Prediction Center: VHF Coherent Scatter Radar

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Korea space weather prediction center (KSWPC) in Korea Astronomy and Space Science Institute (KASI) has been constructing several facilities to observe mid- to low-latitude upper atmospheric/ionospheric phenomena; VHF coherent scattering radar, All-sky Imager, and Scintmon. Those new ionospheric facilities can be integrated to produce more reliable space weather forecast and nowcast with the existing facilities; Solar Flare Telescope (SOFT), Solar Optical Observatory's sunspot telescope and solar imaging spectrograph, and Magnetometer. The specification of KASI VHF coherent scattering radar is 40.8 MHz of target frequency, 200 kHz of bandwidth, 24 kW of peak power. The science goal of this radar is to measure the irregularities in E- and F-layers over Korea, especially sporadic-E, spread-F, and traveling ionospheric disturbance (TID). The radar will be installed at Gyerong in a territory of Korean Air force by early 2009.

[Ⅷ-1-5] Construction of Korean Space Weather Prediction Center: SCINTMON and All-Sky Camera

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As a part of the construction of Korean Space Weather Prediction Center (K-SWPC), Korea Astronomy and Space Science Institute (KASI) installed a Scintillation Monitor (SCINTMON) and an All-Sky Camera to observe upper atmospheric/ionospheric phenomena. The SCINTMON is installed in KASI building in Daejeon in cooperation with Cornell university and is monitoring the ionospheric scintillations on GPS L-band signals. All-Sky Camera is installed at Mt. Bohyun in Youngcheon in cooperation with Korea Polar Research Institute. It is used to take the photograph for upper atmospheric layer through appropriate filters with specific airglow or auroral emission wavelengths and to observe upper atmospheric disturbance, propagation of gravity wave and aurora. The integrated data from the instruments including SCINTMON and All-Sky Camera will be used for giving nowcast on the space weather and making confidential forecast based on some space weather prediction models.

[Ⅷ-1-6] Construction of Korean Space Weather Prediction Center: Storm Prediction Model

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Korea Astronomy and Space Science Institute (KASI) is developing an empirical model for Korean Space Weather Prediction Center (KSWPC). This model predicts the geomagnetic storm strength (Dst minimum) by using only CME parameters, such as the source location (L), speed (V), earthward direction (D), and magnetic field orientation of an overlaying potential field at CME source region. To derive an empirical formula, we considered that (1) the direction parameter has best correlation with the storm strength (2) west 15° offset from the central meridian gives best correlation between the source location and the storm strength (3) consideration of two groups of CMEs according to their magnetic field orientation (southward or northward) provide better forecast. In this talk, we introduce current status of the empirical storm prediction model development.

[Ⅷ-1-7] Construction of Korean Space Weather Prediction Center: Space radiation effect

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As an activity of building Korean Space Weather Prediction Center (KSWPC), we has studied of radiation effect on the spacecraft components. High energy charged particles trapped by geomagnetic field in the region named Van Allen Belt can move to low altitude along magnetic field and threaten even low altitude spacecraft. Space Radiation can cause equipment failures and on occasions can even destroy operations of satellites in orbit. Sun sensors aboard Science and Technology Satellite (STSAT-1) was designed to detect sun light with silicon solar cells which performance was degraded during satellite operation. In this study, we try to identify which particle contribute to the solar cell degradation with ground based radiation facilities. We measured the short circuit current after bombarding electrons and protons on the solar cells same as STSAT-1 sun sensors. Also we estimated particle flux on the STSAT-1 orbit with analyzing NOAA POES particle data. Our result clearly shows STSAT-1 solar cell degradation was caused by energetic protons which energy is about 700 keV