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Variability of the Sun and Its Terrestrial Impact (VarSITI)
SEE / ISEST-Minimax24 / SPeCIMEN / ROSMIC
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VarSITI Newsletter

Inside this issue

Project SPeCIMEN/ISEST/ ROSMIC

Article 1:

Observations and Research Interest on Space Weather at Institute of Geology and Geophysics, Chinese Academy of Sciences

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Libo Liu


Baiqi Ning

Observation Chain of the Geo-space Environment

To effectively monitor the geospace environment over mainland of China, and to study the space weather and underlying drivers, the institute (IGG) takes many years to build an observation chain including permanent and temporary stations (Figure 1). The chain simultaneously detects the ionosphere (via ionosondes,

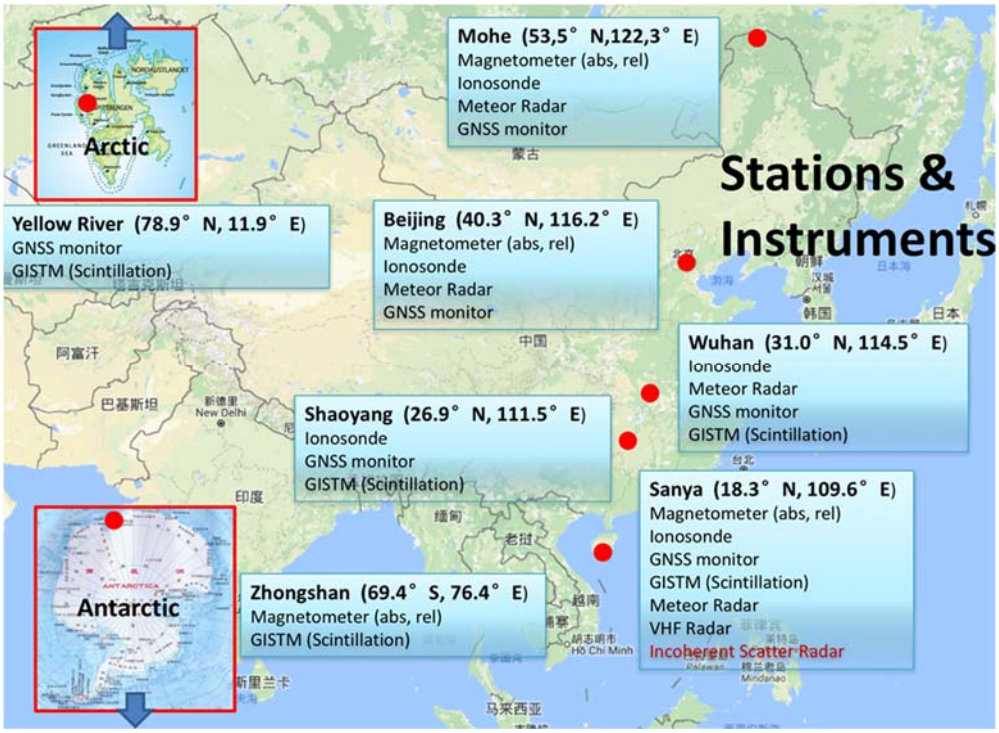

Figure 1. Location of stations and instruments being operated in IGG.

GNSS, and VHF coherent scatter radar), neutral atmosphere (meteor radars), and geomagnetic fields (magnetometers). The instruments are in routine operation, and all recorded data are transferred in real time and stored at the Data Center of Beijing. In addition, a new phased array incoherent scatter radar is under construction, it will be installed at Sanya station in the coming years.

A multi-constellation BG2 GNSS ionospheric monitor has been designed at IGG. A network consisting of nearly 30 such multi-constellation GNSS receivers is developed with functions of automatic data acquisition, transferring and analysis (http://gnss.stern.ac.cn). The inclusion of Beidou/Compass GEO satellites in GNSS receivers presents an outstanding merit for continuous monitoring the ionospheric total electron content (TEC) along fixed satellite-receiver links. The network becomes more powerful in space weather monitoring over China with the rising number of receiver and better spatial coverage.

Nowcasting the state of the ionosphere and upper atmosphere

A series of analysis software are developed for displaying the current space weather condition. We developed some initial systems, which nowcast maps of TEC over China area, and the latitudinal and height profiles of electron density and horizontal winds in the mesosphere and lower thermosphere (Figure 2) along 120°E longitude (Yu et al., 2013; 2015).

The TEC products are broadcasting at the web (http://space.iggcas.ac.cn/TEC.asp). Moreover, the real-time data from the four ionosondes are provided to the Global Ionospheric Radio Observatory (GIRO) system for accurate specification of electron density in the Earth's ionosphere in the world.

