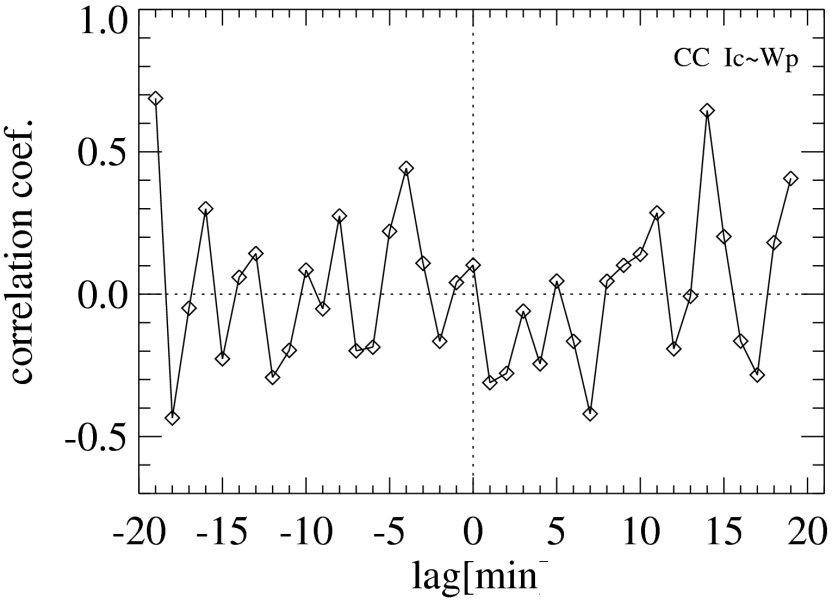


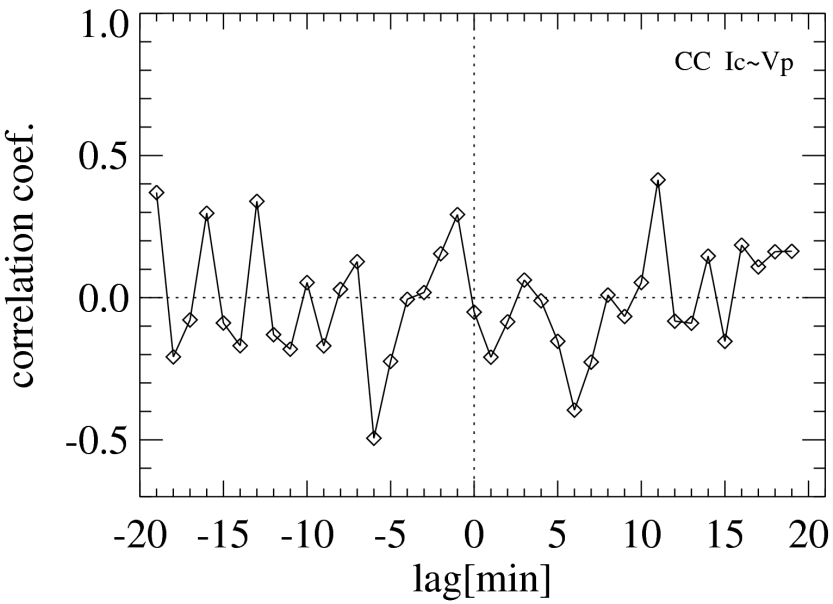


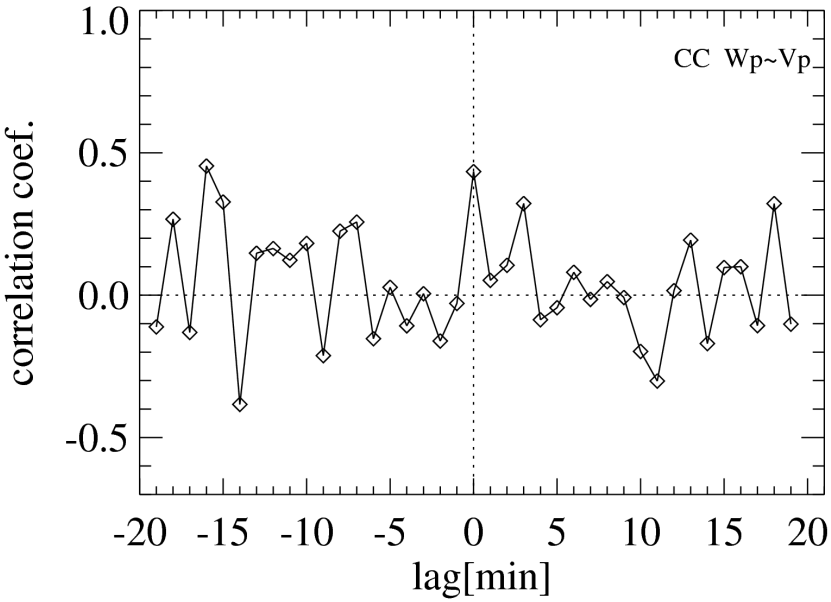
statistically significant periods in Ic and vp ~8 min



