

3. 国際ワークショップ 目次詳細

(所属・職名は平成29年3月現在)

研究代表者	所属機関	所属部局	職名	研究課題名	頁
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International Workshop on Water-Carbon Dynamics in Eastern Siberia

Dr. Yoshihiro Iijima (Graduate School of Bioresources, Mie University)

Hydro-climatological influences on terrestrial ecosystem along with the concurrent global warming have been severely manifested in high-latitude regions of Northern Hemisphere. Land surface with underlying permafrost in eastern Siberia, developed under cold climate for seventy thousand years, faces unanticipated environmental changes in particular. The ecosystem ranging from boreal forest to tundra in this region has specific eco-hydrological characteristics and vulnerabilities in terms of water and carbon dynamics under symbiotic relationship with permafrost existence. Permafrost ecosystem change and its impacts on sustainability of natural environment under the current global warming are major serious issues in the high-latitude regions of Northern Hemisphere.

The subject of this international workshop, therefore, expects to enhance integrative discussion on water-carbon dynamics influenced due to changing permafrost ecosystem based on increasing knowledges by multi-disciplinary international collaboration researches carried out during the recent decades. The primary aim of the workshop is to motivate all the participants as principal author(s) in each chapter of a science book on water-carbon dynamics in eastern Siberia. The workshop had been held in ISEE, Nagoya University from 19 to 21 January, 2017 with 12 participants including 3 researchers from Sakha Republic, Russia.

In the first and second days, the presentation by all participants has been made as following individual research topics corresponding to chapters of planned book: 1) General Introduction of environmental conditions (Prof. Ohta), 2) Science research history from Soviet Union Time (Dr. Maximov, Dr. Fedorov, and Dr. Desyatkin), 3) Atmospheric water cycle (Dr. Iijima instead of Dr. Ohshima), 4) Water cycle in forest (Dr. Kotani), 5) Carbon dioxide cycle in forest (Dr. Maximov and Dr. Kotani), 6) Water cycle in stable isotope ecology (Dr. Sugimoto), 7) Water-carbon cycle in dendro-ecology (Dr. Tei), 8) Permafrost-forest dynamic (Dr. Iijima and Dr. Fedorov), 9) River discharge (Dr. Hiyama), 10) Remote Sensing in Terrestrial Water (Dr. Suzuki), and 11) Water-carbon cycle modelling (Dr. Yamazaki and Dr. Park) as summarized in Form 3-1.

We had intensive discussion on each research topics in terms of contents and structure of the chapters during the first and second days of the workshop. Most important outcomes of the workshop is to share the long-term scientific knowledges on permafrost ecosystem and environmental changes done by Russian researchers, which can be connected to the knowledges of them based on recent intensive bilateral (Russia and Japan, Russia and Netherlands, and others) and international (among them) field-based researches. In the last part of the second day and the third day, direction of the book for contents and confirmation for writing formats has been discussed and summarized as “Discussed Items on the Workshop”.

We have started to write all chapters and we plan to publish the book entitled “Water-carbon dynamics in eastern Siberia” from Springer by 2019 (within 2 year after the workshop).

Ionospheric Plasma Bubble Seeding and Development

Hisao Takahashi (Instituto Nacional de Pesquisas Espaciais (INPE), Brazil)

1. Purpose:

The present workshop is aimed at organizing in depth discussion by key world scientists on the topic of ionospheric plasma bubbles (IPB) and to review what we know today and we do not know, and what we want to know for the next step. The ionospheric plasma irregularities (bubbles) in the low to middle latitudes have been subject of extensive research during the last few decades. Different observation techniques (ionosonde, VHF radar, IS radar, optical imagers, GNSS receiver network, satellite onboard in situ measurement, beacon etc.) have been used to investigate different physical parameters and manifestations of the bubbles. Recent progress of global circulation model (GCM) including coupling process between lower and upper atmosphere as well as simulation models of IPB have also made significant progress in the last 20 years. The workshop, therefore, intends to summarize the past and present on-going research works on IPB and to find out what we want to take as next steps to achieve further progress in the field.

