HMI Signatures of Transient Emission from White-Light Flares

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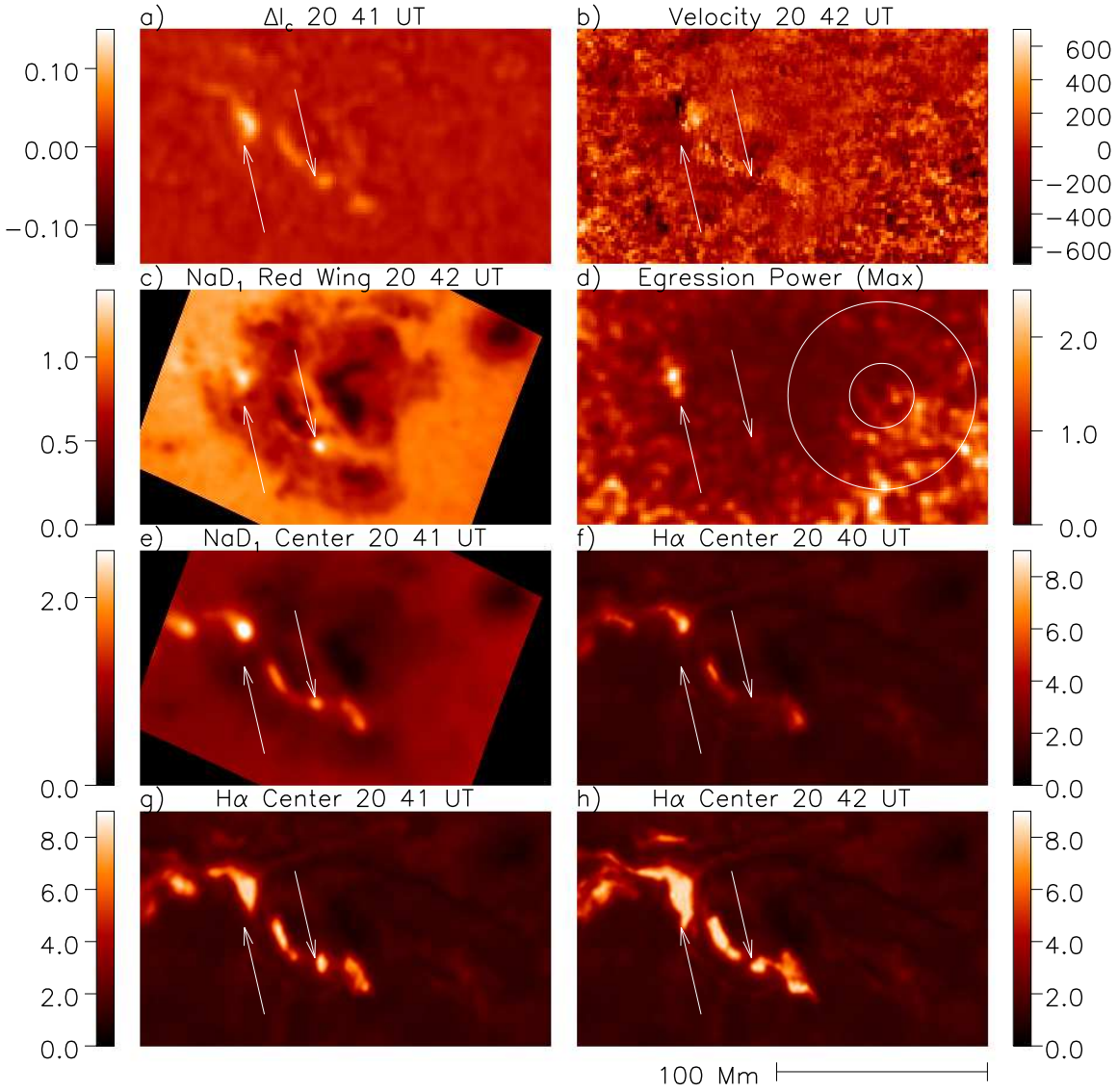
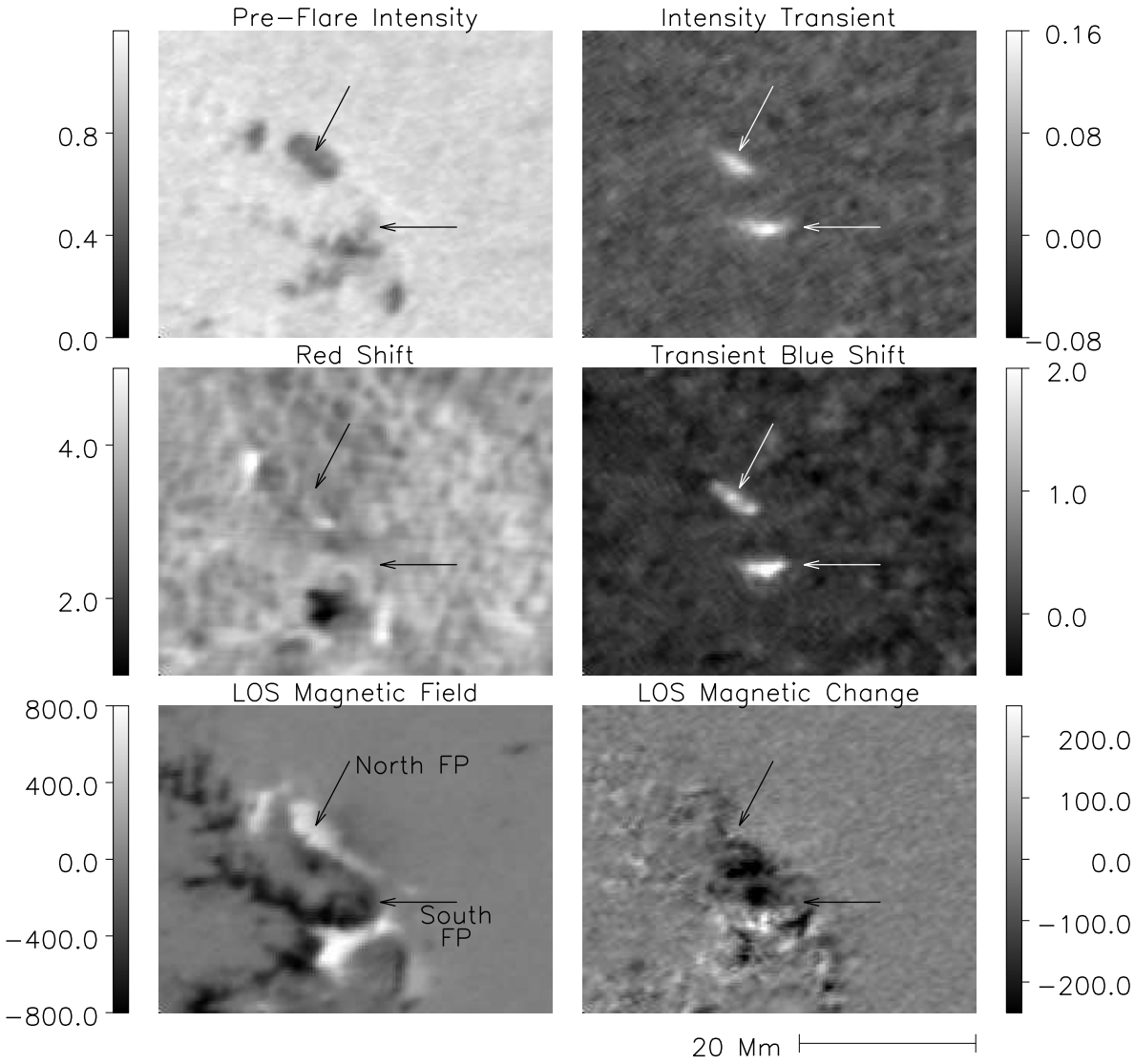
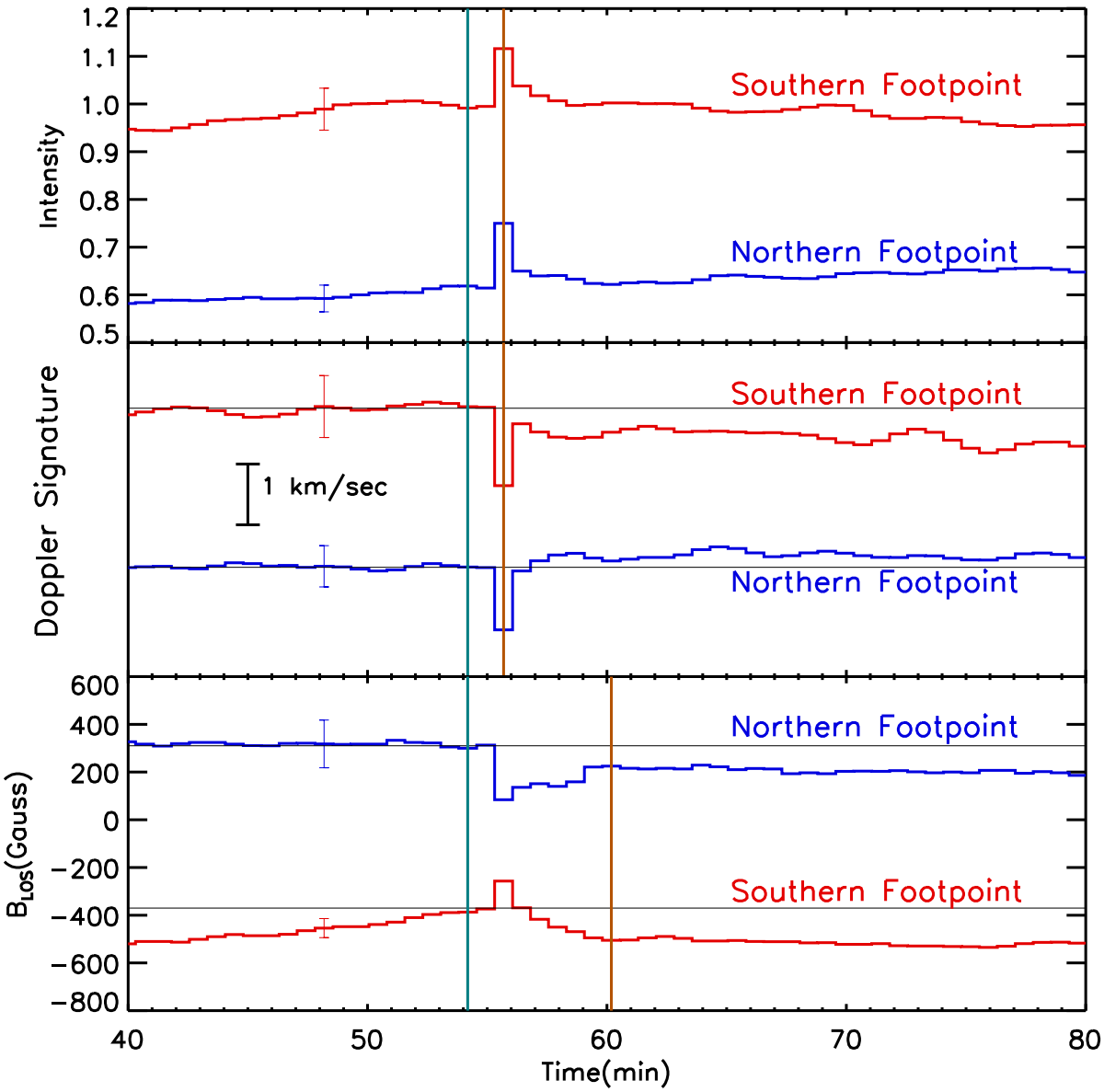