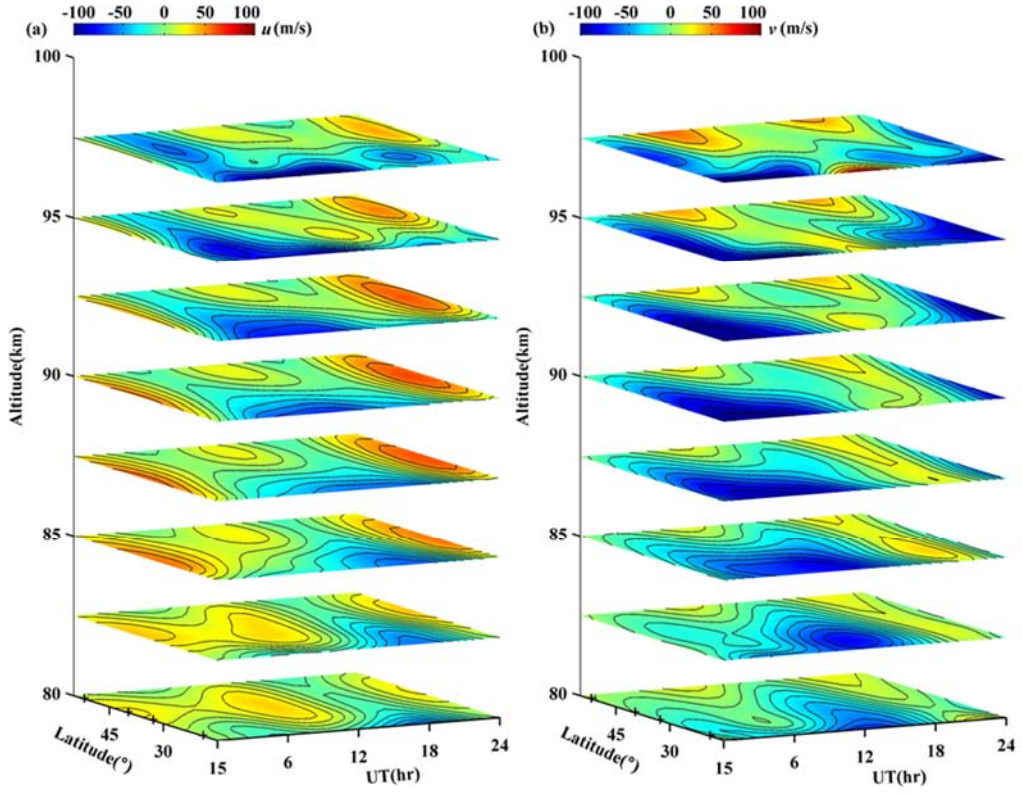

Figure 2. Example snapshot of zonal and meridional winds on August 29, 2016 along 120°E longitude.

Research interest

In recent years, the research group of ionosphere and upper atmosphere in IGG focuses its interest on the following aspects: (1) the response of the ionosphere to solar activity and geomagnetic disturbances; (2) couplings between the ionosphere and lower atmospheres, including possible seismic signatures in the ionosphere; (3) ionosheric irregularities and scintillation; (4) ionospheric dynamics and electrodynamics; (5) ionospheric models and data assimilation; and (6) novel ionospheric observation methodology and potential applications.

Some investigations on the ionosphere and upper atmosphere conducted by our group and by Chinese colleagues in the past few years are introduced in some detail in Liu et al. (2014) and Liu and Wan (2016).

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Liu L., and W. Wan, New understanding achieved from 2 years of Chinese ionospheric investigations, Sci. Bull., 2016, 61(7):524–542, DOI 10.1007/s11434-016-1035-9.

Yu Y., W. Wan, B. Ning, L. Liu, Z. Wang, L. Hu, and Z. Ren, Tidal wind mapping from observations of a meteor radar chain in December 2011, J. Geophys. Res. Space Physics, 2013, 118, 2321–2332, DOI: 10.1029/2012JA017976.

Yu Y., W. Wan, B. Xiong, Z. Ren, B. Zhao, Y. Zhang, B. Ning, and L. Liu, Modeling Chinese ionospheric layer parameters based on EOF analysis, Space Weather, 2015, 13, 339–355, doi:10.1002/2014SW001159.

Project ROSMIC

Article 2:

Role of the Sun and the Middle Atmosphere/Thermosphere/ Ionosphere In Climate (ROSMIC)

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Duggirala Pallamraju

Stanley Solomon

Solar influence pervades the heliosphere through electromagnetic radiation, high energy particles, and magnetic fields. Under the ROSMIC project, one of the studies focuses on sources and variability in the Earth's upper atmosphere (mesosphere and thermosphere). The upper atmosphere is affected by variations in the solar flux, especially in the EUV and X-rays, and geomagnetic activity, both of which vary significantly as a function of solar activity. Measurements, especially during the prolonged solar minimum, have revealed some new aspects of vertical coupling of atmospheres, wherein it is seen that upper atmospheric regions are affected by planetary scale waves, especially the quasi-16 day waves (Laskar et al., 2013; Pedatella and Liu, 2013), that originate in the lower atmosphere. As the solar activity increases, the wave effect of the lower atmosphere on upper atmospheric behavior transitions to those of solar control (Pallamraju et al., 2010). These results on neutral wave dynamics in the upper atmosphere were enabled by ground based optical oxygen dayglow emission intensity variations. In the gravity wave regime, such experimental results are supported, in part, by simulation studies (Yiğit and Medvedev, 2010), where gravity wave drag is shown to be lower during high solar activity compared to that during low solar activity. The optical results motivated a search for such solar dependent effects on the planetary scale waves, across latitudes and over long time periods, which was accomplished using equatorial electrojet data, total electron content over the Indian tropical region, and mean temperature variations (caused essentially due to stratospheric warming events) over high latitudes. In addition to confirming the inverse relationship between forcing of solar activity and lower atmospheric influence on the upper atmosphere, this result showed that when there are stratospheric sudden warming events, vertical coupling from the lower atmosphere is enabled even during high solar activity conditions (Laskar et al., 2014). The question that remains to be answered is whether the propagation of planetary scale waves from lower below are hindered by the sharp temperature gradients in the lower thermosphere during high solar activity periods or the dominant effects of solar influence in the thermosphere during high solar activity epoch prevent the detection of lower atmospheric effects.

