VarSITI – Variability of the Sun and Its Terrestrial Impacts

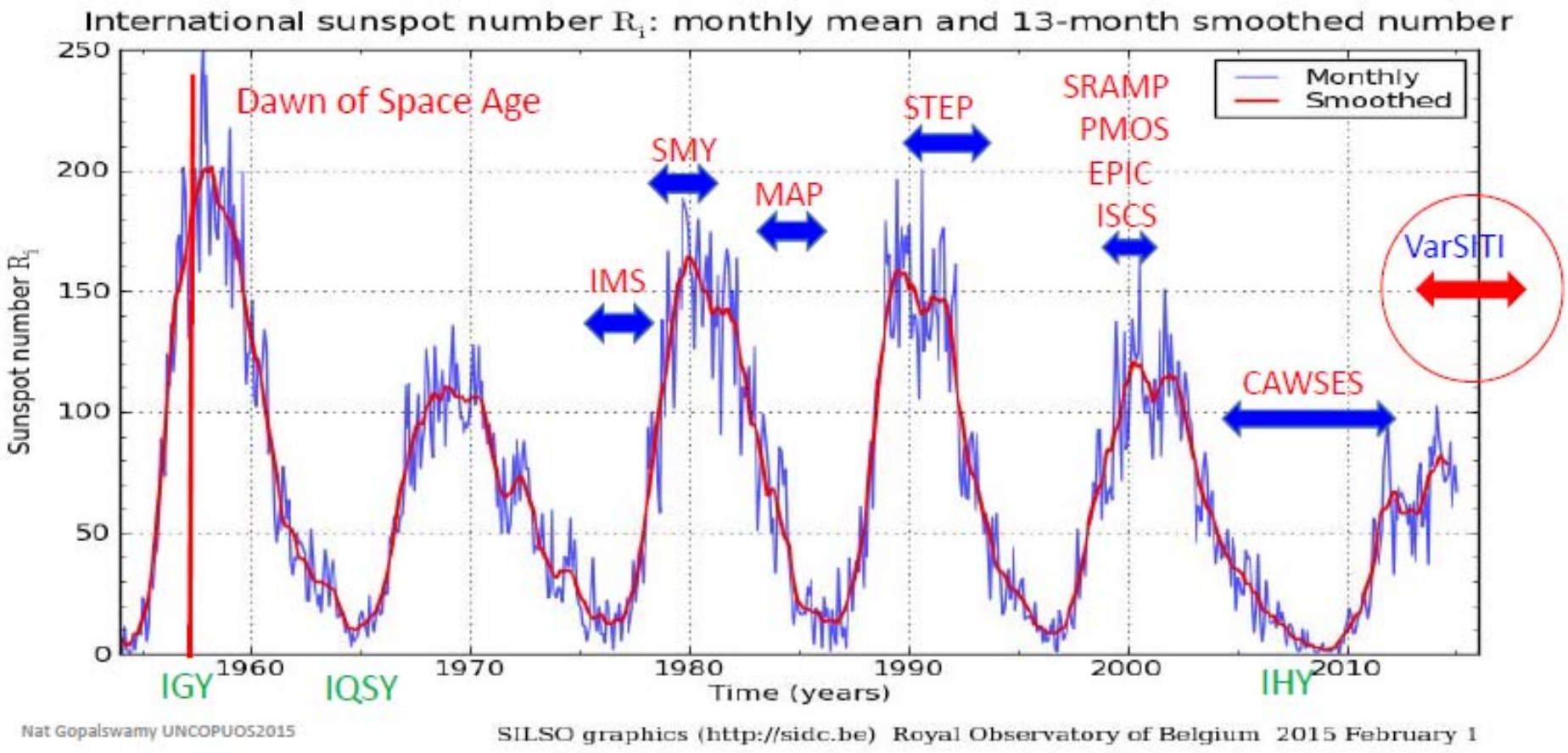
Annexure III

the SCOSTEP's scientific program

Scientific Committee on Solar-Terrestrial Physics

2014-2018

Solar Variability and SCOSTEP Scientific Programs



Nat Gopalswamy UNCOPUOS2015

VarSITI organization

- VarSITI-related scientists (signed in to the VarSITI mailing list) are **almost 1000**
- From 68 countries
- Some (Russia, Japan, India, USA, Nigeria, China) – with more than 80 each
- Others (Azerbaijan, Bosnia and Herzegovina, Congo, Cuba, Georgia, Ghana, Mauritius, Sri Lanka, Sudan, Tanzania, Zambia) – with just 1 participant, but still participating

