1. Title of Seminar:

Japan-Korea Space Weather Workshop 2011: Current Status and Prospect of Space Weather Modeling and Observation


3. Place of Seminar: Daejeon, Korea

4. Total Budget
   a. Financial Support by JSPS: Total amount: 887,838 yen
   b. Other Financial Support: Total amount: 12,600 thousand won

5. Co-Organizers

<table>
<thead>
<tr>
<th>a. Japanese Organizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Institution / Department</td>
</tr>
<tr>
<td>Position</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>b. Korean Organizer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
</tr>
<tr>
<td>Institution / Department</td>
</tr>
<tr>
<td>Position</td>
</tr>
</tbody>
</table>
6. Participants

a. List of Japanese-side Participants (Except for Organizer)

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Department</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tatsuki Ogino</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Professor</td>
</tr>
<tr>
<td>Kazuo Shiokawa</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Professor</td>
</tr>
<tr>
<td>Satoshi Masuda</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Kanako Seki</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Nozomu Nishitani</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Associate Professor</td>
</tr>
<tr>
<td>Yuichi Otsuka</td>
<td>Solar-Terrestrial Environment Laboratory, Nagoya University</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Masumi Shimojo</td>
<td>Nobeyama Solar Radio Observatory, National Astronomical Observatory of Japan</td>
<td>Assistant Professor</td>
</tr>
<tr>
<td>Sujin Kim</td>
<td>Nobeyama Solar Radio Observatory, National Astronomical Observatory of Japan</td>
<td>Post-Doc</td>
</tr>
</tbody>
</table>

b. List of Korean-side Participants (Except for Organizer)

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Department</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young-Deuk Park</td>
<td>Space Situational Awareness Center, Korea Astronomy and Space Science Institute</td>
<td>PI of Space weather prediction center, Principal Researcher</td>
</tr>
<tr>
<td>Yeon-Han Kim</td>
<td>Space Situational Awareness Center, Korea Astronomy and Space Science Institute</td>
<td>Senior Researcher</td>
</tr>
<tr>
<td>Su-Chan Bong</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>Senior Researcher</td>
</tr>
<tr>
<td>Jaejin Lee</td>
<td>Space Situational Awareness Center, Korea Astronomy and Space Science Institute</td>
<td>Senior Researcher</td>
</tr>
<tr>
<td>Young-SilKwak</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>Manager of Space Science Research Center, Senior Researcher</td>
</tr>
<tr>
<td>Junga Hwang</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>Senior Researcher</td>
</tr>
<tr>
<td>Sung-Hong Park</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>PostDoc</td>
</tr>
<tr>
<td>Pankaj Kumar</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>PostDoc</td>
</tr>
<tr>
<td>Malini Aggarwal</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>PostDoc</td>
</tr>
<tr>
<td>Jong Uk Park</td>
<td>Space Science Division, Korea Astronomy and Space Science Institute</td>
<td>Director of Space Science Division</td>
</tr>
<tr>
<td>Kyung-Suk Cho</td>
<td>Space Science Research Center, Korea Astronomy and Space Science Institute</td>
<td>Principal Researcher</td>
</tr>
</tbody>
</table>
c. List of Other Countries' Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution/Department</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number of Participants:

Japanese: 9  
Korean: 65  
Others: 0

7. Objective of Seminar

Space weather study is now playing important roles not only to advance our understanding of the solar-terrestrial environment but also to mitigate the impact of solar and magnetospheric storm to our sophisticated infrastructure. The objective of this seminar is to exchange the information of latest space weather study in the leading institutes in Japan and Korea, STEL and KASI, and to make a future collaboration plan between them for the following three subjects.