An important question regarding middle atmosphere wave and tidal motions is whether they are evolving with time in response to increases in anthropogenic trace gases. Recent studies by Emmert et al. (2012), using data from the ACE satellite, and by Yue et al. (2016), using data from the TIMED satellite, showed that the CO_2 mixing ratio is increasing more rapidly at and above the mesopause than it is in the fully-mixed lower atmosphere. This was taken as evidence of a possible secular increase in turbulent mixing, potentially driven by changes in gravity wave generation or propagation. However, Garcia et al. (2015) were unable to simulate such changes using comprehensive whole-atmosphere modeling without arbitrarily imposing an unrealistically large increase in turbulent mixing. At the TRENDS-2016 workshop in Kühlungsborn, Germany, a new analysis of the ACE and TIMED data was presented by Qian et al., who found much smaller differential trends in CO_2. This topic is of importance for understanding the evolution of thermospheric density due to changes in solar forcing, CO_2 cooling, and dynamical variations, and will be a controversial subject of forthcoming data analyses and modeling studies.

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Emmert, J. T., M. H. Stevens, P. F. Bernath, D. P. Drob, and C. D. Boone (2012), Observations of increasing carbon dioxide concentration in Earth's thermosphere, Nature Geoscience, 5, 868, doi:10.1038/NGEO1626.

Garcia, R. R., M. López-Puertas, B. Funke, D. E. Kinnison, D. R. Marsh, and L. Qian (2016), On the secular trend of CO_x and CO_2 in the lower thermosphere, J. Geophys. Res. Atmos., 121, 3634, doi:10.1002/2015JD024553.

Laskar, F.I., Pallamraju, D., Lakshmi, T.V., Reddy, M.A., Pathan, B.M., Chakrabarti, S. (2013), Investigations on vertical coupling of atmospheric regions using combined multiwavelength optical dayglow, magnetic, and radio measurements. J. Geophys. Res. Space Phys. 118 (7), 4618–4627. http://dx.doi.org/10.1002/jgra.50426.

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Pallamraju, D., Das, U., Chakrabarti, S.(2010), Short- and long-timescale thermospheric variability as observed from OI 630.0nm dayglow emissions from low latitudes. J. Geophys. Res. 115 (A6), A06312. http://dx.doi.org/10.1029/2009JA015042.

Pedatella, N. M., and H.-L. Liu (2013), The influence of atmospheric tide and planetary wave variability during sudden stratosphere warmings on the low latitude ionosphere, J. Geophys. Res. Space Physics, 118, 5333–5347, doi:10.1002/jgra.50492.

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Project ISEST

Article 3:

An introduction on ISEST (International Study of Earth-Affecting Solar Transients) Working Group on Simulation

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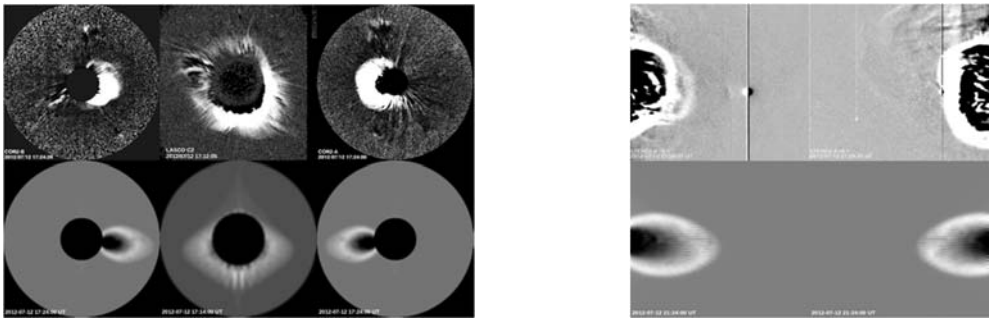
Fang Shen

The research of ISEST is enabled by continuous observations of the Sun and the heliosphere from an array of spacecraft and ground-based instruments, global numerical simulations of the system and theoretical analysis. The working group on simulation (WG3) is one of seven VarSITI/ISEST project's working groups . The scientific goals WG3 are to (1) provide global context for the Interplanetary CMEs (ICMEs) investigated by the ISEST team; (2) investigate processes of the CME initiation, heliospheric propagation, and CMEs interaction; (3) develop tools to assist collaboration of numerical modellers, theoreticians, and observers.

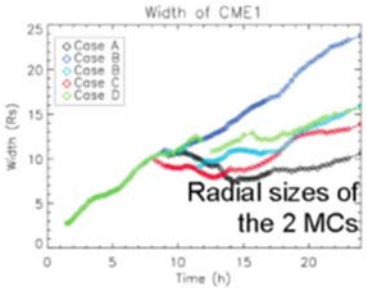
WG3 uses existing 3D MHD models including ENLIL, COIN-TVD, CESE, H3DMHD and SWMF. In recent years, significant progress has been made to increase the performance of the existing simulation models. Relatively simple simulations starting in the inner heliosphere (ENLIL) are now run in real-time. More realistic simulations with simplified CME "initiation" mechanisms can be run to support the real event analyses (H3DMHD, SWMF, COIN-TVD, etc). For example, based on the COIN-TVD MHD model, the numerical simulation of the 2012 July 12-14 ICME event shows an excellent similarity with the realistic coronagraph observations (Figure 1) [adopted from Shen et al., 2014] .