Box B1 – first half (0-35 min) - crosscorrelations

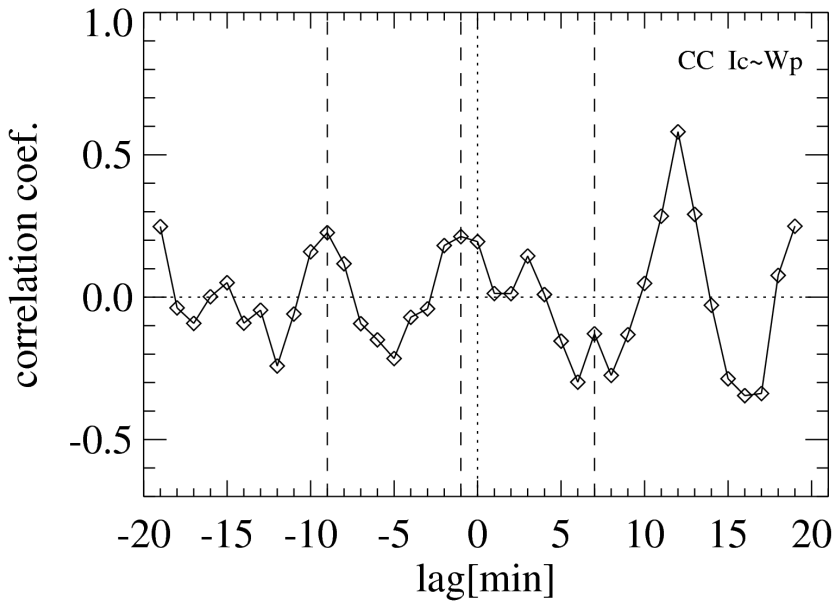


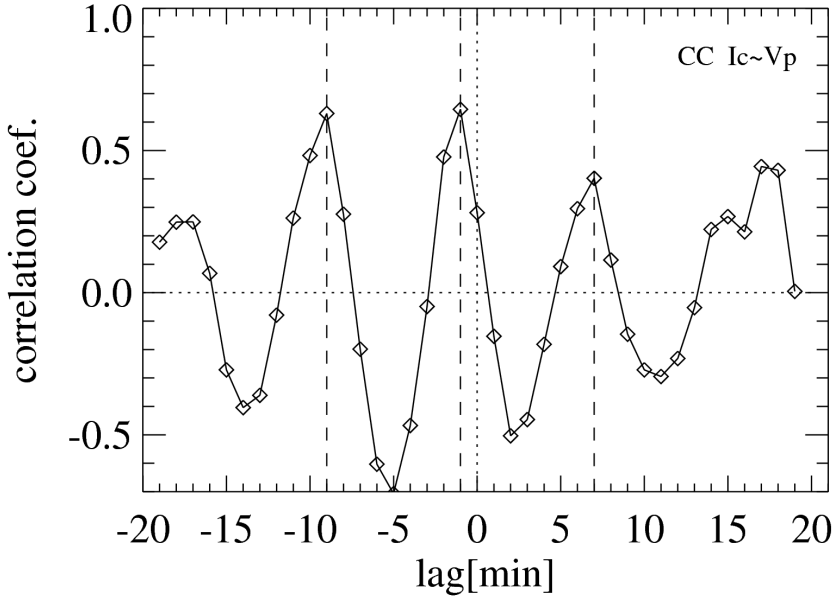


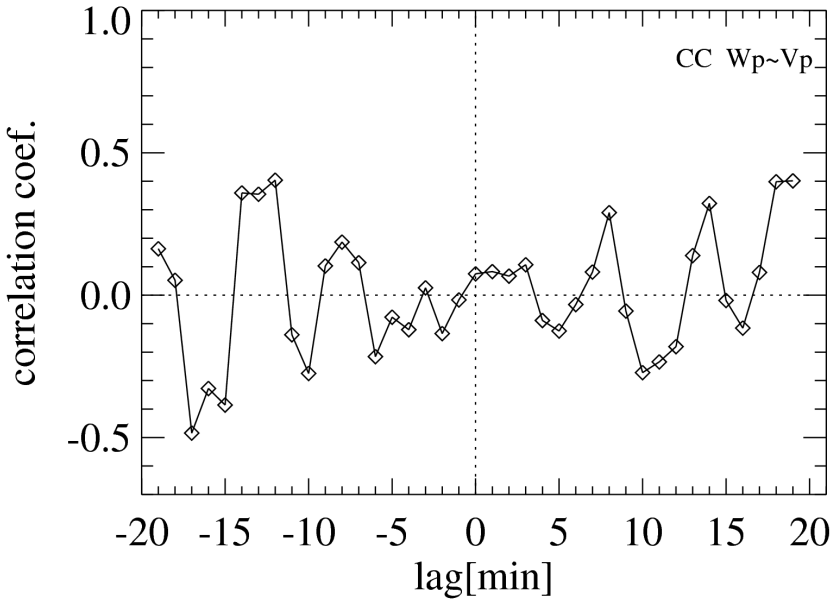


no statistically significant periods

Box B1 – second half (36-70 min) - crosscorrelations





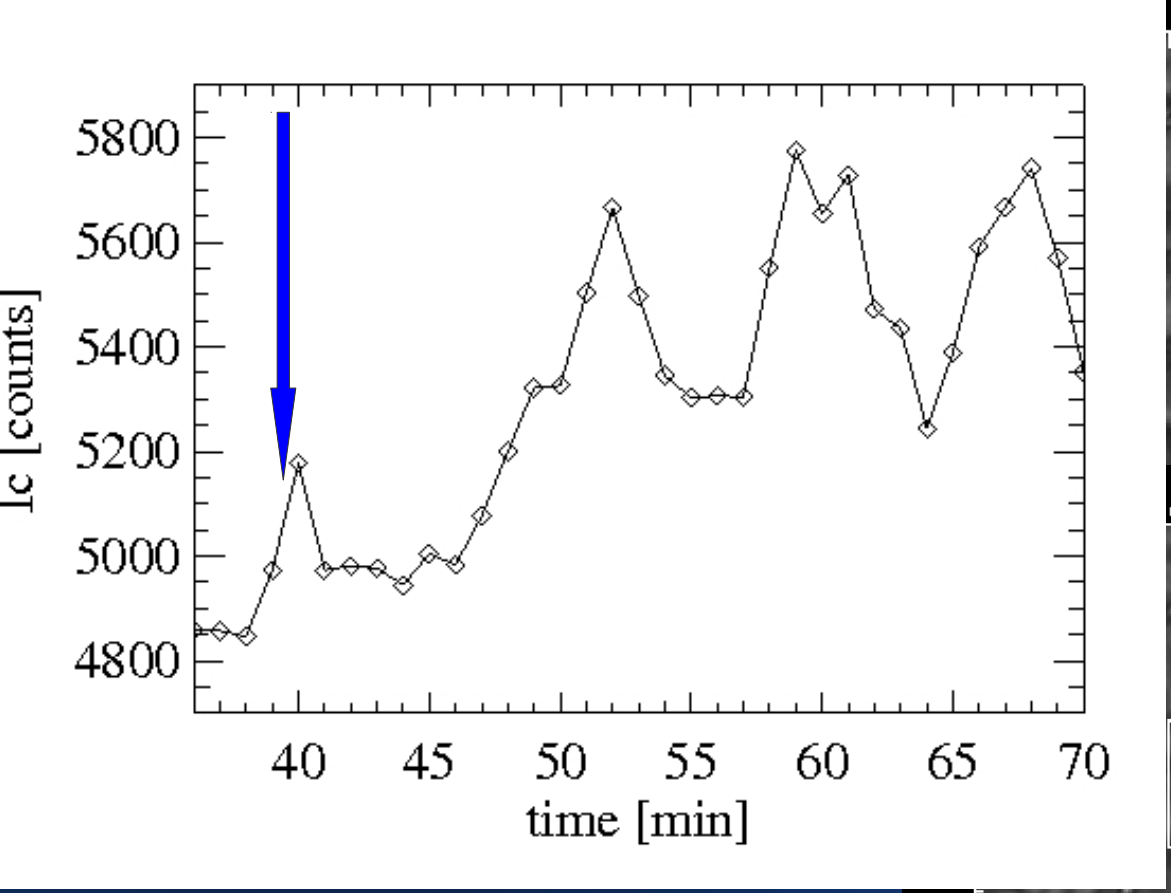


statistically significant correlation between Ic and vp; Ic behind vp ~1 min

Box B1 - findings

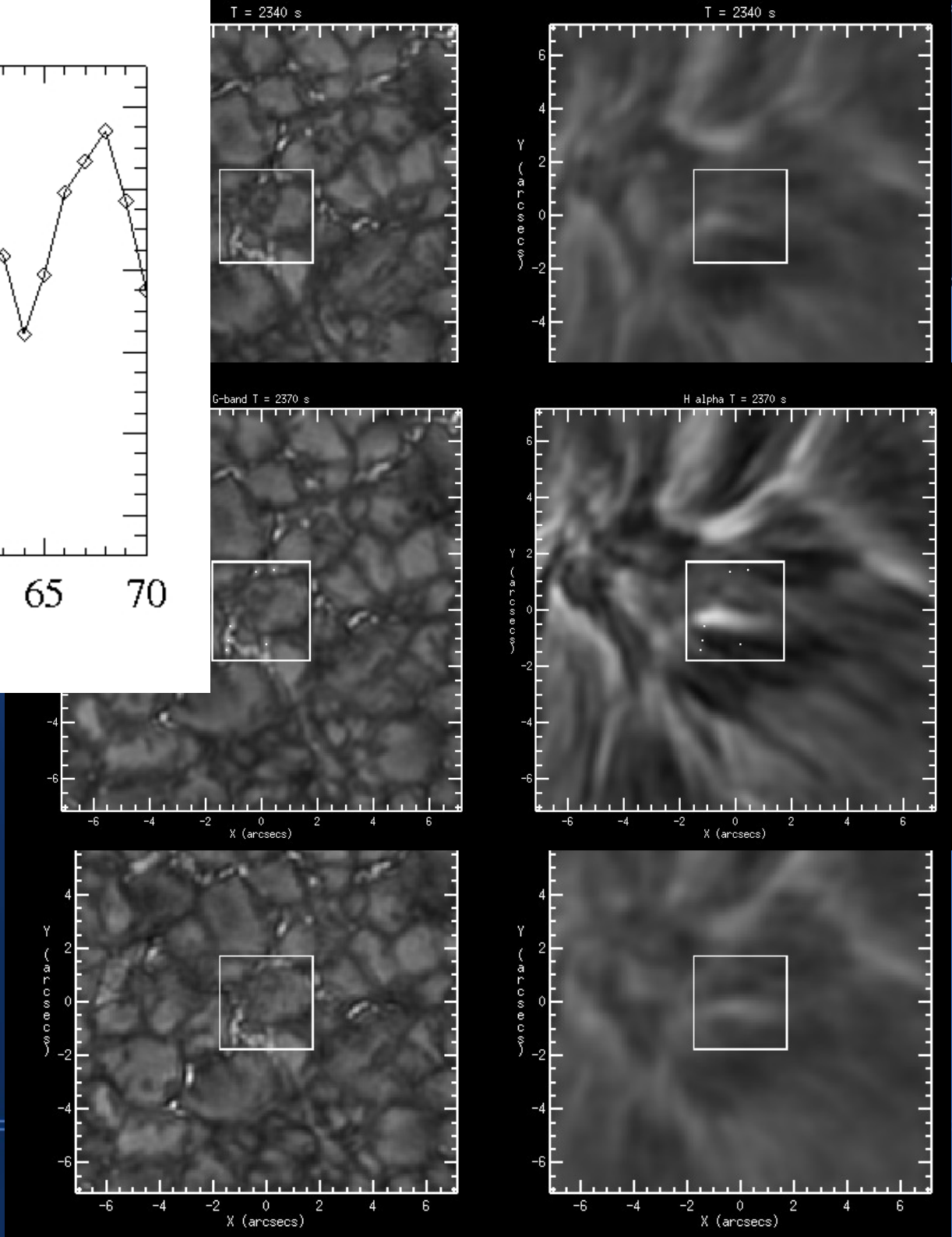
Variations of studied spectral characteristics except wp differ in first and second half of full time span of observation