1. Sun and Solar Wind

The space environment near the Earth is mainly affected by the solar and solar wind activities. STEL have developed data-driven modeling of solar flares and CMEs for a long time, and KASI have published many papers on the observation of CMEs and their geo-effectiveness. A coordinate study of the observation and numerical simulation from these two institutes can produce synergy effect to improve our understanding on the solar activities and our forecasting capability in space weather. Practically, we are expecting better understanding of solar eruption and improved space weather prediction model based on CME observation from this joint workshop. With this motivation, we study and discuss following topics through the workshop:
1. High resolution observation of the Sun by Hinode and SDO satellites.
2. Numerical simulation and observation of solar flare and CMEs
3. Forecast of solar flares and CME geo-effectiveness

2. Magnetosphere

The magnetosphere is the volume of space around an astronomical object where charged particle motions are controlled by the object’s magnetic field. Understanding Earth’s magnetosphere is important in modern technology such as satellites and communications. The energetic particles trapped in magnetic field provide harsh environment for satellite operation. Abrupt variation of magnetic field can cause electric blackout. Most of all, magnetosphere is a big laboratory for studying plasma physics. This seminar was held to provide opportunities of sharing the knowledge of magnetosphere and collaborating for research achievement. Main topics we discuss are:

1. Relativistic electron loss/acceleration process in radiation belt.
2. Numerical simulation of magnetospheric phenomena
3. Magnetosphere and ionosphere coupling

3. Upper Atmosphere (Ionosphere/Thermosphere)

As the nearest space environment to us, the Earth’s upper atmosphere including the thermosphere and the ionosphere is strongly coupled and forced system: The coupling between neutral and plasma species brings dynamic complexities into the system; The state of the upper atmosphere depends strongly on the solar and magnetic activity. This seminar was held to provide opportunities of sharing the knowledge of upper atmosphere and collaborating for research achievement. Main topics we discuss are:

1. Understanding of the electrodynamics and energetic of the Earth’s upper atmosphere
2. Response of the Earth’s upper atmosphere to the solar and magnetosphere activities
3. Studies for an improved understanding of the physics of the mid-latitude upper atmosphere

8. Schedule and Topics of Seminar

Korea-Japan Space Weather Workshop 2011:
Current Status and Prospect of Space Weather Modeling and Observation
Place: Eunhasu Hall, KASI
Date: 28 September to 1 October, 2011

September 28 (Wednesday)
Registration & Administrative discussion

September 29 (Thursday)
Inaugural Session
09:00-09:05 Welcoming Remark Young-Deuk Park (KASI)
09:05-09:10 Congratulatory Address Jong Uk Park (KASI)
09:10-09:15 Opening Address 1 KanyaKusano (STEL)
09:15-09:20 Opening Address 2 Kyung-Suk Cho (KASI)

Invited Lecture Chair: Junga Hwang (KASI)
09:20-09:50 Space Weather Research in Korea Byung-Ho Ahn (KNU)

Sun (Hinode/SDO and Beyond) Chair: Kanya Kusano (STEL)
09:50-10:05 Progress of Korean Data Center for SDO Seonghwan Choi (KASI)
10:05-10:20 Tiny Pores Observed by New Solar Telescope (NST) and Hinode Kyung-Suk Cho (KASI)
10:20-10:35  The Onset of Solar Eruptions  Kanya Kusano (STEL)
10:35-10:50  Setting up Empirical Space Weather Models Based on Solar Information  Yong-Jae Moon (KHU)

10:50-11:05  Break

Sun (Hinode/SDO and Beyond) Chair: Kyung-Suk Cho (KASI)
11:05-11:20  Study of Particle Acceleration/transport/loss process in Solar Flares Based on Microwave Observations  Satoshi Masuda (STEL)
11:20-11:35  Acceleration & Heating in Prominence Eruption Observed in Radio & EUV  Masumi Shimojo (NAOJ)
11:35-11:50  Current Status of the Korean Solar Radio Burst Locator  Su-Chan Bong (KASI)
11:50-12:05  Multi-wavelength Observations of Supra-Arcade Structure Associated with M1.6 Limb Flare  Sujin Kim (NAOJ)