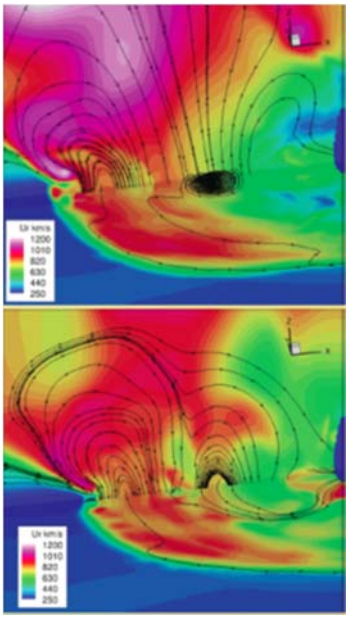
(a) **(b)**

Figure 1 Comparison of (a) (top) realistic and (bottom) synthetic from numerical simulation (left) STEREO/ COR2B, (right) STEREO/COR2A, and (middle) LASCO/C2 images; (b) (top) realistic and (bottom) synthetic (left) SECCHI/HI-1B and (right) SECCHI/HI-1A images. (adopted from Shen et al., 2014)

Besides the single CME event, changes in CME properties during the CME-CME interaction were also simulated by modellers. During the CMEs interaction, the first CME was initially compressed, but the later expansion following the interaction depends on their relative orientations, as shown in Figure 2 [adopted from Lugaz et al., 2013].



(a) Time-evolution of the radial width of CME1 in different cases.



(b) The two panels on the right display the radial velocity distribution (in colour) along with the magnetic field lines in the ecliptic and meridional planes, showing the interaction of two CMEs.

Figure 2 (adopted from Lugaz et al., 2013)

WG3 has identified several scientific questions listed as follows:

(1) How to improve the real-time forecasting? The ENLIL model, moving towards ensemble-forecasting, is useful for predicting arrival times and the interaction with solar wind structures. However, the CME model does not contain internal magnetic field.

(2) How to provide tools for comparison with realistic events? Synthetic remote-sensing and in-situ observations are needed. Advanced comparison between simulations and realistic observations leads to the data assimilation, which is essential for effective forecasting .

(3) What are causes of CME eruptions? An improved understanding of initiation mechanism(s) will lead to effective prediction models of CME eruption.

(4) What about complex physical processes associated with CMEs and ICMEs? These include energy exchange during interaction, shock formation and properties, nature of dimming/EUV waves, particle acceleration, reconnection between CMEs, reconnection with solar wind, etc.

References:

(1) Shen, F., C. Shen, J. Zhang, P. Hess, Y. Wang, X. Feng, H. Cheng, and Y. Yang: 2014, Evolution of the 12 July 2012 CME from the Sun to the Earth: Data-constrained three-dimensional MHD simulations, J. Geophys. Res., 119, 7128-7141, doi:10.1002/ 2014JA020365.

(2) Lugaz, N., C. J. Farrugia, W. B. Manchester , and N. Schwadron: 2013, The interaction of two coronal mass ejections: influence of relative orientation, Astrophys. J., 778, 20, 14 pp.

Project ISEST

Highlight on Young Scientists 1:

Characterization of Space Weather Events with Solar Radio Bursts

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University of Rwanda, Rwanda

Jean Uwamahoro

Solar Radio Bursts (SRBs) are electromagnetic radiations in radio range that originate in the solar corona by plasma emission mechanisms. In particular, type II and IIIs SRBs are of much interest for space weather studies as they often occur in association with geoeffective solar transients phenomena such as coronal mass ejections (CMEs) and solar flares. Our research focus on characterizing solar transients phenomena using observed SRBs parameters. We also use SRBs signatures to investigate ionospheric TEC variability. For this study, we use data provided by a ground based CALLISTO (Compound Astronomical Low Cost Low Frequency Instrument in Transportable Observatory) network of solar spectrometers that is part of multiple instruments designed for ground observations of SRBs and the data are obtained in the form of dynamic spectra. From the later, one can obtain the drift rate (df/dt) of type II bursts that can be used in a model to estimate the associated CME speed.

High intensity SRBs associated with X-class solar flares have been reported to seriously affect receiver tracking GPS satellites whose efficient functioning depend on the ionospheric total electron content (TEC) status. Our research also use observed SRBs parameters to investigate the corresponding changes in ionospheric TEC. This research work will contribute towards more understanding of SRBs for an improved space weather prediction.

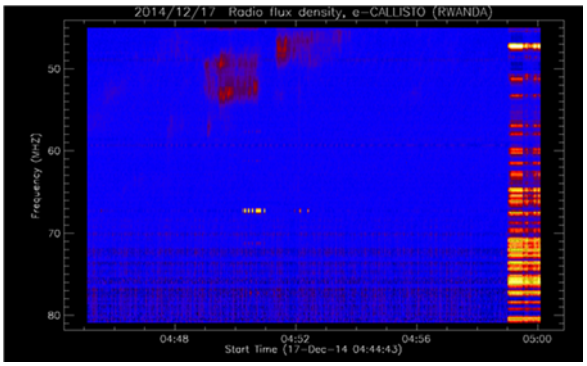

Figure 1: Dynamic spectrum for the 2014 December 17 type II burst observed by CALLISTO system in RWANDA. The event lasted from 04:49 UT until 04:52 at UT and was emitted at 51.5 MHz with drift rate of - 0.094 MHz/s. The later was used in a model to estimate associated CME speed at 535 km/s. A good estimate as compared to the observed CME speed of 587 km/s.

