[구SS-07] Forecast of geomagnetic storm using coronal mass ejection and solar wind condition near Earth

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To improve the forecast capability of geomagnetic storms, we consider the real time solar and near Earth conditions together, since the characteristics of CMEs can be modified during their transit from the Sun to the Earth, and the geomagnetic storms may be directly affected by not only solar events but also near Earth interplanetary conditions. Using 55 CME-Dst pairs associated with M- and X- class solar flares, which have clearly identifiable source regions during 1997 to 2003, we confirm that the peak values of negative magnetic field Bz and duskward electric field Ey prior to Dst minimum are strongly related with Dst index. We suggest the solar wind criteria (Bz<-5 nT or Ey>3 mV/m for t>2 hr) for moderate storm less than -50 nT by modifying the criteria for intense storms less than -100 nT proposed by Gonzalez and Tsurutani (GT, 1987). As the results, 90% (28/31) of the storms are correctly forecasted by our criteria. For 15 exceptional events that are incorrectly forecasted by only CME parameters, 12 cases (80%) can be properly forecasted by solar wind criteria. When we applying CME and solar wind conditions together, all geomagnetic storms (Dst<-50 nT) are correctly forecasted. Our results show that, the storm forecast capability of the 2~3 days advanced warning based on CME parameters can be improved by combining with the urgent warning based on the near Earth solar wind condition.

[구SS-08] Physical Characteristics of Two Types of EUV Coronal Jets Observed by SDO/AIA

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We have investigated the EUV coronal jets observed by Solar Dynamic Observatory (SDO) / Atmospheric Imaging Assembly (AIA). From the Heliophysics Events Knowledgebase (HEK), we consider all recorded 40 EUV jets in 171Å from May 2010 to July 2011 and use 19 jets whose location can be clearly identified, excluding limb events because of the ambiguity of their positions. According to the positions of their roots, these coronal jets are classified into two types: bright point jet (BPJ, 9 jets) and active region boundary jet (ABJ, 10 jets). BPJs are located at the top of bright points and ABJs at the boundaries of active regions. There are significant differences in speed and size between two types. Here the speed and size of a jet are assumed to be its maximum values in the case that the jet has several ejections. The average speed and size of 9 BPJs are about 110 km/s and 69,000km, respectively. The average speed and size of 10 ABJs are about 660 km/s and 194,000 km, respectively. The speed distribution of ABJs has two peaks at about 270 km/s and 1700 km/s. It is very interesting to note that three ABJs have very high speeds larger than 1600 km/s and they are all composed of a group of recurrent jets with low and high speed at the same location. In addition, we are investigating these events in other wavelengths and compare their characteristics.