2. Period: Nov. 29 – Dec. 2, 2016

3. Place: Room 409, Research Institute Building II

Institute for Space-Earth Environmental Research (ISEE), Nagoya University

4. Results:

This workshop was held in co-operation with PSTEP (Project for Solar-Terrestrial Environment Prediction). Its Organizers were Dr. H. Takahashi (Convener) (Brazil), Dr. M. A. Abdu (Co - convener) (Brazil), Dr. Y. Otsuka (ISEE local organizer), and Prof. K. Shiokawa (ISEE local organizer). 23 participants from 8 countries actively discussed generation of plasma bubbles in the equatorial ionosphere.

Program of this workshop is shown below:

All presentations are invited.

Nov. 29 (Tue)

10:10-10:20 Opening remarks

10:20-11:05 N. Balan: "Onset conditions of equatorial spread F obtained using HF Doppler and ionosonde observations"

11:20-12:20 M. A. Abdu: Review-1: "Some Outstanding Issues on the Short Term/Day-to-Day Variability in the Equatorial Plasma Bubbles Development"

14:00-14:45 G. Li: "Observational study of EPB in the Chinese low latitude region"

14:45-15:30 K. Shiokawa: "Observations of plasma bubble disappearance"

16:00-17:00 M. Yamamoto: Review-2: "Findings on onset of plasma bubble from our

studies: Irregularity echo behavior from EAR, large-scale wave structure (LSWS) from satellite-ground beacon, and statistics with GAIA model"

17:00-17:45 K. Kornyanat (Kukkai): "NICT activity on plasma bubble observation in Asia-Oceania"

Nov. 30 (Wed)

10:00-11:00 R. Tsunoda: Review-3: "Upwelling Paradigm for the Development of Equatorial Plasma Bubbles: Fact or Fiction?"

11:20-12:05 Tulasi Ram: "Unusual enhancement/inhibition of Equatorial Plasma Bubbles during Active Space Weather periods"

14:00-14:45 B. A. Carter: "The role of coupled thermosphere-ionosphere models in understanding the daily occurrence variability of Equatorial Plasma Bubbles"

14:45-15:30 H. Shinagawa: "Occurrence characteristics of plasma bubbles deduced from GAIA simulation data"

16:00-16:45 T. Yokoyama: "High-resolution modeling of equatorial plasma bubble"

16:45-17:30 M. Ishii: "Needs-Seeds matching for EPB research"

Dec. 1 (Thu)

10:00-11:00 C. Huang: Review-4: "The postsunset vertical plasma drift: the controlling factor for the generation of equatorial plasma bubbles"

11:20-12:00 Round Table-1: (Observation and Model)

14:00-14:45 S. R. Fabiano: "AMISR-14 observations of equatorial F-region irregularities"

14:45-15:30 H. Takahashi: "Plasma bubble observation by groundbased optical and GPS Radio-wave measurements"

16:00-16:45 A. Saito: "Space-borne observation of equatorial plasma bubbles by ISS-IMAP/VISI"

16:45-17:30 T. Tsugawa: "Plasma bubble monitoring using GNSS-TEC and SEALION observations"

Dec. 2 (Fri.)

10:00-11:00 Y. Otsuka: Review-5: "Review of post-midnight irregularities during solar minimum period"

11:20-12:00 Round Table-2: (New measurements)

14:00-14:45 Round Table-3: (Workshop Review and Special issue)

14:45-15:00 Closing Remark

5. List of publications (plan):

We are planning to publish 5 review papers, 12 contributed papers and one preface as a special issue in Journal of Progress in Earth and Planetary Science (PEPS). This special issue will come on October, 2017.