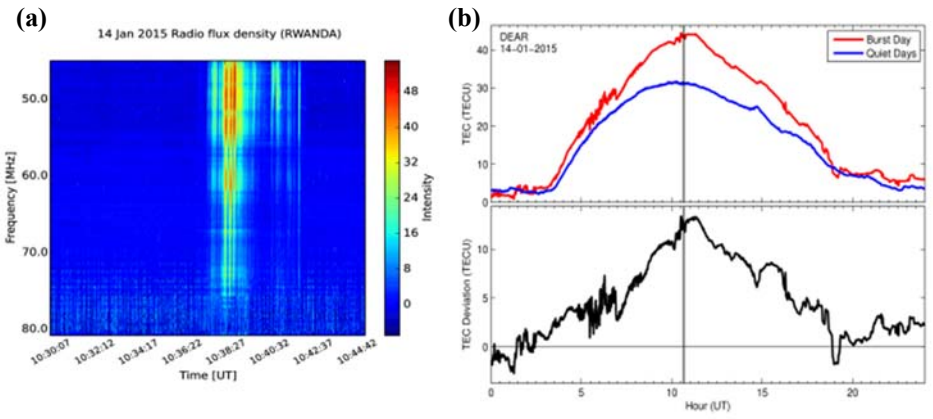

Figure 2: The figure indicates TEC behavior during the burst time on day 14, January 2015. Panel (a) is the smoothed dynamic spectrum for the burst II event. Panel (b) illustrate TEC enhancement corresponding to the radio burst event with respect t to quiet days in the month.

References:

Benz, A. O., Monstein, C., and Meyer, H. (2005). Callisto A New Concept for Solar Radio Spectrometers. Solar Physics, 226, 143–151.

Cerruti, A. P., Kintner, Jr. M. P., Garry, D. E., Mannucci, A. J., Meyer, R. F., Doherty, P., Coster, J. A. (2008). The effect of intense December 2006 solar radio bursts on GPS receivers. Space weather, 6, S10D07, doi:10.1029/2007SW000375.

Cliver, E.W., et al., (1999). on the origin of solar metric type II bursts. solar physics, 187, 89-114.

Highlight on Young Scientists 2:

Solar Cycle Irregularities and Predictability

Jie Jiang

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Both theory and observations show that the solar polar field is the dominant source of the toroidal flux that emerges in the subsequent solar cycle. The tilt angles of sunspot groups are crucial for the evolution of the polar fields. The tilt angle distribution has a random component (tilt-angle scatter). The tilt scatter leads to an uncertainty of polar field generation more than 30% [1]. It also is the cause of the weak polar field during the end of cycle 23 and hence the weakness of the cycle 24 [2]. During cycle 23, there are a number of bigger sunspot groups with a "wrong" orientation of their magnetic polarities in the north–south direction, e.g., AR10696. Figure 1 shows the evolution of the axial dipole moment as determined from observations and our simulations. The tilt angle scatter constitutes a significant random factor in the cycle-to-cycle amplitude variability, which strongly limits the scope of predicting solar cycle strength. To make the prediction at an earlier phase of a cycle, some uncertainty must be involved. We developed a method to predict the strength of cycle 25, which will be of moderate amplitude [3]. The predicted results are shown in Figure 2.

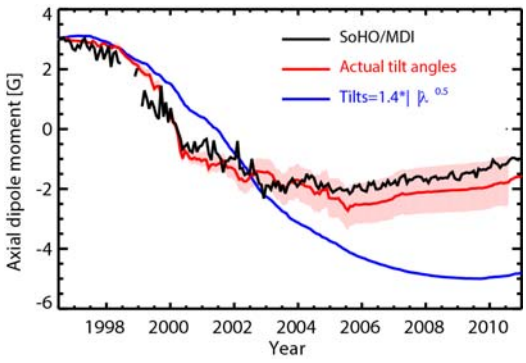

Figure 1

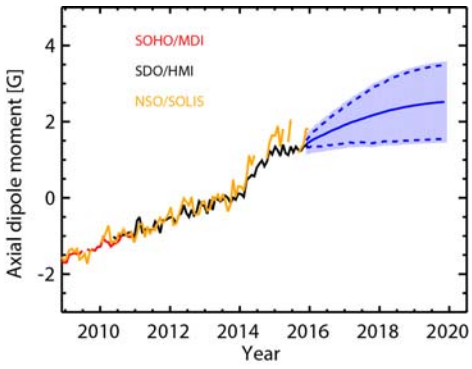

Figure 2

Figure 1: Time evolution of the solar axial dipole moment, which is directly related to the polar fields. The curves correspond, respectively, to observed SOHO/MDI magnetic maps (black), a simulation using the actual tilt angles of bipolar magnetic regions (red), and a simulation using tilt angles according to a fitted latitude dependence (blue). The much stronger dipole moment than the observations is typical for previous attempts to reproduce the observed weak axial dipole moment, unless the models were arbitrarily modified, e.g., in terms of meridional flow variations.

