

**Session: [B3B-1] S1 : Solar System and Sun-Earth Interactions**

**Date:** August 20, 2014 (Wednesday)

**Time:** 14:00~15:25

**Room:** Room A (Room 101~102)

**Chair:** Kyungsuk Cho (Korea Astronomy and Space Science Institute)

**[B3B-1-1]**

**14:00~14:20**

**[Invited] Solar and Space Weather Studies in Korea**

Y.-D. Park (Korea Astronomy and Space Science Institute, Korea), K. S. Cho, and J.-J. Lee

We introduce Korean solar physics and space weather research. In spite of short history, we have been developed very fast in these research fields.

For the solar physics researches, we take the best data from NST what is the largest ground base solar telescope in BBSO of USA as well as the best high resolution space based solar image from the SDO by the co-operation with NJIT and NASA. Particularly, FISS which is installed on 2009 at the NST in BBSO get very high resolution spectroscopic images and derive excellent research papers.

In the field of space weather forecast and research, RRA become the membership of International Space Environment Service Network as on behalf of Korean space weather and KMA and KASI are constructed many space weather infrastructures.

As one of infra structure, KASI constructed the RBSP receiving system for the space weather research. RBSP is observe the radiation belt with two satellites which were launched August 30, 2012 by NASA.

Also, RRA and KMA developed space weather monitoring system as well as many Universities and KASI developed space weather forecast model to increase the space weather forecast probabilities.

**[B3B-1-2]**

**14:20~14:35**

**Relationship of Smoothed Sunspot Number and Land Surface Temperature In the Philippines**

John Christian B. Lequiron (Rizal Technological University, Philippines)

The study have presented the archived data of existing Land Surface Temperature (LST) and Smoothed Sunspot Number (SSN) on local (PAGASA) and international (NOAA) institutions with the purpose of determining the effect of the different climate types of the Philippines to the relationship of SSN and LST.

The researcher used the descriptive method in this study, to assess the relationship of SSN and LST in the Philippines. This method enabled the researcher to identify and conclude if such relationship exists in the two variables. The findings of the study are the following; there is a negligible correlation between the relationship of SSN and LST in most of the stations having different climate types but Laoag, Ilocos Region and the stations in Climate Type IV have a higher correlation value than the other stations. Even though that stations having a climate type IV has a negligible correlation between the SSN and LST, it is still significantly different from the other climate types because it has the highest correlation values due to its dry season throughout the year. With the above findings, the researcher concluded that; there is no existing relationship between SSN and LST in the Philippines but there are stations that has a correlation between the SSN and LST due to the existence of dry season. Regions having a dry season throughout the year tend to have higher correlations than those having a wet season throughout the year. Lastly, there are other factors other than rainfall that affects the relationship of SSN and LST in a certain region.

**[B3B-1-3]**

**14:35~14:55**

**[Invited] Probing the Upper Atmosphere by Observing Meteors Over King Sejong Station Antarctica**

Yongha Kim (Chungnam National University, Korea), Junseok Hong, Changsup Lee, Jeong-Han Kim, and Geonhwa Jee

As a meteor enters the Earth's upper atmosphere, it ablates due to friction with atmospheric particles at altitudes of 70 - 100 km and produces a plasma trail that contains an abundance of free electrons. These free electrons within the trail can produce the backscatter of a radar signal propagating perpendicular to the trail. By observing this back-scattered meteor echo, one can measure meteor decay time, radial drift velocity, and the spatial information of meteors (e.g., range and angle of arrivals). At King Sejong Station (KSS) Antarctica, a VHF meteor radar has been operating since its installation on March 2007 for the purpose of studying the upper atmosphere. The KSS radar consists of 1 transmitter, 5 receivers, data acquisition systems, and radar control/analysis software. The radar operates at 33.2 MHz, using a solid state transmitter with a peak power of 8 kW initially and upgraded to 12 kW in 2012. The KSS meteor radar has detected ~20,000 and ~30,000 meteors per day at a peak power of 8 kW and 12 kW, respectively, which varies with season as well as with local time. Analyses of the meteor echo data have produced valuable scientific information such as temperatures near mesopause and wind profiles at altitudes of 80 - 100 km day and night for full year around regardless of weather conditions. We have devised more accurate method of determining temperature from detected meteor decay times and presented continuous seasonal temperature variation in the high latitude mesosphere, where optical methods cannot monitor temperatures due to extended daylights during summer. We also discover strong wave activities in the upper atmosphere over the Antarctic peninsula from our wind measurements from the analysis of meteor echoes. The KSS meteor radar continues to produce valuable data not only for upper atmospheric studies but also for meteor science.

[B3B-1-4]

14:55~15:10

### **CME, Dynamo Effect and Their Effect on Auroras**

Karan Bhatta (St. Xavier's College, Nepal) and Kishor Acharya

The Sun and the Earth with their inextricable interactions produce a wide number of phenomena and auroras happen to be one such visually amazing phenomenon. Much has been speculated about this visual treat which is caused by particle interaction between the Sun and the Earth on molecular, atomic and ionic scale. In my paper I have shed light regarding some scientific findings about auroras in two ways -firstly by expounding on how coronal mass ejections trigger the movement of solar wind which in turn acts as sources for the production of auroras and secondly by explaining the interaction between the solar wind and the magnetosphere commonly referred to as the dynamo action. In effect, these two factors give rise to auroras and also control their directions and frequency of occurrence. All in all, such grandeur vistas are not simply restricted to the Sun and the Earth but are a common occurrence in any star-planet system where the planet has a magnetic field strength comparable to that of the Earth.

[B3B-1-5]

15:10~15:25

### **The Daejeon 40.8 MHz VHF Radar Observations of the E- and F-Region Field-Aligned Irregularities in the Middle Latitude**

Young-Sil Kwak (Korea Astronomy and Space Science Institute, Korea), Tae-yong Yang, Hyosub Kil, Woo Kyoung Lee, and Jae-Jin Lee

The electron density irregularities in the ionosphere cause diffraction of the radio waves that can be responsible for scintillation, fading, and disruption of the propagating signals. For this practical importance, significant efforts have been made to establish information on the occurrence climatology of such irregularities, to understand the onset conditions of such irregularities, and to predict or avoid the impact of these irregularities on the society. A 40.8 MHz VHF radar was built at Daejeon (36.18°N, 127.14°E, 26.7°N dip latitude) in South Korea aiming at continuous monitoring of middle-latitude field-aligned irregularities (FAIs) in the Far East Asian sector. The radar, which consists of 24 Yagi antennas, observes the FAIs using a single beam with a peak power of 24 kW. The radar has been operated continuously since December 2009 and provides a unique opportunity to investigate the climatology of the mid-latitude FAI activities. In this talk, we introduce the first ionospheric VHF radar experiment in South Korea and report characteristics of the mid-latitude E- and F-region FAIs. And also we report the seasonal variations of the mid-latitude ionospheric FAIs based on the continuous and long-term observations of the Daejeon VHF radar.