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The microwave instruments are used many areas of the space remote sensing and space science applications. The imaging radar of synthetic aperture radar (SAR) is well known microwave radar sensor for earth surface and ocean research. Unlike radar, microwave radiometer is passive instrument and it measures the emission energy of target, i.e. brightness temperature BT, from earth surface and atmosphere. From measured BT, the geophysical data like cloud liquid water, water vapor, sea surface temperature, surface permittivity can be retrieved. In this paper, the radiometer characteristics, system configuration and principle of BT measurement are described. Also the radiometer instruments TRMM, GPM, SMOS for earth climate, and ocean salinity research are introduce. As first korean microwave payload on STSAT-2, the DREAM (**D**ual-channels **R**adiometer for **E**arth and **A**tmosphere **M**onitoring) is described the mission, system configuration and operation plan for life time of two years. The main issues of DREAM unlike other spaceborne radiometers, will be addressed. The calibration is the one of main issues of DREAM mission and how it contribute on the space borne radiometer. In conclusion, the radiometer instrument to space science application will be considered.

■ Session Ⅷ-1 : Space Environment 3
Thursday, 23 October [15:15-17:15]

[Ⅷ-1-1] Construction of Korean Space Weather Prediction Center: Introduction

Kyung-Suk Cho, Su-Chan Bong, Yeon-Han Kim, Khan-Hyuk Kim, Junga Hwang, Young-Sil Kwak, Rok-Soon Kim, Jae Jin Lee, Seonghwan Choi, Ji-Hye Baek, and Young-Deuk Park

Korea Astronomy and Space Science Institute, Korea

It is well known that solar and space weather activities can influence the performance and reliability of modern technological system and can endanger human life. Since 2007, the Korea Astronomy and Space Science Institute (KASI) has initiated a research project for the construction of Korean Space Weather Prediction Center (K-SWPC) to make preparations for the next solar cycle maximum (~2012). In this talk, we briefly introduce the current progress of KASI activities for K-SWPC; extension of ground observation system, construction of space weather database and network, development of prediction models, and space weather effects. In addition, future plans for KSWPC will be discussed.

[Ⅷ-1-2] Construction of Korean Space Weather rediction Center: K-SRBL

Su-Chan Bong[1], Yeon-Han Kim[1], Kyung-Suk Cho[1], Seonghwan Choi[1], Young-Deuk Park[1], and Dale E. Gary[2]

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A major solar radio burst can disturb many kinds of radio instruments, including cellular phone, GPS, and radar. Korea Astronomy and Space Science Institute (KASI) is developing Korean Solar Radio Burst Locator (KSRBL) in collaboration with New Jersey Institute of Technology. KSRBL is a single dish radio spectrograph, which records the spectra of microwave (0.5 – 18 GHz) bursts with 1 MHz spectral resolution and 1 s time cadence, and locates their positions on the solar disk within 2 arcmin. Hardware manufacturing is almost completed including 4-channel digitizer/FPGA. The system is currently installed at Owens Valley Radio Observatory (OVRO), and test of the operation is in progress. It will be installed at KASI in 2009. We report current status and test results of KSRBL.

[Ⅷ-1-3] Construction of Korean Space Weather Prediction Center: Magnetometer

Khan-Hyuk, Kim[1], Seong-Hwan, Choi[1], Kyung-Seok, Cho[1], Young-Deuk, Park[1], and Kyu-Chul, Choi[1,2]

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Solar and Space Weather Research Group in Korea Astronomy & Space Science Institute (KASI) has been funded for "Construction of Korean Space Weather Prediction Center" from Korean government. It has started since 2007 February and is planed as a 5-year project. The goal of this project is to develop a space weather warning and prediction system by the next solar maximum. KASI installed a magnetometer at Mt. Bohyun, which is about 200 km south-east apart from KASI, in 2007 September. After finishing test observations of the magnetometer for the period from September 2007 to January 2008, KASI has operated the magnetometer to monitor geomagnetic field variations associated with space weather effect. Ground-based magnetometers are critical for understanding geomagnetic disturbances in the near-Earth space environment, which are caused by solar wind variations. In this talk, we introduce science topics to be done with the data from KASI magnetometer and also discuss how they are related to space weather phenomena.

[Ⅷ-1-4] Construction of Korea Space Weather

Prediction Center: VHF Coherent Scatter Radar

Junga Hwang, Young-Sil Kwak, Kyung-Suk Cho, Khan-Hyuk Kim, and Young-Deuk Park

Korea Astronomy and Space Science Institute

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

Young-Sil Kwak, Junga Hwang, Kyung-Suk Cho, Su-Chan Bong, Seonghwan Choi, Young-Deuk Park, Jaemann Kyeong, and Yoon-Ho Park

Korea Astronomy and Space Science Institute

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

R.-S. Kim[1,2], K.-S. Cho[1], Y.-J. Moon[3], Yu Yi[2], S. H. Choi[1], J. H. Baek[1], and Y. D. Park[1]

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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

Jaejin Lee, Kyung-Suk Cho, Jung A Hwang, Young-Sil Kwak, Khan-Hyuk Kim, Su-Chan Bong, Yeon-Han Kim, Young-Deuk Park, and Seonghwan Choi

Korea Astronomy and Space Science Institute

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