

Geomagnetically quiet days and solar wind

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It is necessary to do the aeromagnetic survey during a quiet period of geomagnetic activity to avoid effect of geomagnetic disturbances. It is important for such space weather users to provide a forecast of a quiet period of geomagnetic activity. A statistical analysis was done on the solar wind parameters associated with quiet days of geomagnetic activity. The period that had been used for the analysis was made 10 years from 1995 through 2004 because of good coverage of solar wind data.

The international quietest days are determined as follows. Three values, (1) the sum of the eight Kp values, (2) the sum of squares of the eight Kp values, and (3) the maximum of the eight Kp values, are calculated for each day of each month. Then each day of the month is numbered in small the order according to those three values, respectively. The three order numbers are averaged and the days with lowest mean order numbers are selected as the five or ten quietest days. Those quietest days are reported from GeoForschungsZentrum (GFZ) Potsdam of Germany. However, levels of geomagnetic activities of those quietest days are different every month. In our analysis we used sum of eight Kp indices less than or equal to 30 nT as a quiet day. A peak of occurrence of quiet days is in 1997, near the minimum of solar activity. Correlation between occurrence of quiet days and solar activity is small. Quiet days tend to occur in slow-speed, low-density, low-temperature solar wind before arrival of Corotating Interaction Region (CIR) according to the result of superposed epoch analysis. Because CIRs tend to recur for several solar rotations, it could be predict quiet days of geomagnetic activity.