Slide 1: The "Red Shift"



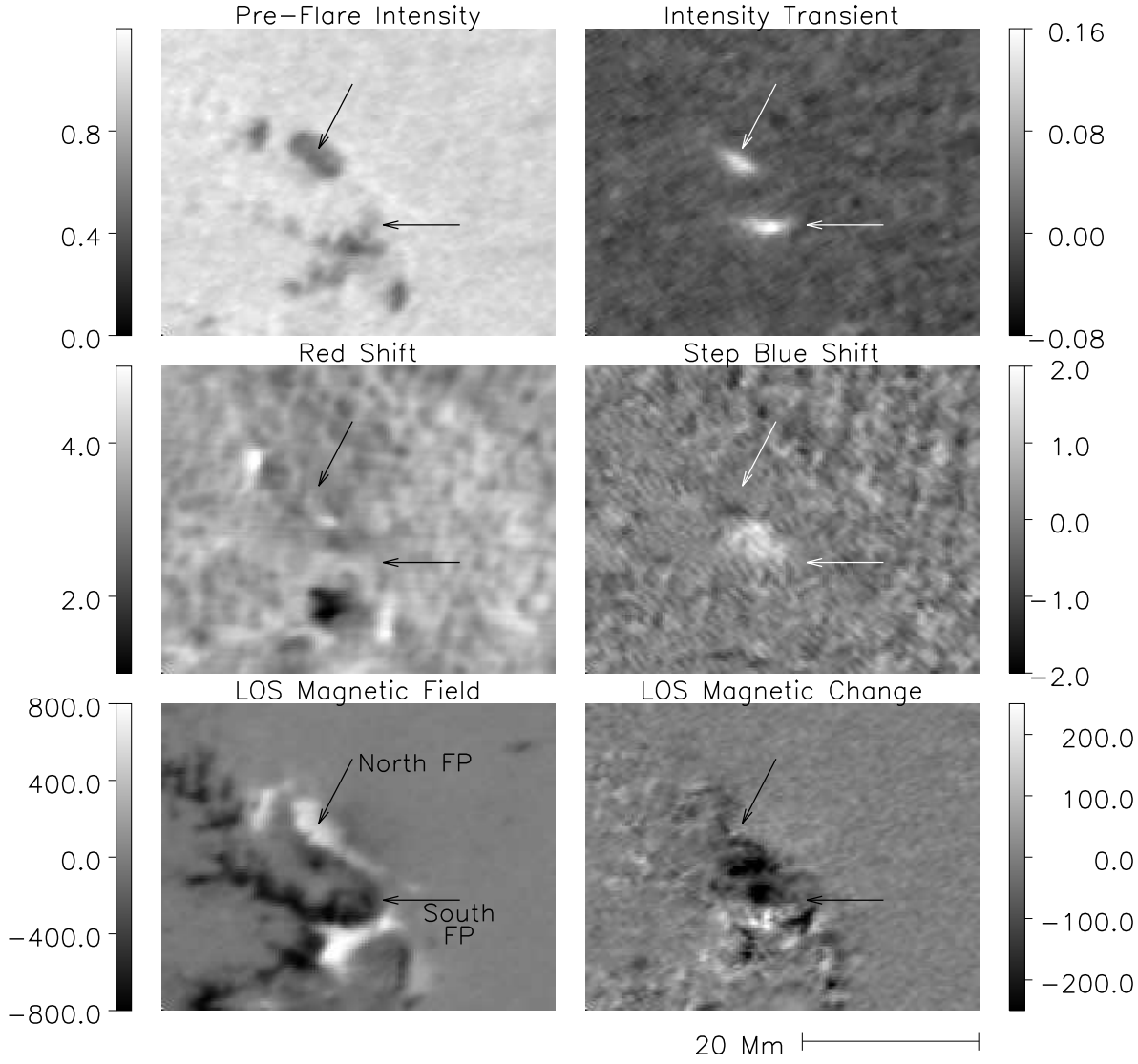
Slide 2: The "Blue Shift"



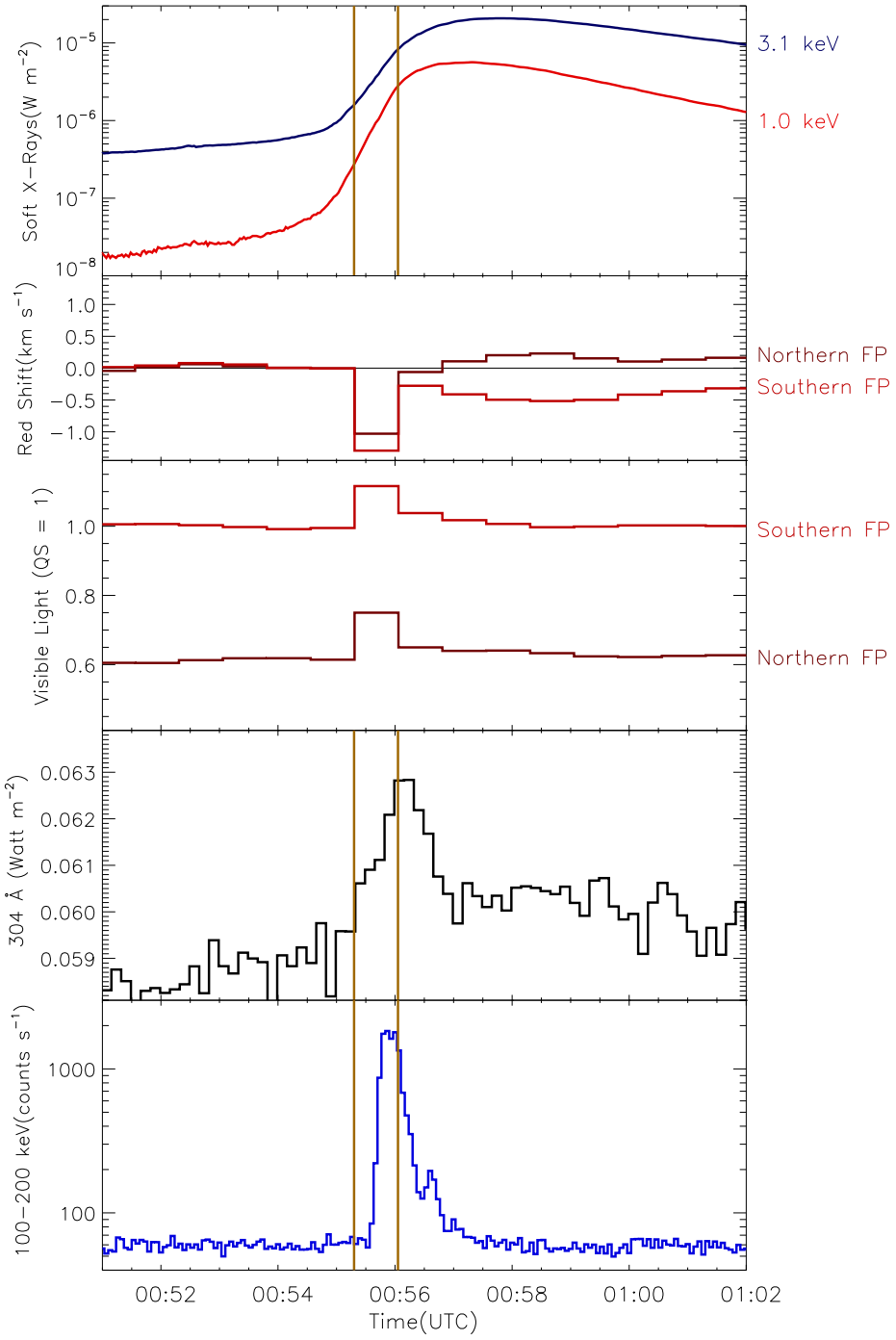
Slide 3: The Timing



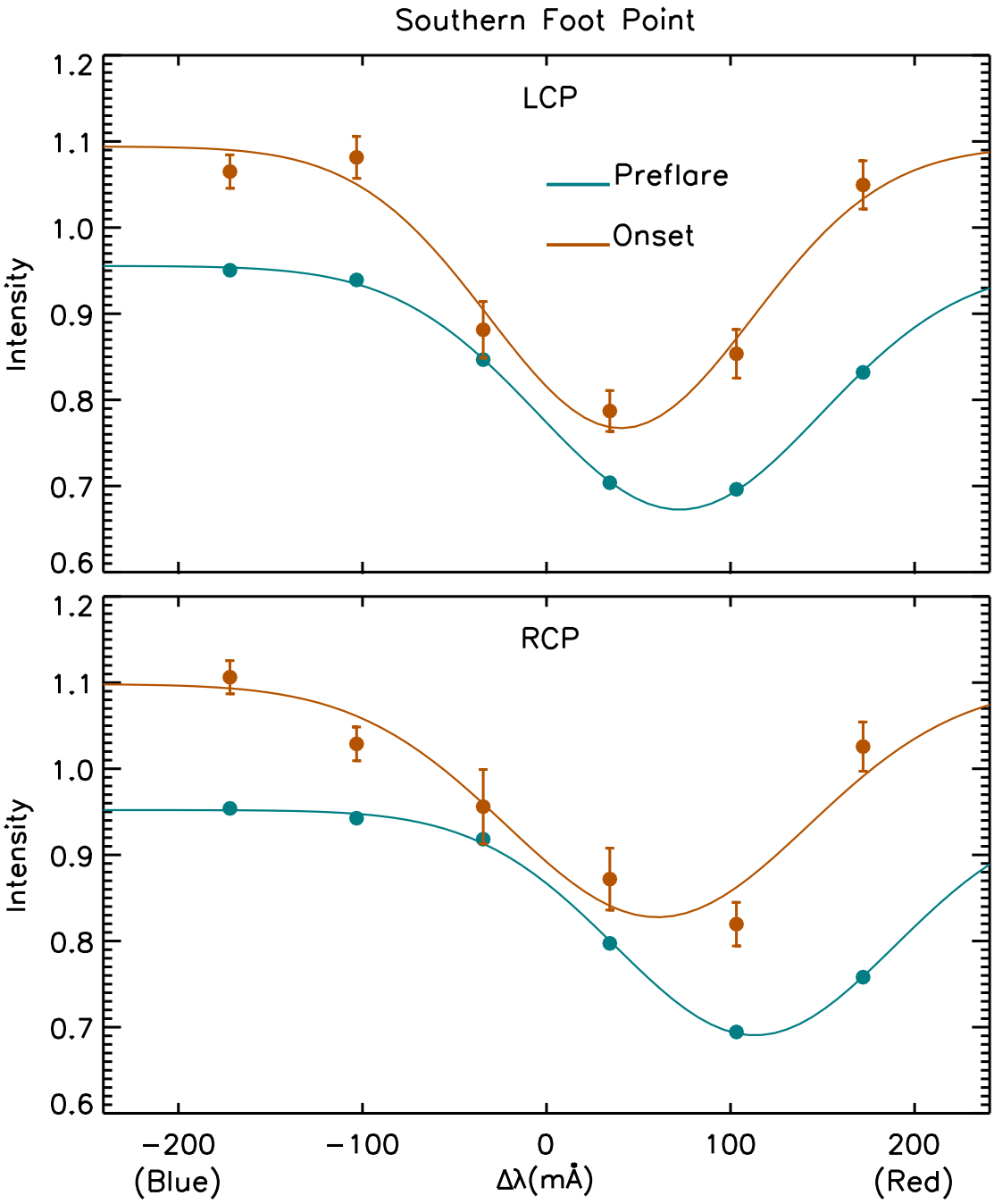
Slide 4: The "Step" Doppler Signature



Slide 5: The Issue of Aliasing



Slide 6: The Spectrum



Slide 7: Interpretations of the Transient "Blue Shift"

- An upwardly expanding photosphere, possibly due to heating by white light or some other mechanism.
- A downwardly moving chromosphere that is heated, whereby the photospheric line appears in emission.
- Destruction of molecules that perturb the Doppler signature.
- Horizontal motion, possibly due to Lorentz forces:
  - Forces related to reconnection.
  - Forces related to mode coupling.
- Pre-flare flows redirected by a changed magnetic configuration.

Slide 8: **Closing Statement**

The GONG observations strongly imply that the "blue shift" is a transient aliasing phenomenon caused by the intensity varying while the spectrum is being measured. In this context, the GONG appears to be a critical control element to the interpretation of transient phenomena in flares.