[초SE-21] Development of Empirical Space Weather Models based on Solar Information

Yong-Jae Moon[1], Roksoon Kim[2], Jinhye Park[1] and Kang-Jin[1]
[1]*School of Space Research, Kyunghee University*
[2]*NASA Goddard Space Flight Center*

We are developing empirical space weather (geomagnetic storms, solar proton events, and solar flares) forecast models based on solar information. These models have been set up with the concept of probabilistic forecast using historical events. Major findings can be summarized as follows. First, we present a concept of storm probability map depending on CME parameters (speed and location). Second, we suggested a new geoeffective CME parameter, earthward direction parameter, directly observable from coronagraph observations, and demonstrated its importance in terms of the forecast of geomagnetic storms. Third, the importance of solar magnetic field orientation for storm occurrence was examined. Fourth, the relationship among coronal hole-CIR-storm relationship has been investigated, Fifth, the CIR forecast based on coronal hole information is possible but the storm forecast is challenging. Sixth, a new solar proton event (flux, strength, and rise time) forecast method depending on flare parameters (flare strength, duration, and longitude) as well as CME parameter (speed, angular width, and longitude) has been suggested. Seventh, we are examining the rates and probability of solar flares depending on sunspot McIntosh classification and its area change (as a proxy of flux change). Our results show that flux emergence greatly enhances the flare probability, about two times for flare productive sunspot regions.

[초SE-22] Data Archive Project of 44-year Full Disk CaII K Images at Kyoto University

Reizaburo Kitai[1], Satoru Uenoi[1], Ayumi Asai[2], Hiroaki Isobe[2], and Hiroo Hayashi[3]
[1] *Kwasan & Hida Observatories, Kyoto University, Japan*
[2] *Unit of Synergetic Study of Space, Kyoto University, Japan*
[3] *Research Institute of Sustainable Humanosphere, Kyoto University, Japan*

At Kyoto University, a continuous solar full-disk observation in CaII K line had been done during 44 years of 1926 - 1969. The observation was done with a Askania spectroheliograph on daily base. The images were taken on photographic plates.

We started a project to archive these image data into a digital database which will be open to the public for scientific researches. One of the scientific usage of the database is to study the long term variation of the solar chromospheres. Since the area of CaII K plage area is a measure of solar chromospheric heating, we can do comparative study of the sunspot cycle and the chromospheric heating cycle of the sun. Another interesting field of scientific utilization of the database is the long term variation of the heating of terrestrial upper atmosphere. As was shown by Yokoyama, Masuda and Sato (2005) , the area of the CaII K plage is a good proxy measure of solar EUV irradiation onto the upper atmosphere of the earth. Thus the completion of our database will serve to supply a basic and long-span data for upper atmospheric heating issues by the cooperative study with the Inter-university Upper atmosphere Global Observation NETwork (IUGONET) developed in Japan.