

## **Flare Clustering**

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Since the mid 70's the statistics of flares has been intensively examined because of the clues that they might provide on flare origins or for flare prediction. The scientific debate has continued for more than 40 years in spite of the fact that most papers relay entirely or in part on the x-ray flare data generated by the GOES satellites. Here we report on clustering of flares during cycle 23, which spanned 1997 to 2008. In the maximum of cycle 23, 2000 to 2003, 18.6% of the flares, in a GOES data set containing all flares from C5.0 through X, occurred in clusters that lasted more than a solar disk passage, 13 days (G13\_Clusters), and one lasted more than 3 disk passages, 42.6 days. The mean rate of flaring in G13\_Clusters was 4.46 flares/day, while outside them the flare rate was 1.16 flare/day. G13\_Clusters only occurred in solar maximum. These observations indicate; 1) G13\_Clusters are created from more than a single active region; 2) There is a global effect because of the much higher sustained rate of flaring in the G13\_Cluster periods; 3) If subsequent cycles are similar to cycle 23 it may be possible to predict long periods of enhanced flare rates. The details vary but the same clustering phenomena occurs for GOES data sets with lower thresholds above C1.