12:05-12:30  Discussion

12:30-13:30  Lunch (KASI Restaurant)
13:30-14:30  KASI Tour

Magnetosphere (RBSP and ERG) Chair: Kanako Seki (STEL)
14:30-14:45  Radiation Belt Storm Probes and Application for Space Weather Services  Jaejin Lee (KASI)
14:45-15:00  The GEMSIS-Magnetosphere Project: New Models of the Inner Magnetosphere to Investigate High Energy Particle Variation and the ERG Science Center  Kanako Seki (STEL)
15:00-15:15  Observational Tests and Comparison of the Interchange and Ballooning Mode Instabilities in the Tail Close to the Earth  Dae-Young Lee (CBNU)
15:15-15:30  TRIO-CINEMA (Triplet Ionospheric Observatory-Cubesat for Ion, Neutral, Electron, and MAgnetic fields)  Dong-Hun Lee (KHU)

15:30-16:00  Photograph and Break

Magnetosphere (RBSP and ERG) Chair: Jaejin Lee (KASI)
16:00-16:15  Large Electric Fields Observed at the Nightside Plasmapause  Khan-Hyuk Kim (KHU)
16:15-16:30  High Resolution MHD Simulation of Plasma Turbulence in Earth’s Magnetosphere  Tatsuki Ogino (STEL)
16:30-16:45  Energization of Particles in the Near-Earth Magnetotail by the Impact of an Interplanetary Shock  Ensang Lee (KHU)

16:45-17:15  Discussion

17:15-17:20  Banquet Venue Briefing
18:00  Banquet (DdiulSeokgalbi)

September 30 (Friday)

Ionosphere (Coherent Scatter Radar and Airglow) Chair: Kazuo Shiokawa (STEL)
09:30-09:45  VHF Coherent Scatter Radar Observations of Mid-Latitude E- and F-region Field-aligned Irregularities over South Korea  Young-Sil Kwak (KASI)
09:45-10:00  Spatial Relationship of Nighttime Medium-scale Traveling Ionospheric
Disturbances and F-region Field-aligned Irregularities Observed with Two Spaced All-sky Airglow Imagers and the MU Radar
Yuichi Otsuka (STEL)
10:00-10:15 Monitoring Temperature near the Mesopause with a VHF Meteor Radar at King Sejong Station, Antarctica
Yong Ha Kim (CNU)
10:15-10:30 Introduction to the CAWSES-II Task Group 4: What is the Geospace Response to Variable Inputs from the Lower Atmosphere? Kazuo Shiokawa (STEL)

10:30-11:00 Break

Ionosphere (Coherent Scatter Radar and Airglow) Chair: Young-Sil Kwak (KASI)
11:00-11:15 Study of Magnetosphere-ionosphere-thermosphere Coupling Using the SuperDARN Hokkaido Radar
Nozomu Nishitani (STEL)
11:30-11:45 Multi-technique Observation of Equatorial Ionospheric Irregularities during Disturbed Period
Malini Aggarwal (KASI)
11:45-12:15 Discussion
12:15-12:20 Field Trip Briefing
12:20-13:20 Lunch (KASI Restaurant)
13:20 Field Trip (Baekje Cultural Festival including Dinner)

October 1 (Saturday)
09:30-11:30 Subgroup Discussion (1F Conf. Rm., 3F SWML, 3F Meeting Rm.)
11:30-12:00 Summary (Eunhasu Hall)
12:00-13:00 Lunch (KASI Restaurant)

9. Research Trend at Home and Abroad
Both in Japan and Korea, space weather research is now quickly developed. In particular, several new satellite missions and mission plans advance the new studies in various fields.

Japanese solar satellite observatory Hinode, which was launched in 2006, has been successfully operated for the last five years, and it has made many discoveries for solar dynamics. STEL, Nagoya University now assumes the role of the science center for Hinode’s data in Japan. On the other hand, KASI recently built the data center for Solar Dynamics Observatory (SDO), which is the latest solar physics satellite launched by NASA in 2011. KASI/SDO center is responsible to provide the SDO data to Asian countries including Japan. The coordinated research using Hinode and SDO’s data is highly promising for further progress of solar study and the improvement of space weather forecast.

KASI has developed a couple of empirical scheme to forecast the space weather using the coronagraph image and the radio observation. On the other hand, STEL