Figure 2: Predicted evolution of the axial dipole moment until 2020 (expected activity minimum of cycle 24) based on 50 surface flux transport simulations with random sources starting from a synoptic magnetogram taken with SDO/HMI. Solid blue lines show the average of the simulations. Blue shading indicates the total 2σ uncertainty range. The expected value for the dipole moment around the year 2020 is not much higher than that observed at the end of cycle 23. We therefore expect that cycle 25 will be of moderate strength. However, the uncertainty of this prediction is considerable. This reflects the intrinsic limitation of such predictions resulting from the random nature of flux emergence.
eftthan 80%.

References:

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[2] Jiang,J., Cameron,R.H., Schüssler,M., The Cause of the Weak Solar Cycle 24, Astrophys. J. Lett., 2015, 808, L28.

[3] Cameron, R. Jiang, J., Schüssler, M., Solar Cycle 25: Another Moderate Cycle? Astrophys. J. Lett., 2016, 823, L22.

Project ROSMIC

Meeting Report 1:

6th Workshop on Vertical Coupling in the Atmosphere-Ionosphere System, Taipei, Taiwan, 25-29 July 2016

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Institute of Space Science, National Central University, Taoyuan City, Taiwan

Loren C. Chang

Figure 1. Group photo of participants.

To facilitate the community dialogue crucial to understanding how vertical coupling contributes to the overall variation of the Earth's atmospheric system, the 6th Workshop on Vertical Coupling in the Atmosphere-Ionosphere System was held at Academia Sinica in Taipei, Taiwan from July 25 to 29, 2016. This is the first time this Workshop has been held in East Asia, to encourage involvement of researchers in this region.

Participation included colleagues from 16 institutions across 9 countries, with over 40 abstracts received. Topics of interest included upper and middle atmosphere variability induced by atmospheric tides, planetary waves. Ionospheric variations due to solar eclipses, dust storms, earthquakes, and increasing carbon dioxide concentrations were also discussed.

A special edition of the Journal of Atmospheric and Solar-Terrestrial Physics will be open for submission in early November, with a submission deadline of March 1, 2017. Abstracts and the Workshop program are available online at: http://www.ss.ncu.edu.tw/~vcais6/program.html .

Project ISEST/ SPeCIMEN

Meeting Report 2:

International Symposium on Recent Observations and Simulations of the Sun-Earth System III, Golden Sands, Bulgaria, 11-16 September 2016

Vania K. Jordanova
Los Alamos National Laboratory, Los Alamos, USA

Vania K. Jordanova

Figure 1. Group photo of participants.

The 3rd International Symposium on Recent Observations and Simulations of the Sun-Earth System (ISROSES-III) was held in Golden Sands, Bulgaria, from 11 to 16 September 2016. It created a forum for researchers from all space science communities worldwide to discuss the complex, multi-scale, interactions in the Sun-Earth system. The Symposium covered a broad range of topics: a) interactions and coupling within the Sun-Earth system, b) advances in measurement, data analysis, theory, and simulations of the Sun-Earth system, c) reaction of the Earth system to the Sun and the solar wind, and d) recent research in space weather science and applications. The ISROSES-III scientific program consisted of oral and poster sessions which gathered about 100 participants for fruitful discussions. Among the ISROSES-III participants were distinguished speakers from the US, European Union, Canada, China, Japan, Norway, Russia, and other countries. For further information about the symposium, please visit the official website: http://www.isroses.lanl.gov/

Meeting Report 3:

International Symposium on the Whole Atmosphere (ISWA), Tokyo, Japan, 14-16 September 2016

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Department of Earth and Planetary Science, Graduate School of Science, The University of Tokyo, Japan

Kaoru Sato

Figure 1. Group photo of participants.

Figure 2. Group photo of the early career scientists who were awarded the VarSITI grant.

The International Symposium on the Whole Atmosphere (ISWA) was organized by School of Science, the University of Tokyo and National Institute of Polar Research, and held at Ito Hall of the University of Tokyo on 14-16 September 2016. A total of 118 scientists and students from 14 countries participated in the symposium and reported their latest research regarding the whole atmosphere, particularly focusing on the dynamics of the middle and upper atmosphere. Research topics covered in this symposium include vertical and intra/interhemispheric coupling, atmospheric waves such as Rossby waves, gravity waves and tides, wave-mean flow interaction, solar effects, observation technology, and high-resolution modeling. A side meeting concerning the Interhemispheric Coupling Study by Observations and Modeling (ICSOM; http://pansy.eps.s.u-tokyo.ac.jp/icsom/) was also held during the symposium, in which a preliminary result of the first ICSOM campaign performed in January-February 2016 was reported. It was also confirmed that the next ICSOM campaign will be conducted in January-February 2017. Many presentation files will be available online at the ISWA website (http://pansy.eps.s.u-tokyo.ac.jp/iswa/). A special issue of SOLA will be published with papers presented in the symposium. The VarSITI program was a co-sponsor of the symposium and its sponsorship contributed to the partial support for 5 early career scientists to attend the symposium.