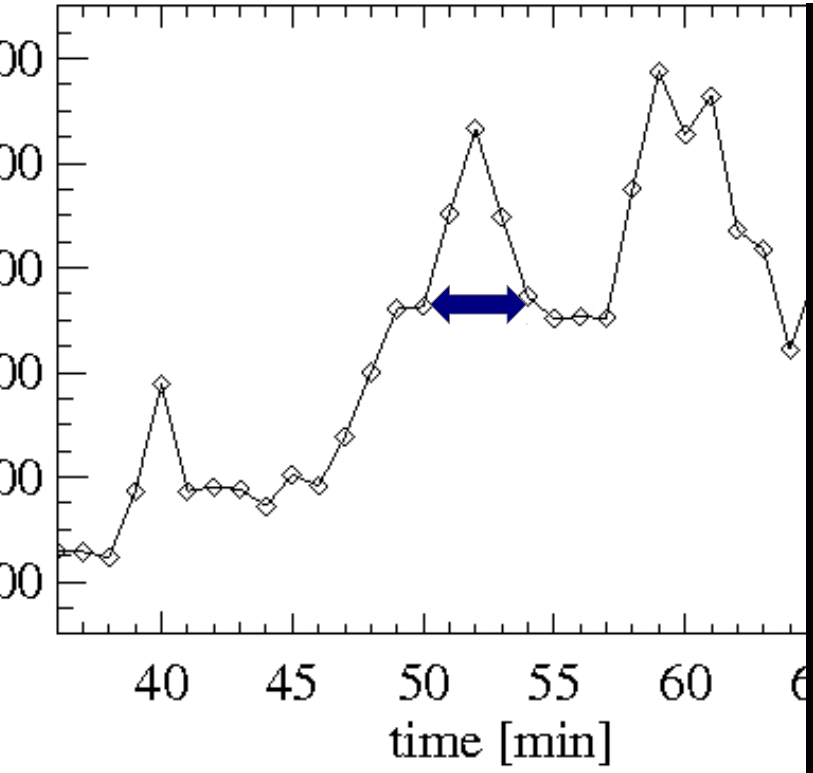
- **Full time span** - ac – ~8 min period in Ic and vp
  - cc – statistically significant correlation between Ic and vp (Ic ~1.5 min behind vp)
- **First half** – ac – no statistically significant
  - cc – no statistically significant
- **Second half** - ac - statistically significant ~8 min period in Ic and vp
  - cc - statistically significant correlation between Ic and vp (Ic ~2 min behind vp)
  - wp ~ vp possible ~7 min period ?!
  - Ic ~ wp possible ~8 min period (Ic ~1 resp. ~9 min behind vp); anomalous local maximum at Ic ~12 min behind vp ?!



EVENT: 39, 39.5 and 40 min

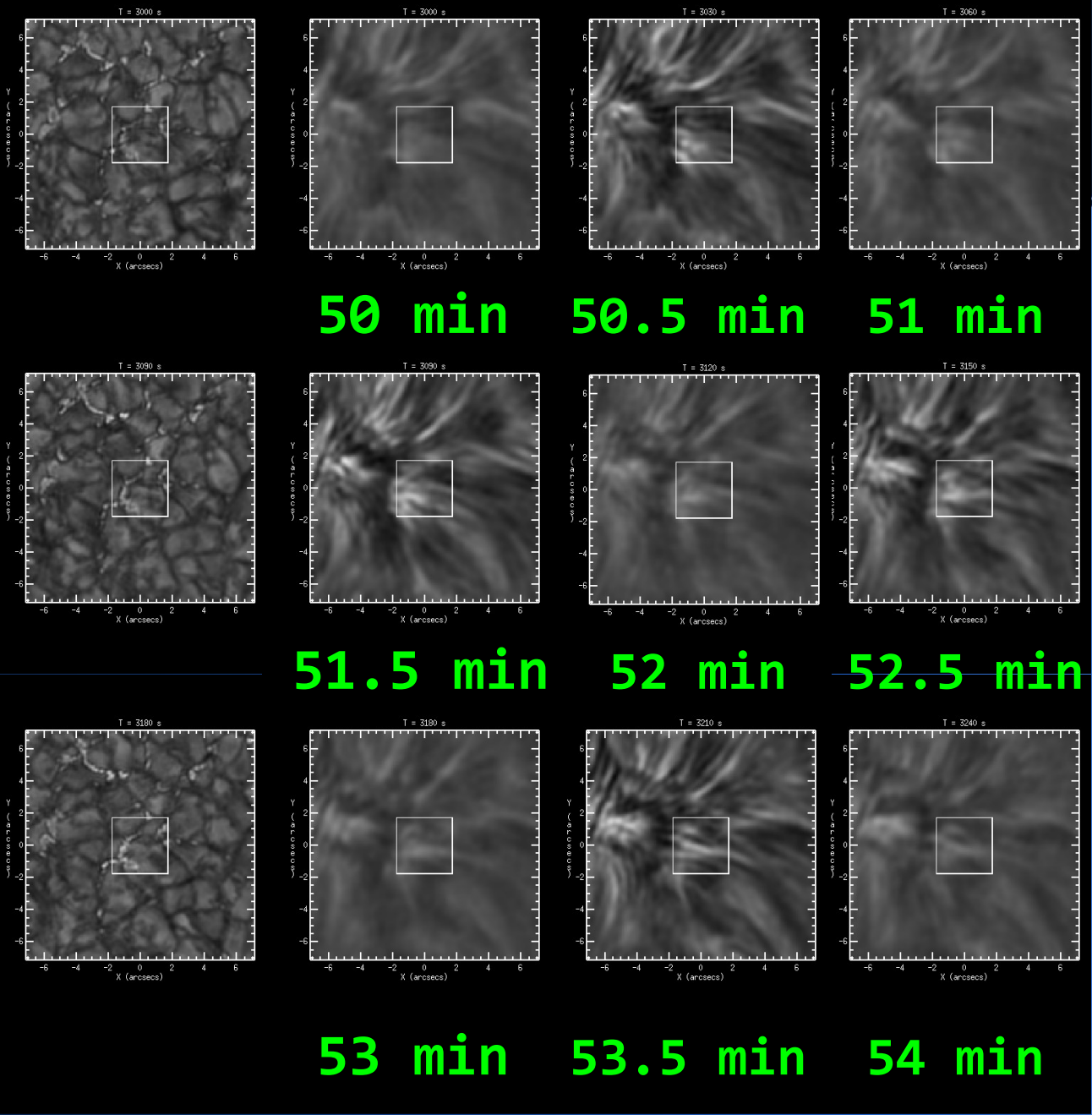
short-lasting brightening

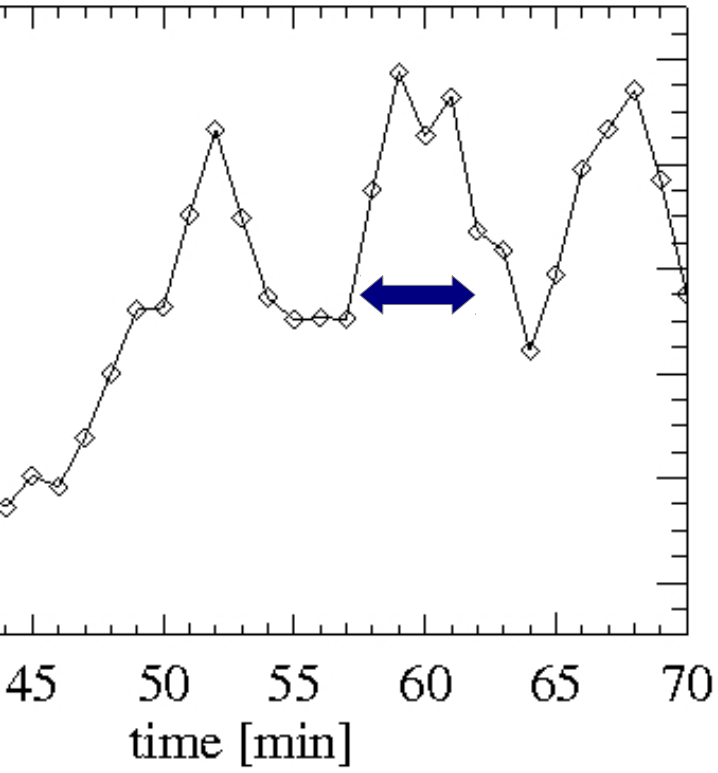




EVENT:

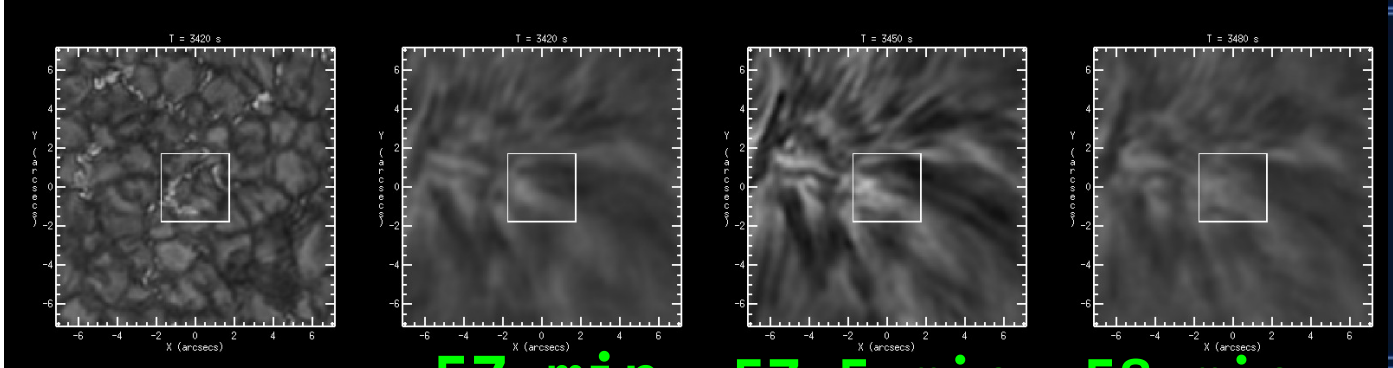
50, 50.5, 51, 51.5, 52, 52.5, 53, 53.5 and 54 min

