How much closer are we to flare prediction?

Responses to Gordon's four questions

Hugh Hudson

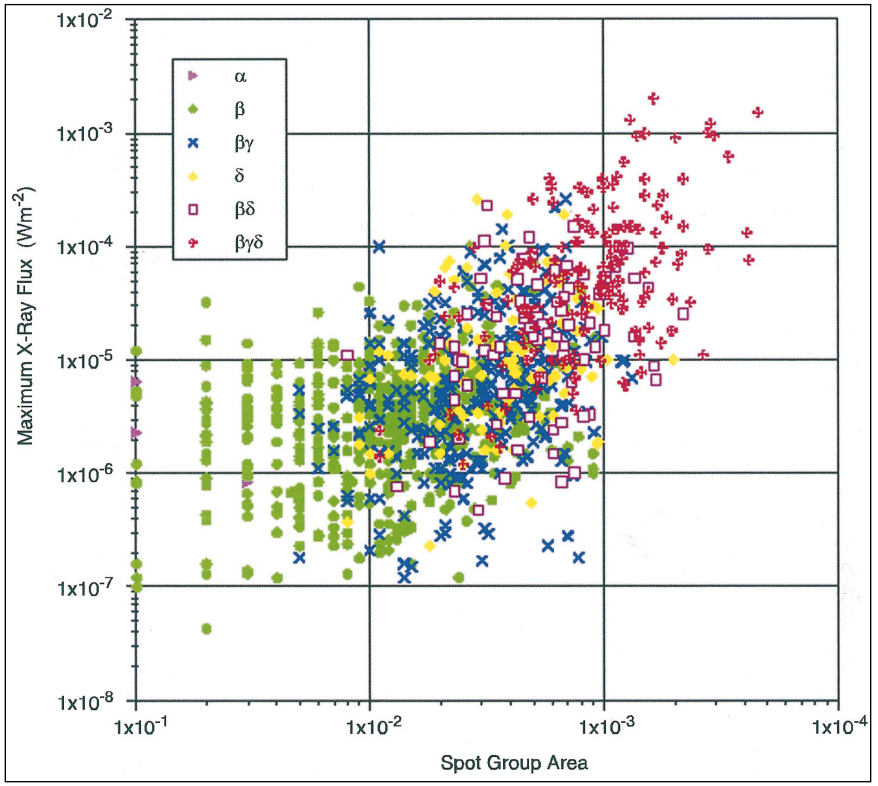
SSL/UC Berkeley

The Bottom Line

- Bloomfield et al. (ApJ 747, L41, 2012) "Poisson probabilities perform favorably…"
- Generally, then, we are not much closer than Giovanelli was in 1939

Type	No. of Groups	No. of Eruptions	k Probability of an Eruption per Area of One-millionth of the Sun's Hemisphere
af	11	1	.....
a	68	6	.....
ap	508	130	0.81×10^{-3}
βf	246	110	0.96×10^{-3}
β	589	255	0.96×10^{-3}
βp	1124	416	0.96×10^{-3}
βγ	286	314	1.20×10^{-3}
γ	73	117	2.05×10^{-3}
Weighted mean	.....	.....	0.96×10^{-3}

Giovanelli, 1939



Sammis et al., 2000

My answers

- *Sigmoid/shear => flare as a quantitative matter?*

  - We must achieve mastery of the theory of eruption, and get appropriate data

- *False positive vs false negative?*

  - "True negative" is the safest prediction (Bloomfield)

- *Extrapolation schemes helpful?*

  - Extrapolation is always error-prone

- *Predicting geoeffectiveness?*

  - Some hope here! The corona is largely observable

The omissions

- *Do the MHD models have any predictive capability?*

  - No, but they might eventually
- *Can they at least predict N/S orientation*

  - Possibly yes, but not without better data
- *Do we know which flares will have CMEs, and which CMEs will have SEPs?*

  - To a certain extent[2]
- *Is there a seismic warning for AR eruption?*

  - Apparently not, and the data have limitations