Review of the accomplishments of the mid-latitude SuperDARN network

Nozomu Nishitani (ISEE, Nagoya University)

ISEE/CICR International Workshop on "Review of the accomplishments of the mid-latitude SuperDARN network" was held at Room 409 in Research Institute Building II during January 10 to 14, in co-operation with the JSPS Grant Program "Study of dynamical variation of particles and waves in the inner magnetosphere using ground-based network observations (PWING Project)." 15 participants from 5 countries intensively discussed accomplishments and future directions of the mid-latitude SuperDARN network.

The Super Dual Auroral Radar Network (SuperDARN) is a network of HF radars deployed in the high- and mid-latitude regions of both hemispheres that is designed for studying the dynamics of the ionosphere and upper atmosphere on global scales. As of April 01, 2016 there is a total of 34 SuperDARN radars, 22 in the northern and 12 in the southern hemispheres.

SuperDARN achieved official status in 1995 when the Principal Investigators' Agreement was signed. Until about 2004, the SuperDARN radars were only able to monitor the regions of the ionosphere and upper atmosphere above about 60 deg geomagnetic latitude. Ionospheric and upper atmospheric phenomena in the subauroral or mid-latitude regions were largely inaccessible to the radars.

The first mid-latitude SuperDARN radar, located below 50 deg of geomagnetic latitude and looking north-eastward, began operating at the NASA Wallops Flight Facility on Wallops Island, Virginia (U.S.) in 2005. The second mid-latitude radar began operations in Hokkaido (Japan) in 2006. This was followed by the construction of second radar in Virginia directed toward the north-west at Blackstone. The success of these first radars in making novel and scientifically important observations led to a major initiative to build a chain of radars that extends across North America and the northern Pacific Ocean into eastern Asia. As a result, there are now 10 mid-latitude SuperDARN radars in the northern hemisphere and additional radars are under construction or planned.

Over the past 11 years of the operation of mid-latitude SuperDARN radars, a number of scientific discoveries have been made encompassing processes in the magnetosphere, ionosphere, thermosphere and upper mesosphere and covering a wide latitudinal / longitudinal extent, with significant contribution by the Japanese mid-latitude SuperDARN group. It is, therefore, a good approximate point of time to review the new scientific results and critically

assess these achievements. Consequently, we organized an international workshop in Japan that reviewed the research achievements of the mid-latitude SuperDARN radars and also identify scientific directions for the next 10 years.

The workshop began by creating the list of papers (mostly done before the meeting). We also made discussion to have a common idea of what the 'mid-latitude SuperDARN' is. The total number of the mid-latitude SuperDARN papers was 93. Then we categorized those papers into several topics. We finally determined 5 major scientific topics (which will be shown later).

Once we set the major topics, we separated the participants into groups of those topics and assigned a leader for each major topic. After this, most time of the workshop was spent for the discussion within each group. Near the end of the workshop, the leader of each group made a presentation of the result of discussion and (for some of the group) part of sketch of the paper content.

Each chapter of the review paper is set as follows:

1. Overview / definition of mid-latitude SuperDARN
2. Basics of SuperDARN (brief description of irregularities / wave propagation / hardware / operation modes)
3. History / motivation of mid-latitude SuperDARN
4. Convection
5. Ionospheric irregularities
6. Propagation effects
7. Ionosphere / neutral atmosphere coupling
8. Magnetohydrodynamic (MHD) waves
9. Future directions

We also discussed future directions of the mid-latitude SuperDARN network with a wide variety of aspects. In particular, we invited Dr. Yoshi Miyoshi (ISEE, Nagoya Univ.) to the workshop on the fourth day. He gave presentations of the latest status of the ERG/Arase spacecraft, which was successfully launched on December 20, 2016, and prospect of the collaboration between the ERG/Arase spacecraft team and the SuperDARN groups. Then we discussed the possible collaboration.

After the meeting we have been continue the discussions and work on the paper by e-mail. We set the first deadline of the draft as May 15, 2017. We proposed to have a follow-up workshop for 2017 FY to discuss the editorial issues for the ISEE joint research program (workshop), which was approved with partial support. Finally, we plan to publish the final version of the paper in Progress in Earth and Planetary Sciences (PEPS).