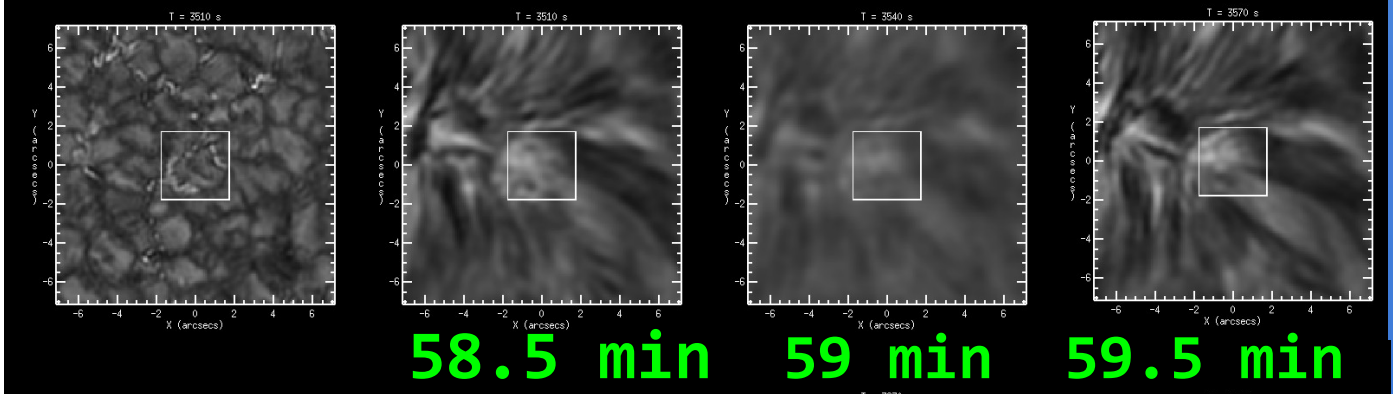


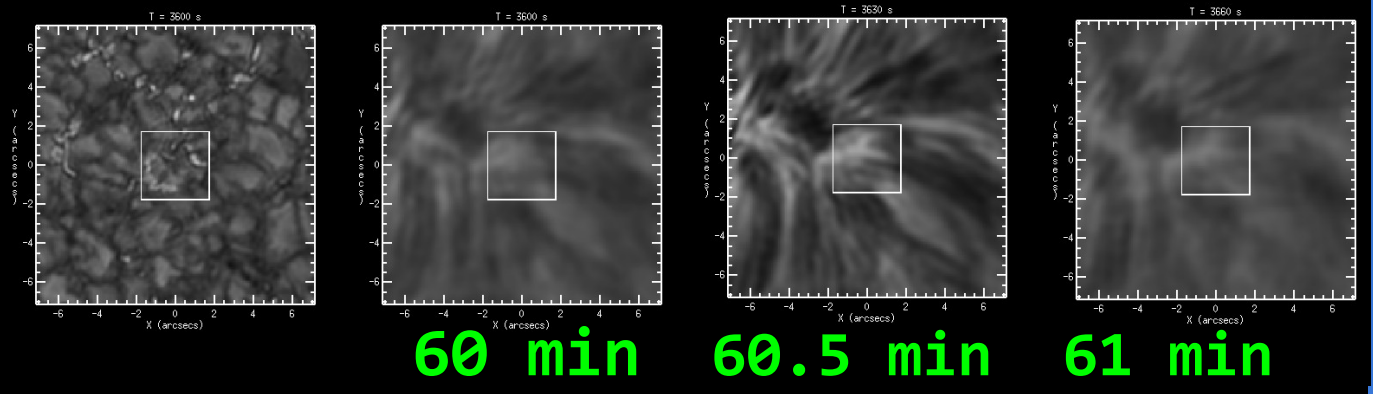


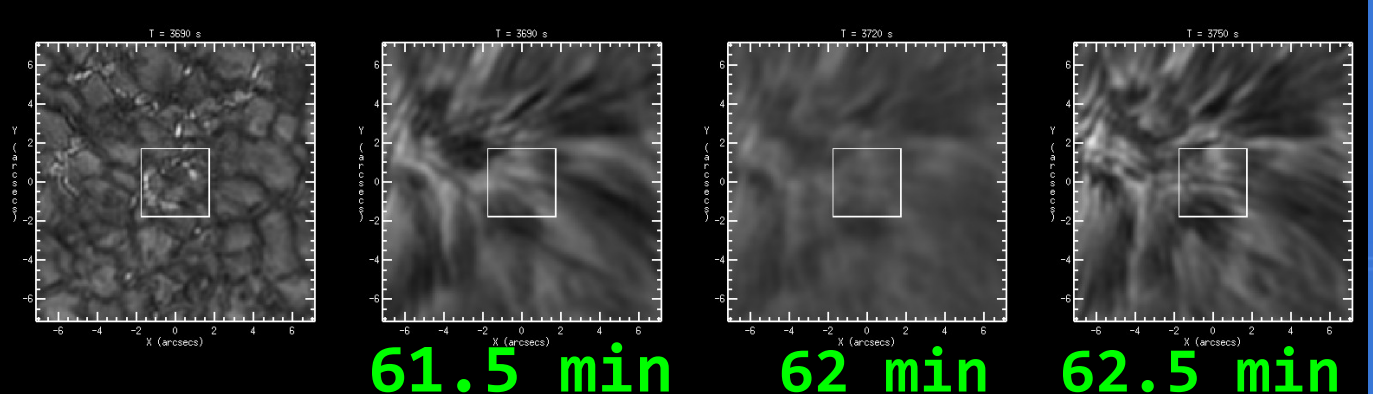
EVENT:

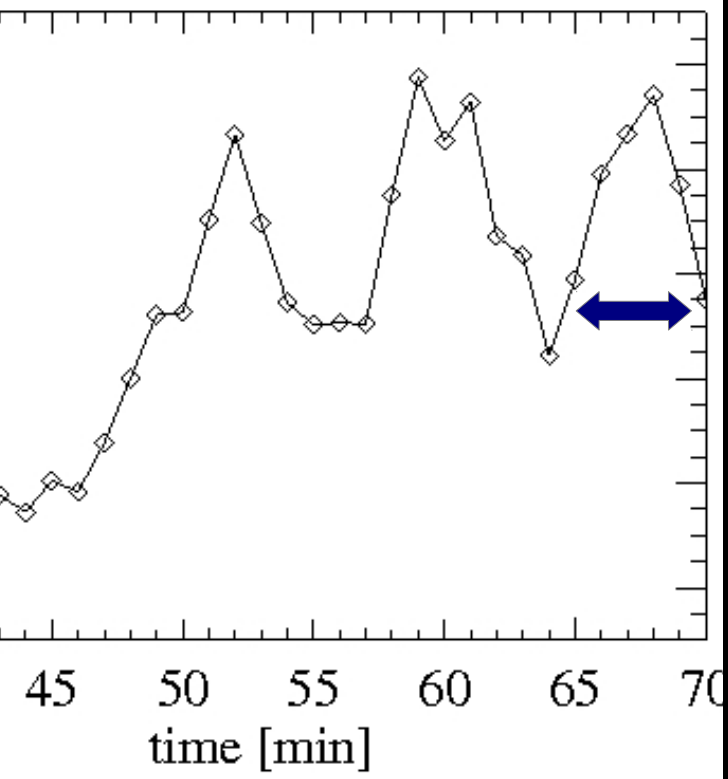
57, 57.5, 58, 58.5, 59, 59.5, 60, 60.5, 61, 61.5, 62 and 62.5 min