Meeting Report 4:

9th IAGA - ICMA/IAMAS - ROSMIC/VarSITI/SCOSTEP workshop on 'Long-Term Changes and Trends in the Atmosphere', IAP, Kühlungsborn, Germany, 19-23 September 2016

Franz-Josef Lübken
Leibniz Institute of Atmospheric Physics,
Kühlungsborn, Germany

Franz-Josef Lübken

The well established biannual workshop on 'Long-Term Changes and Trends in the Atmosphere' took place from 19 to 23 September 2016 at the Leibniz Institute of Atmospheric Physics (IAP) in Kühlungsborn.

The most important topics covered during the workshop were:

1. Observed trends and long term variations in the middle atmosphere
2. Modeled and predicted trends and long term variations in the middle atmosphere
3. Trends and long-term changes in the ionosphere and thermosphere
4. Dynamic, physical, chemical and radiative mechanisms of trends and long term variations
5. Role of the middle atmosphere for climate
6. Trends in the entire atmosphere being relevant for the German research project ROMIC (Role Of the Middle Atmosphere In Climate)

A total of 104 scientists and students from 16 countries participated in this workshop. This is the largest attendance in this series starting in 1999. The workshop was also organized as a ROMIC symposium to present and discuss results from this German program within an international community.

A total of 74 oral talks and 17 posters highlighted the actual status and recent progress in our understanding of trends and long term variations, e. g. by solar variability, from the Earth's surface to the upper thermosphere. Anthropogenic effects as well as variations due to the eleven year solar cycle and other sources of natural variability were discussed. Both measurements of various atmospheric parameters and results from different models were presented. There was consensus to publish the results from this workshop in a special issue of an international peer reviewed journal, namely *Journal of Atmospheric and Solar-Terrestrial Physics*.

The workshop was co-sponsored by IAGA, ICMA/IAMAS, the ROSMIC program of VarSITI (SCOSTEP), the German Space Agency (DLR), the IAP institute, and the German ROMIC research initiative of BMBF.

Kühlungsborn, 24. September 2016

Figure 1. Group photo of participants.

Project SPeCIMEN

Meeting Report 5:

Report on the 7th VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workshop, Hermanus, South Africa, 19-24 September 2016

Jacob Bortnik
Space Physics Dept of Atmospheric and Oceanic Sciences, UCLA, USA
IAGA co-chair of the VERSIM meeting

Jacob Bortnik

Figure 1. Group photo of participants.
The VERSIM workshop attendees photographed on the entrance steps of the South African National Space Agency (SANSA), before the conference banquet on Wednesday September 21st, 2016.

The 7th workshop of the URSI/IAGA Joint Working Group on ELF/VLF Remote Sensing of Ionospheres and Magnetospheres (VERSIM) took place in Hermanus, South Africa, over the period 19-24 September 2016. The workshop attracted 55 participants from 16 different countries and, in large part due to support from SCOSTEP/VarSITI, was able to support 11 individuals who were either young scientists (5), or came from developing countries (6). There were 69 abstracts received, 59 of which could be accommodated as orals, and 10 of which as posters. More information on presenters and abstracts can be found on the abstract webpage: https://events.sansa.org.za/abstracts. The abstracts were organized into 6 days, the first 4 days of which were devoted to core VERSIM topics (including D-region, lightning, whistlers, plasmasphere, chorus and EMIC waves) and the last 2 days transitioned into more of a radiation-belt focus. The VERSIM scientific program can be found here: https://events.sansa.org.za/versim-programme.

Meeting Report 6:

XIVth Hvar Astrophysical Colloquium "Solar and Solar-Terrestrial Physics: Now and in the Future", Hvar, Croatia, 26-30 September, 2016

Domagoj Ruždjak
Hvar Observatory
Faculty of Geodesy University of Zagreb, Croatia

Domagoj Ruždjak

Figure 1. Group photo of participants.

The Hvar Astrophysical Colloquium series of conferences is organized every 2 years and represents the most important solar physics event in Croatia, due to the aim of bringing together researchers from Europe and beyond which are active in the theoretical and observational study of all solar phenomena. The 14th Hvar Astrophysical Colloquium "Solar and Solar-Terrestrial Physics: Now and in the Future" was held on 26-30 September, 2016 in Hvar, Croatia and covered a broad range of topics 1) activity of the Sun and solar-like stars, 2) eruptive processes in the solar atmosphere, 3) solar terrestrial connection and the heliosphere, 4) space weather and space climate forecasting, and 5) observing techniques campaigns and databases. At the meeting participated 75 scientists from 17 countries, and 10 invited, 60 contributed talks and 14 posters was presented. A special issue of the Central European Astrophysical Bulletin is planned based on the papers presented at the Colloquium.

Upcoming meetings related to VarSITI

Conference	Date	Location	Contact Information
European Space Weather Week	Nov. 14-18, 2016	Oostende, Belgium	http://www.stce.be/esww13/
EGU General Assembly	Apr. 23-28, 2017	Vienna, Austria	http://www.egu2017.eu/
2017 International Conference on Space Science and Communication	May 3-5, 2017	Kuala Lumpur, Malaysia	http://www.ukm.my/iconspace/
JPGU-AGU Joint Meeting 2017	May 20-25, 2017	Makuhari, Japan	http://www.jpgu.org/
2nd VarSITI General Symposium	Jul. 10-15, 2017	Irkutsk, Russia	
2017 IAU Symposium "Space Weather of the Heliosphere"	Jul. 17-21, 2017	Devon, UK	http://www.exeter.ac.uk/iaus335
IAPSO-IAMAS-IAGA Joint Assembly	Aug. 27-Sep. 1,2017	Cape Town, South Africa	http://www.iapso-jamas-iaga2017.com
SCOSTEP 14th Quadrennial Solar-Terrestrial Physics Symposium	July 9-13, 2018	Vancouver, Canada	http://www.yorku.ca/scostep/

Project SPeCIMEN

Short News 1:

New Co-leaders of SPeCIMEN

The following two co-leaders are newly joined in VarSITI/SPeCIMEN to work with the current co-leaders, Craig Rodger and Jacob Bortnik.

