method. We plan to investigate variation of tidal parameters with seasons that could be related to interaction between tides and gravity wave from lower atmosphere since the interaction might cause the variability of tidal amplitudes and energies. The obtained tidal characteristics over the KSS are expected to be very unique when compared with other Antarctic sites, because gravity waves in the lower atmosphere are very active near the Antarctic peninsula.

■ Session : 태양 및 우주환경 II
4월 29일(수) 16:25 - 17:55 제2발표장

[SE-07] Prospects of empirical space weather forecast based on solar information

Yong-Jae Moon[1], Rok-Soon Kim[2], Kyung Suk Cho[2]

[1]Department of Astronomy and Space science, Kyunghee University, [2]Solar and Space Weather Group, Korea Astronomy and Space Science Institute

In this talk I will review our recent progress of space weather forecast based on solar information. Major findings can be summarized as follows. First, we presented a concept of storm probability map depending on CME parameters. Second, we suggested a CME earthward direction parameter and demonstrated its importance in terms of the forecast of geomagnetic storms. Third, the importance of solar magnetic field orientation for storm occurrence in terms of ICME classification was examined. Fourth, the relationship among coronal hole-CIR-storm relationship has been investigated, Fifth, the storm forecast based on coronal hole information is in progress but challenging. Sixth, a new proton event forecast method including helio-longitudinal dependence has been suggested. We are attempting to apply machine learning technology to space weather forecast. I will discuss the importance of these works and their future prospects.

[SE-08]Forecast of Geomagnetic Storm based on CME and Interplanetary Condition

Rok-Soon Kim[1,2], Kyung-Suk Cho[1], Khan-Hyuk Kim[1], Yong-Jae Moon[3], and Yu Yi[2]

[1]Solar and Space Weather Research Group, Korea Astronomy and Space Science Institute
[2]Department of Astronomy and Space Science, Chungnam National University
[3]Department of Astronomy and Space science, Kyunghee University

In our previous studies, we already examined the CME properties that control the CME geoeffectiveness and suggested the geomagnetic storm prediction formula based on only initially-observed CME parameters. However, there are some limitations for the forecast using only CME parameters, since geomagnetic storms are directly affected not only by solar source events but also by near Earth interplanetary conditions. In addition to this, the initially-observed CME characteristics can be changed during its transit to the Earth. For this reason, we have to consider real time solar and interplanetary conditions together to improve the forecast capability of geomagnetic storms. In this study, we examine near Earth interplanetary conditions for 64 CME-Dst pairs from 1997 to 2003, which were associated with M and X class solar flares and whose source regions were clearly identified. We ensure that the peak Bz and Ey prior to Dst minimum value are strongly related with Dst index. By carefully investigating the interplanetary condition for moderate geomagnetic storms (Dst $\leq$ 50 nT), we suggest an empirical criteria: Bz = -5 nT or Ey = 3 mV/m for t = 2 hr. As a result, most of the storms (90 %) satisfy the interplanetary criteria. Among 20 exceptional eventsunsatisfying the CME-storm forecast, 15 misses can be explained by the interplanetary condition, but we couldn't find the cause of 5 false alarms. By considering both conditions, all geomagnetic storms (Dst $\leq$ 50 nT) are found to occur when the CME conditions or interplanetary conditions (Bz $\leq$ -5 nT or Ey $\geq$ 3 mV/m for t $\geq$ 2 h) are satisfied.

[SE-09] Application of Support Vector Machine to Space Weather Prediction: Geo-effectiveness of CMEs

Seonghwan Choi[1,2], Yong-Jae Moon[2], Ngo Anh Vien[3], and Rok-Soon Kim[1,4]

[1]Korea Astronomy and Space Science Institute (KASI),
[2]Department of Astronomy and Space Science, Kyunghee University
[3]Department of Computer Engineering, Kyunghee University
[4]Department of Astronomy and Space Science, Chungnam National University

Support vector machine is a powerful machine learning method in classification and regression. Generally machine learning has been greatly applied in image processing, data classification, and data mining. It is very helpful to automatically produce models from data which are not clearly understood. Very recently, researchers started to apply it to space weather forecast. In this study, we apply it to the forecast of geo-effective CMEs using 488 CME-Dst pairs that Kim et al. (2008) used. Here we assume that the occurrence of a geomagnetic storm is governed by CME speed, longitude, and earthward direction parameter. We