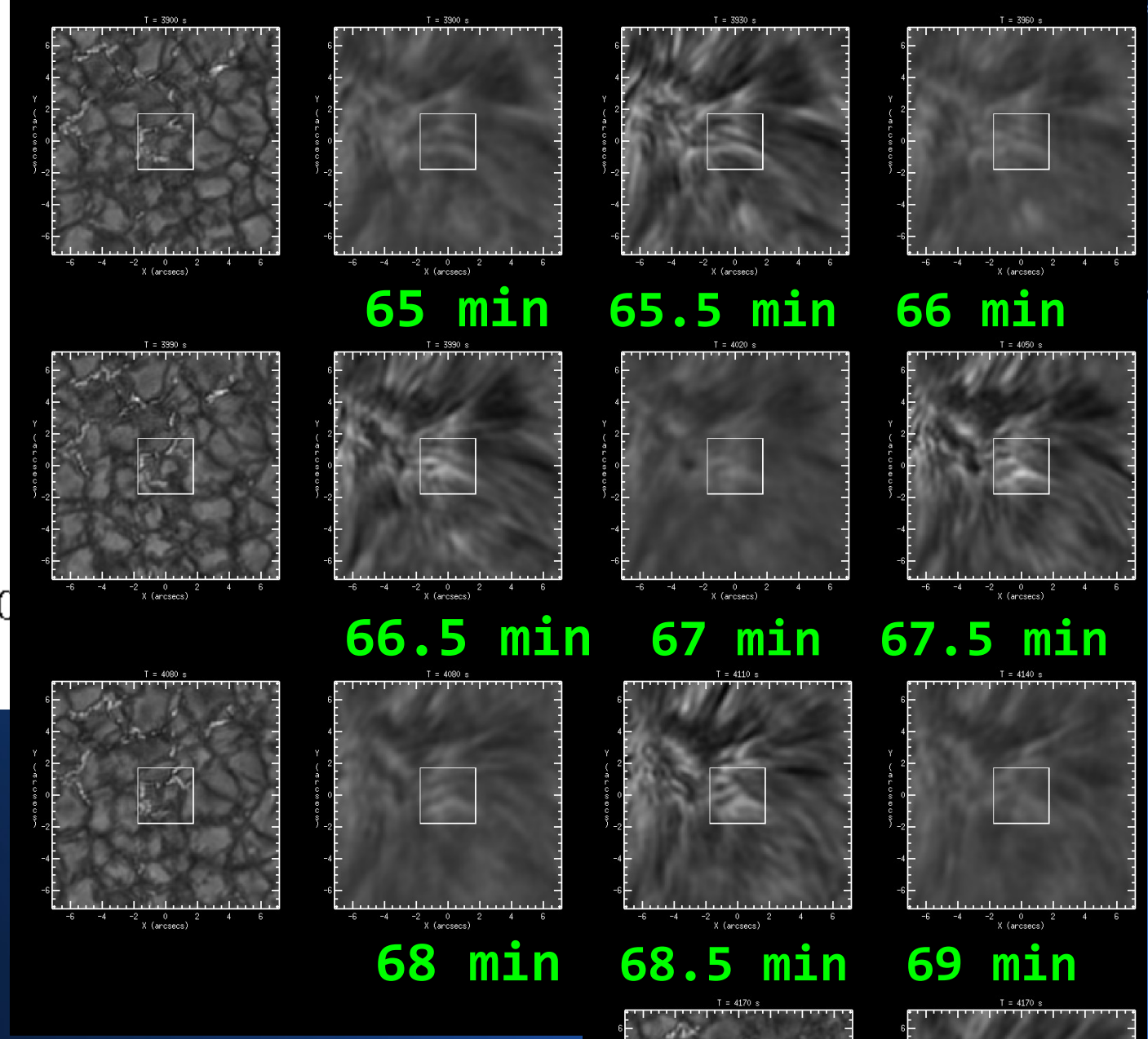




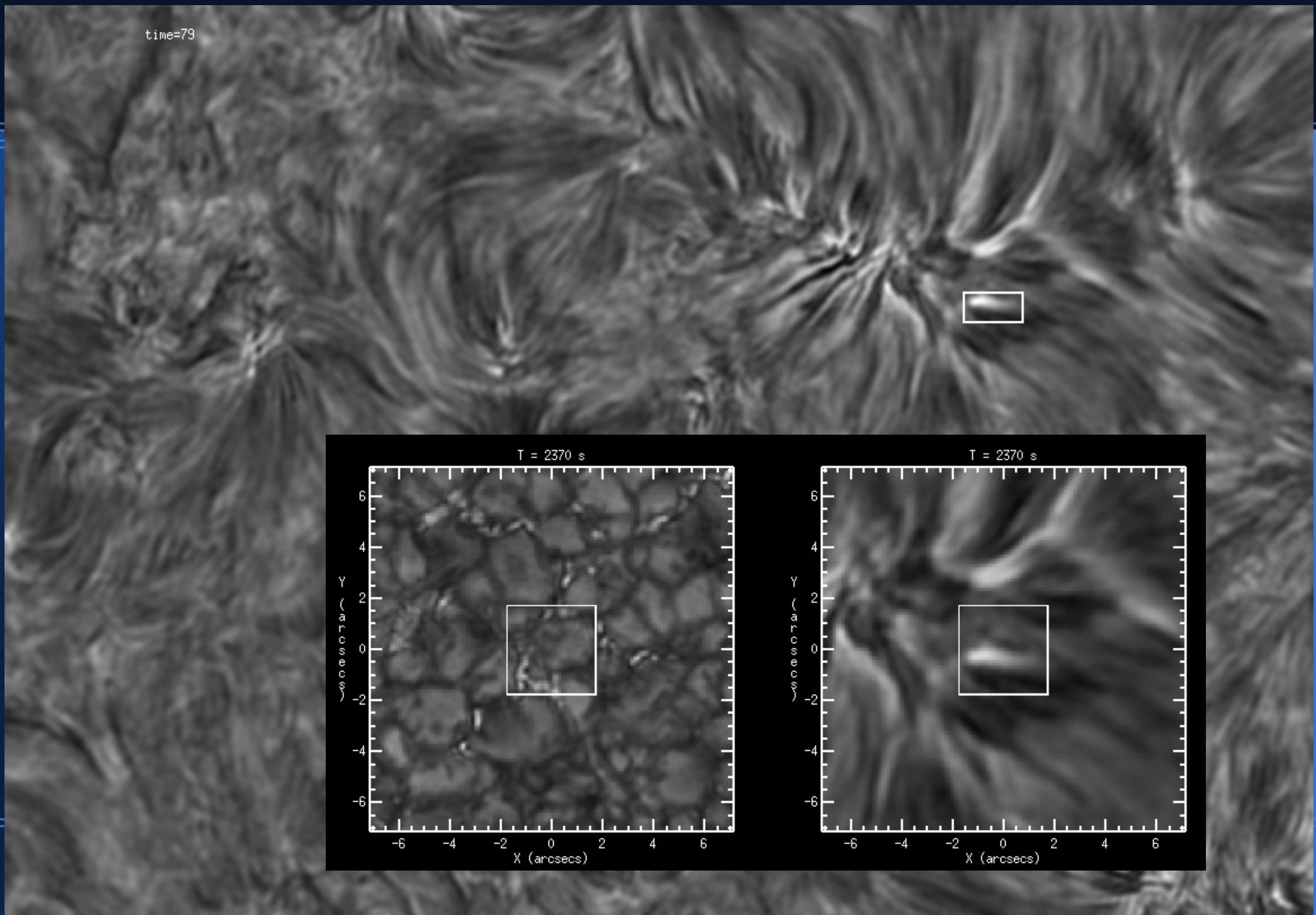


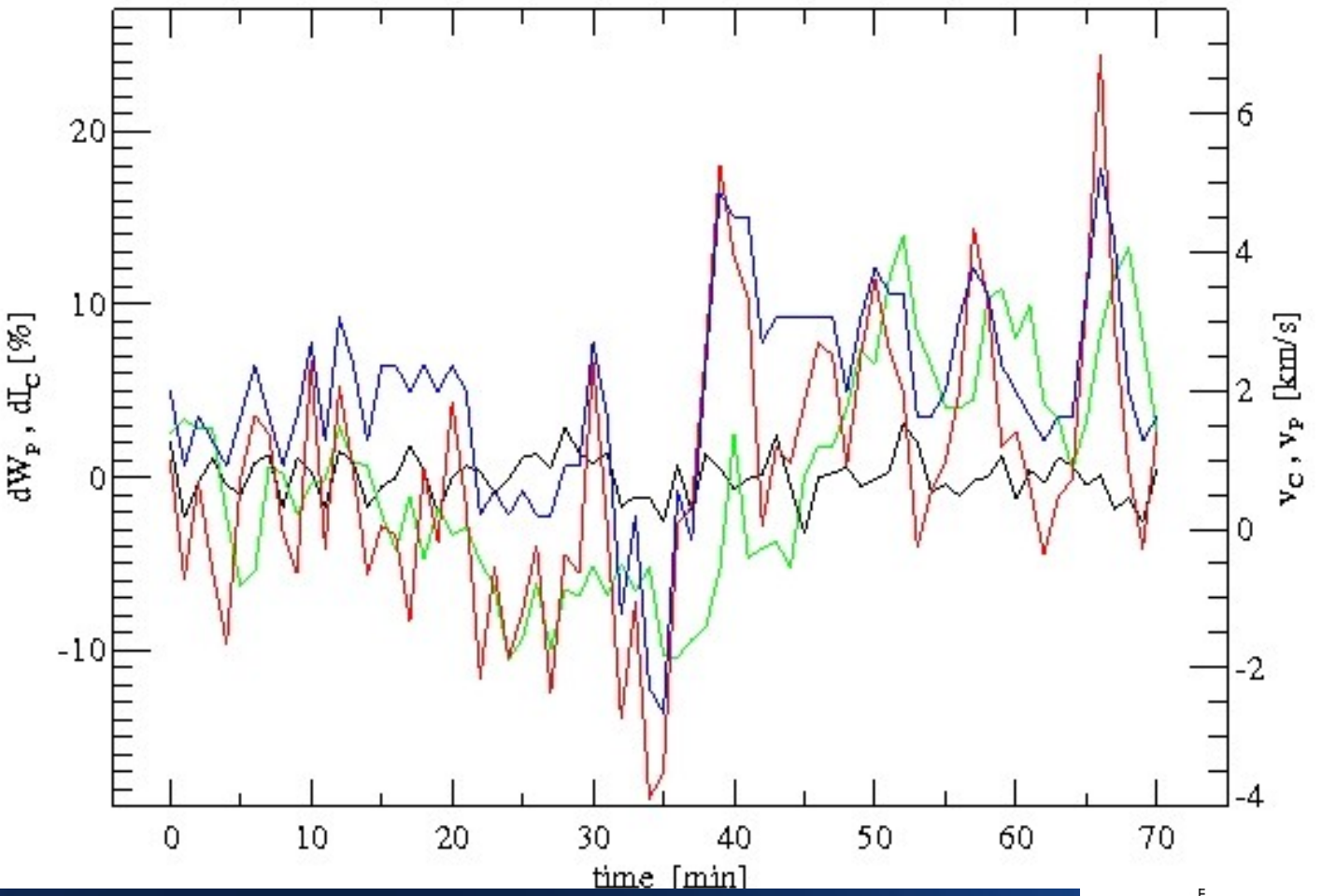
EVENT:

65, 65.5, 66,
66.5, 67, 67.5,
68, 68.5, 69
and 69.5 min



Box B1 – sub-field (50x25)px



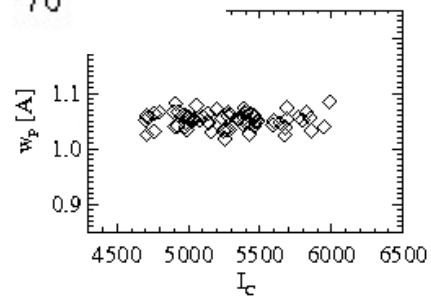


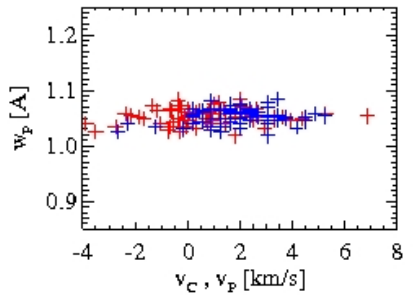
Black - wp

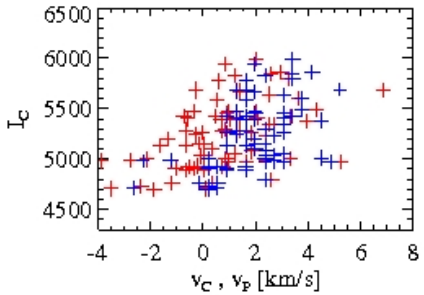
Green - Ic

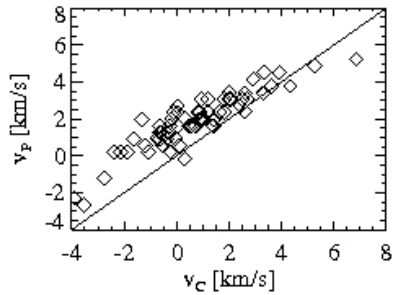
Blue - vp

Red - vc



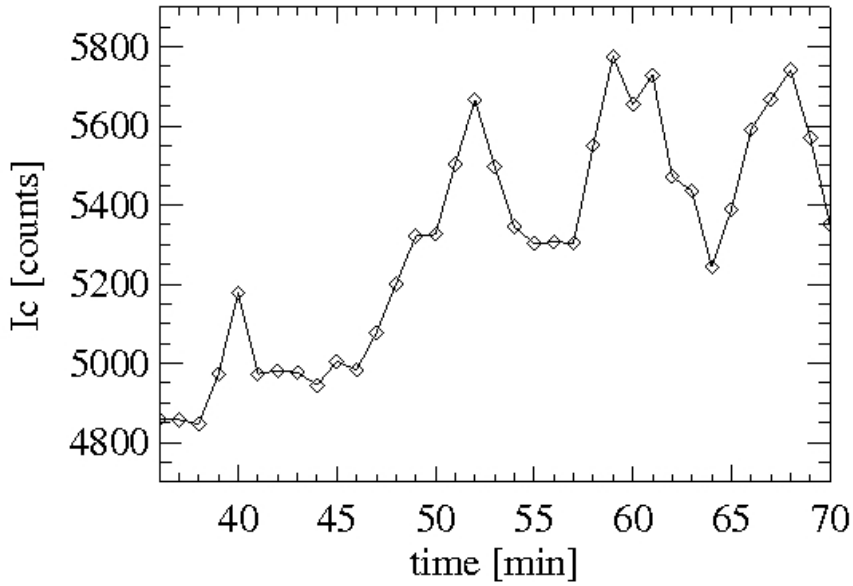


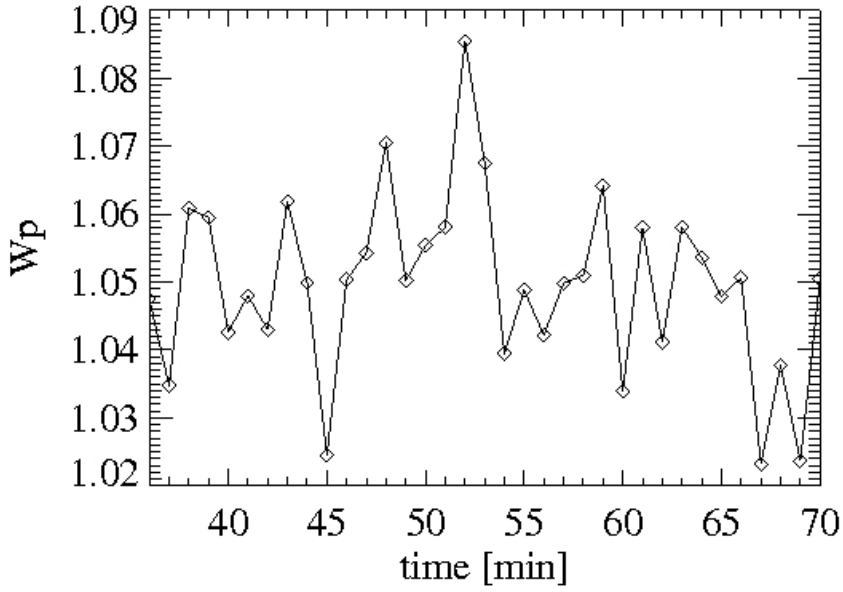