Shri Kanekal
NASA Goddard Space Flight Center, USA

Shri Kanekal

I am Shri Kanekal, a research physicist at NASA Goddard Space Flight Center and a new co-leader for SPeCIMEN-VarSITI. I have been conducting research for over two decades in radiation belt dynamics, solar energetic particles, and charged particle energization, and transport in the inner heliosphere. After my Ph.D in experimental particle physics and postdoctoral stints at Cornell and Fermilab, I started my space physics career at GSFC working on SAMPEX, and Polar missions. Currently I lead CeREs, a cubesat mission to study electron microbursts and am the deputy mission scientist for Van Allen Probes.

Yoshizumi Miyoshi
Institute for Space-Earth Environment Research,
Nagoya University, Nagoya, Japan

Yoshizumi Miyoshi

I am Yoshi Miyoshi, an associate professor of Institute for Space-Earth Environment Research, Nagoya University.
It is an honor to join VarSITI/SPeCIMEN as a new co-leader to work with other co-leaders. I have been conducting research for several phenomena in the inner magnetosphere, especially radiation belts and wave-particle interactions.
I have worked the ERG project as the project scientist. The ERG project is the Geospace exploration mission, which consists of satellite observation, ground-based network observations and modeling/integrated studies.
Many satellite observations and ground-based networks are creating a golden era for geospace studies, and I believe that VarSITI/SPeCIMEN is a good framework to gain the international collaborations.

VarSITI

Short News 2:

SCOSTEP Town Hall Meeting "Future Directions in Solar-Terrestrial Physics" – December 12, 2016

Marianna Shepherd
SCOSTEP Scientific Secretary
Centre for Research in Earth and Space Science, York University, Toronto, Canada

Marianna Shepherd

A Town Hall meeting dedicated on the "Future Directions in Solar-Terrestrial Physics" will be held on December 12, 2016 during the Fall AGU meeting 2016 in San Francisco. The meeting will take place at the Moscone West, Room 2011, at 18:15 - 19:15. The Town Hall meeting is part of SCOSTEP's effort to develop community consensus in defining its future activities based on surveys of (i) current status, (ii) knowledge gap, and (iii) future directions in observations and modeling to fill the gaps. The panel will be chaired by the SCOSTEP President, Dr. Nat Gopalswamy and will include (in alphabetical order) Prof. Jacob Bortnik (University of California, Los Angeles), Dr. Sarah Gibson (HAO/NCAR), Prof. Janet Luhmann (University of California, Berkeley), Dr. Daniel Marsh (NCAR), Prof. Kazuo Shiokawa (Institute for Space-Earth Environmental Research, Nagoya University), Prof. Jie Zhang (George Mason University). The purpose of the meeting and the panel is to discuss the directions SCOSTEP's research should take in the next 10 years.

The purpose of the VarSITI newsletter is to promote communication among scientists related to the four VarSITI Projects (SEE, ISEST/MiniMax24, SPeCIMEN, and ROSMIC).

The editors would like to ask you to submit the following articles to the VarSITI newsletter.

Our newsletter has five categories of the articles:

1. Articles— Each article has a maximum of 500 words length and four figures/photos (at least two figures/photos).
   With the writer's approval, the small face photo will be also added.
   On campaign, ground observations, satellite observations, modeling, etc.
2. Meeting reports—Each meeting report has a maximum of 150 words length and one photo from the meeting.
   With the writer's approval, the small face photo will be also added.
   On workshop/conference/ symposium report related to VarSITI
3. Highlights on young scientists— Each highlight has a maximum of 200 words length and two figures.
   With the writer's approval, the small face photo will be also added.
   On the young scientist's own work related to VarSITI
4. Short news— Each short news has a maximum of 100 words length.
   Announcements of campaign, workshop, etc.
5. Meeting schedule

Category 3 (Highlights on young scientists) helps both young scientists and VarSITI members to know each other. Please contact the editors if you know any recommended young scientists who are willing to write an article on this category.

TO SUBMIT AN ARTICLE

Articles/figures/photos can be emailed to the Newsletter Secretary, Ms. Megumi Nakamura (nakamura.megumi_at_isee.nagoya-u.ac.jp). If you have any questions or problem, please do not hesitate to ask us.

SUBSCRIPTION - VarSITI MAILING LIST

The PDF version of the VarSITI Newsletter is distributed through the VarSITI mailing list. The mailing list is created for each of the four Projects with an integrated list for all Projects. If you want to be included in the mailing list to receive future information of VarSITI, please send e-mail to "nakamura.megumi_at_isee.nagoya-u.ac.jp" (replace "_at_" by "@") with your full name, country, e-mail address to be included, and the name of the Project you are interested.

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Miwa Fukuichi left the office for having a baby in September 2016, Megumi Nakamura is taking over Miwa's task as the newsletter secretary from this issue.

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