

Early Observable Events in Correlation with Geomagnetic Storms

Victoria Strait

Furman University

Mentors: Bob Rutledge and Chris Balch, NOAA SWPC

Coronal Mass Ejections are associated with several solar events including large flares, high and low energy proton events, and Types II and IV radio bursts. The purpose of this project is to uncover what correlations exist between several of these CME-associated events and their resulting geomagnetic effects on Earth.

With data from the Space Weather Prediction Center's Weekly Space Weather Reports, EPAM, and LASCO, we recorded several properties of most significant flares associated with a maximum observed A_p index of greater than 100 including duration, brightness, location, proton fluence, radio flux, and peak values of the 47–65 and 115–195 keV proton channels. These were used as parameters for correlating causative solar events with numerical indices A_p , a_p , and K_p . While finding very little correlation between the maximum A_p of a geomagnetic storm and most of these variables, and little more between those variables and maximum A_p , the number of specific K_p s observed produced the most significant results. We also concluded that while geomagnetic activity depends heavily on the frequency at which the low energy proton channels' peaks occur, it depends very little on the magnitude of the maximum flux values. A large part of error in these results comes from the lack of reliable data that was available in the Weekly Reports. Further studies are needed in order to investigate the relationship between geomagnetic activity and event duration and location on the solar disk.