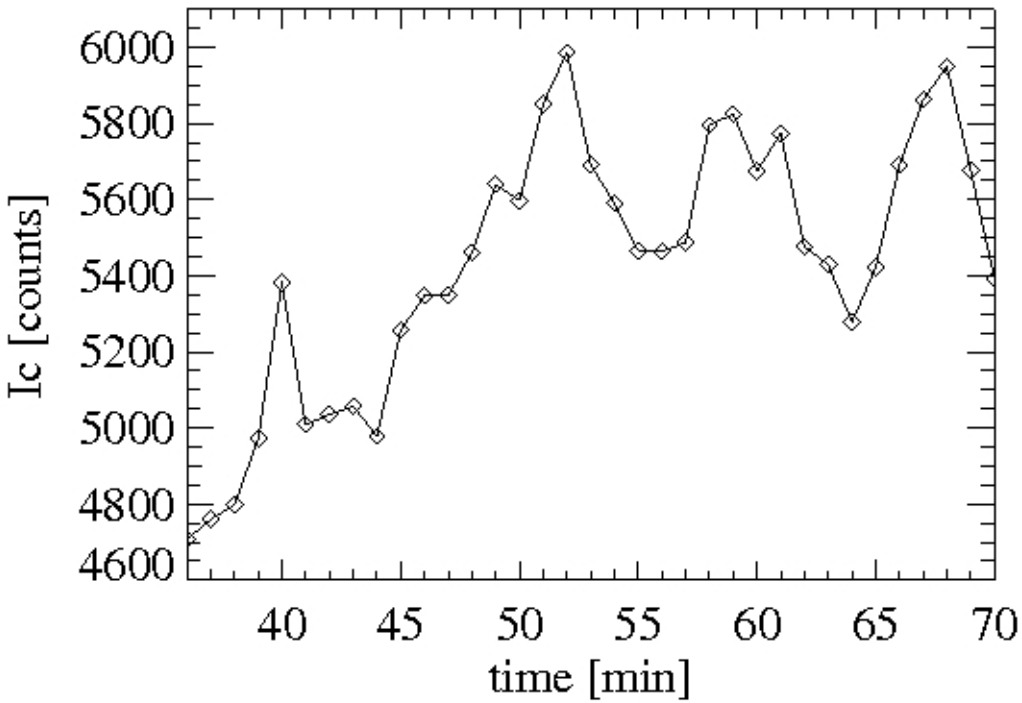
Ic and wp second half of time span

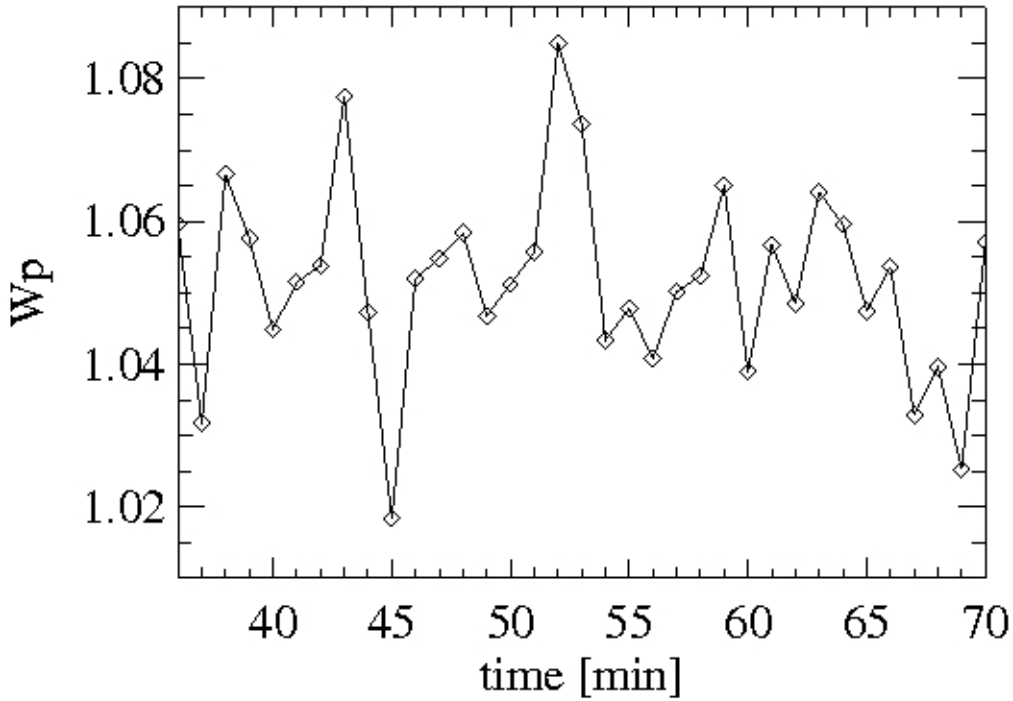
Ic, wp - N1



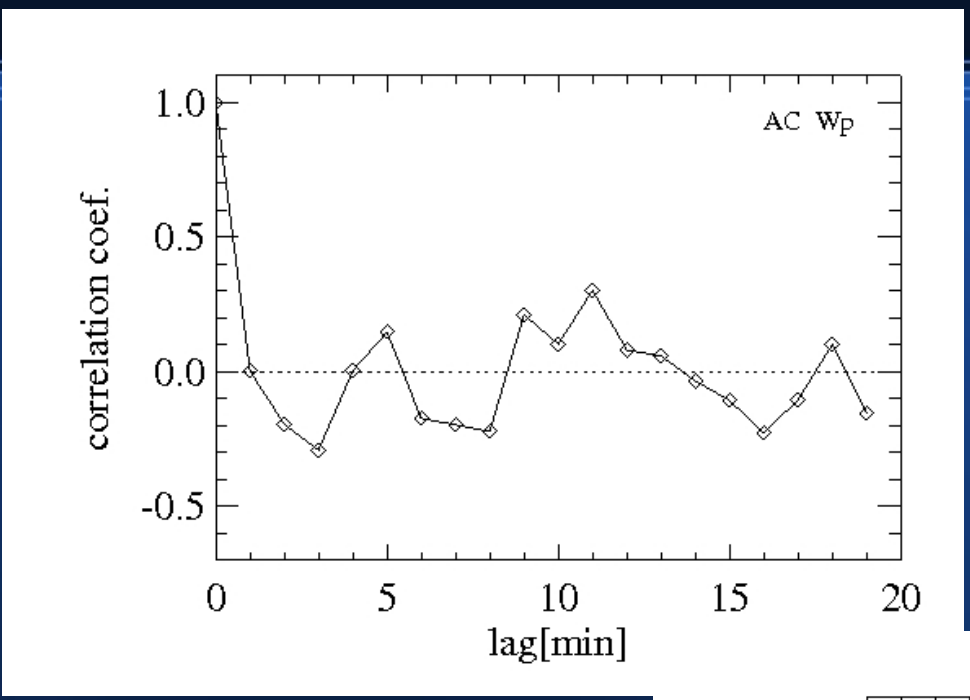


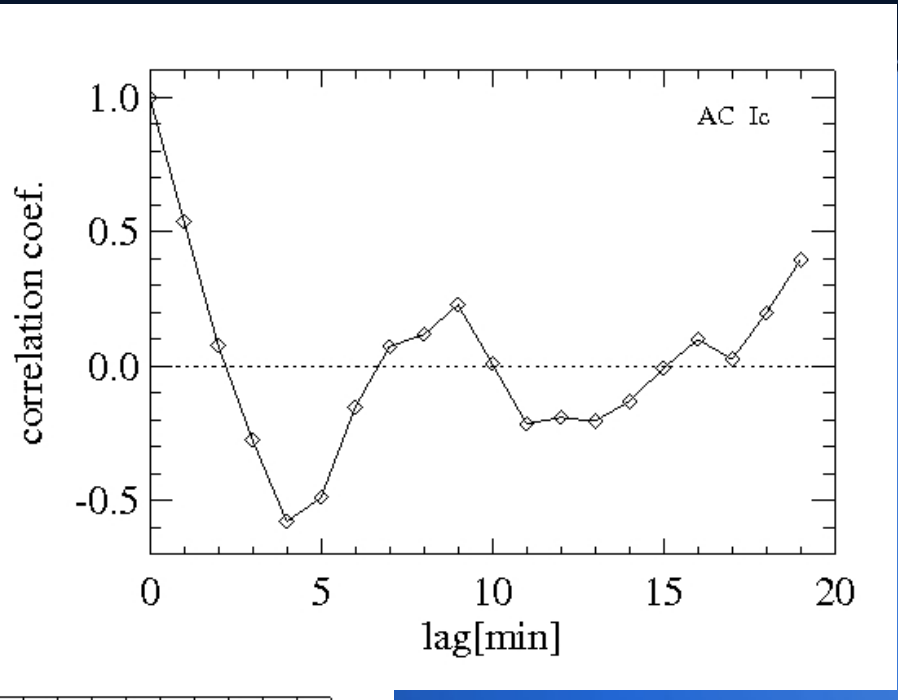
Ic, wp - selection



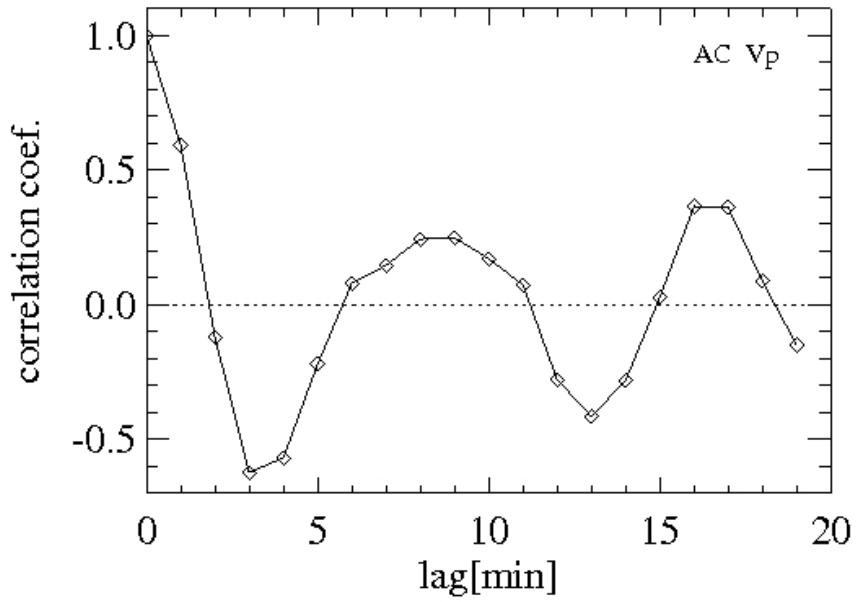


Box B1 (selection) – second half (36-70 min) - autocorrelations

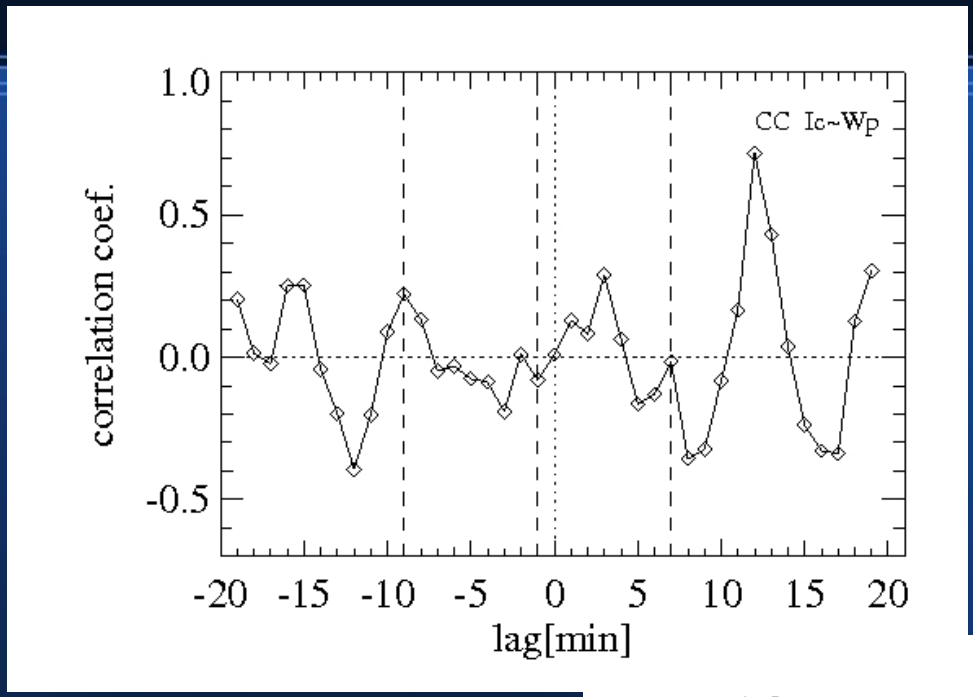


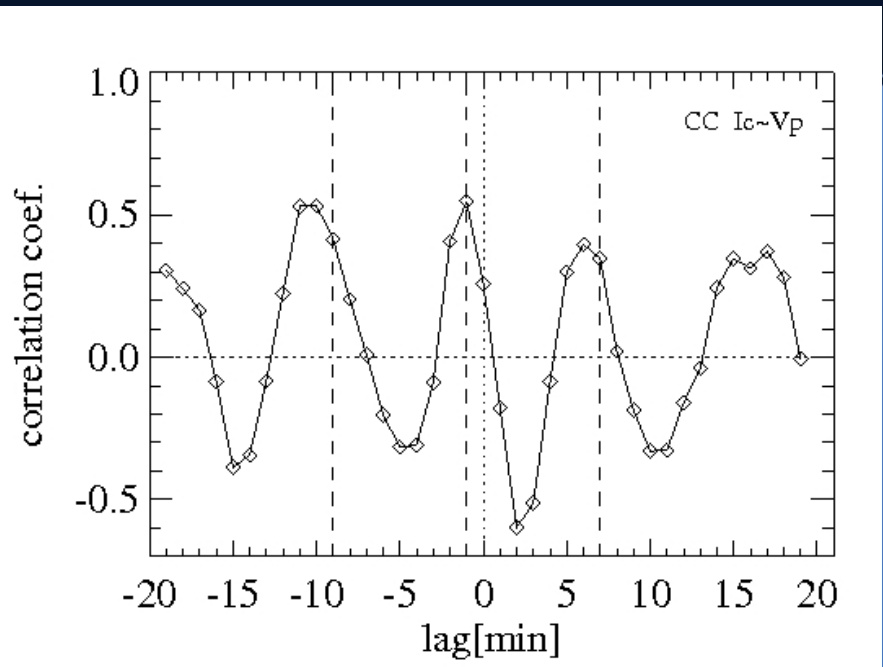


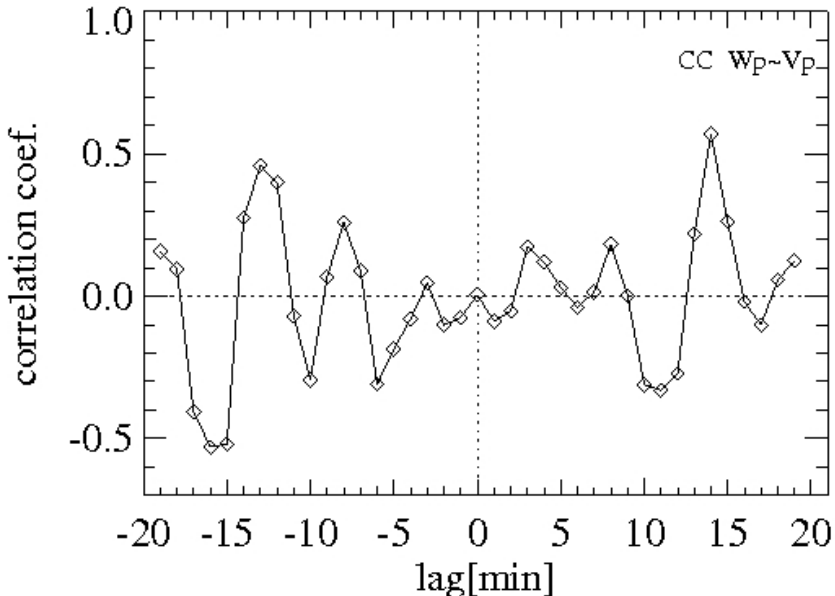
statistically significant periods in Ic and vp ~8 min



Box B1 (selection) – second half (36-70 min) - crosscorrelations

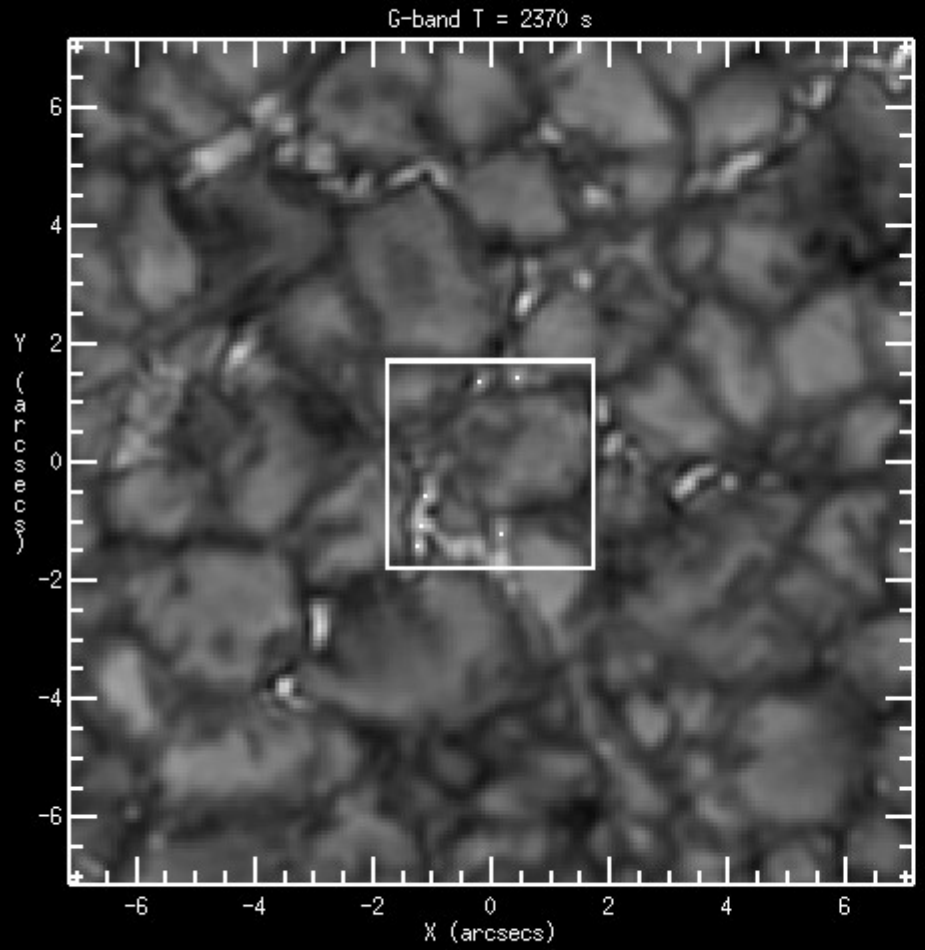


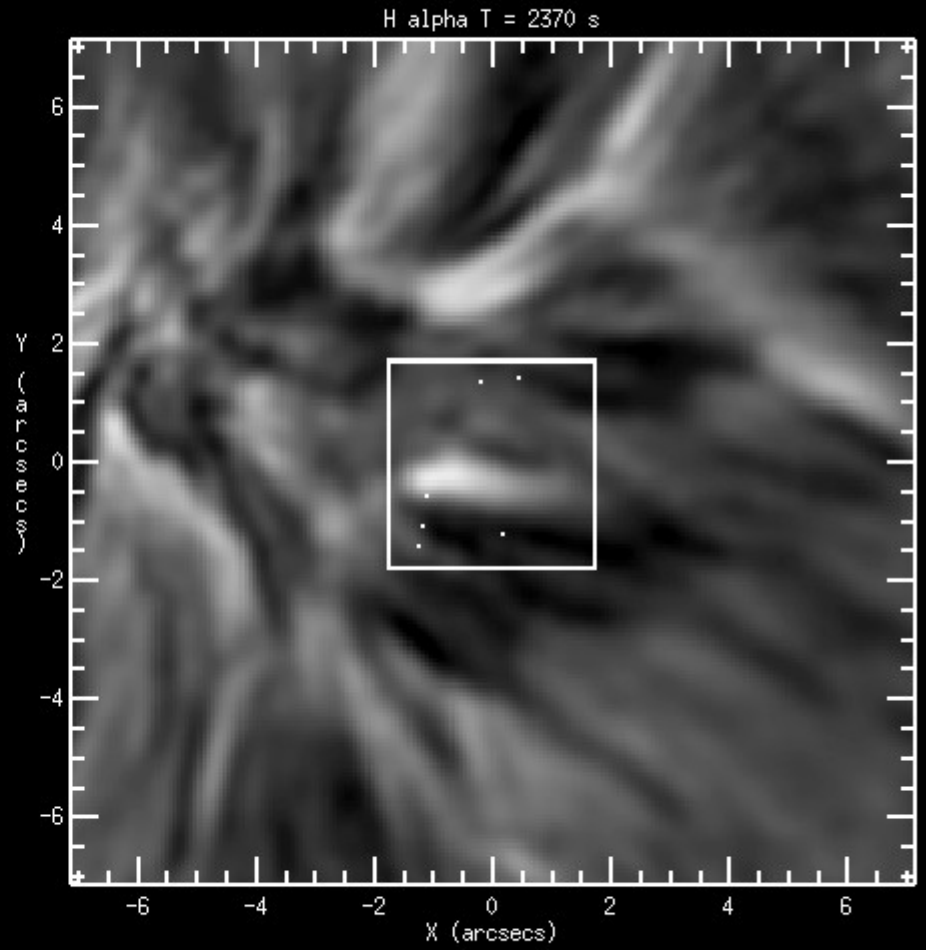




statistically significant correlation between Ic and vp; Ic behind vp ~1 min

GBP dynamics and Hα response





VIDEO ...