VarSITI has 4 scientific projects

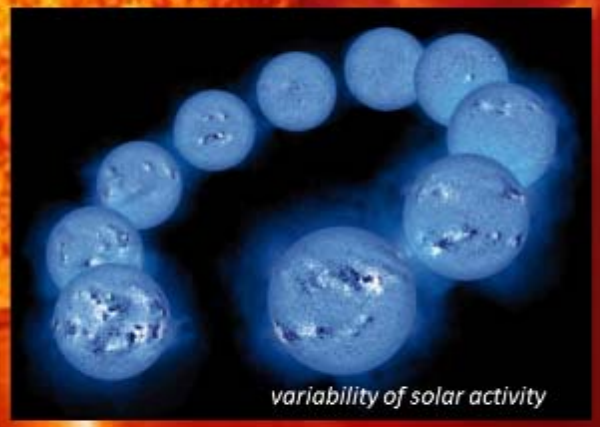
International Study of Earth-Affecting Solar Transients (ISEST)/MiniMax24

How do coronal mass ejections (CMEs) and corotating interaction regions (CIRs) propagate and evolve, drive shocks and accelerate energetic particles in the heliosphere?

ionospheric plasma bubble

Solar Evolution and Extrema (SEE)

1) Are we at the verge of a new grand minimum? If not, what is the expectation for cycle 25?
2) Does our current best understanding of the evolution of solar irradiance and mass loss resolve the "Faint Young Sun" problem? What are the alternative solutions?
3) What is the largest solar eruption/flare possible? What is the expectation for periods with absence of activity?


variability of solar activity

Role Of the Sun and the Middle atmosphere/thermosphere/ionosphere In Climate (ROSMIC)

1) What is impact of solar forcing of the entire atmosphere? What is the relative importance of solar irradiance versus energetic particles?
2) How is the solar signal transferred from the thermosphere to the troposphere?
3) How does coupling within the terrestrial atmosphere function (e.g. gravity waves and turbulence).
4) What is the impact of anthropogenic activities on the Middle Atmosphere, Lower Thermosphere, Ionosphere (MALTI)?
5) What are the characteristics of reconstructions and predictions of TSI and SSI?
6) What are the implications of trends in the ionosphere/ thermosphere for technical systems such as satellites.

Specification and Prediction of the Coupled Inner-Magnetospheric Environment (SPeCIMEN)

Can the state of the Earth's inner magnetosphere be specified and predicted to high accuracy, based on inputs from the Sun and solar wind?


solar influence on climate


space safety


polar aurora

futurehumanevolution.com

VarSITI Leaflet (distributed in Dec 2015)

VarSITI runs these projects by:

- Organizing coordinated investigations (**campaigns**)
- Supporting the creation and distribution of **databases** of solar-terrestrial data
- Organizing and supporting topical **meetings** and sessions in general meetings

1 CAMPAIGN in 2017

SPeCIMEN: Coordinated investigations of topside H+ ions: new results for inner magnetosphere

Motivation: During the last deep min much higher neutral H than models predict ⇒ much lower O+/H+ transition height ⇒ increased plasmaspheric H+ fluxes ⇒ enhanced nighttime mid-lat NmF2 ⇒ implications for plasmasphere refilling after magnetic storms

Objective: observations during the approaching the next min after a very weak cycle

2 Periods: March 21÷24 and June 6-10, 2017

Krarkiv incoherent scatter radar

Meeting to summarize the results:

06-10 October 2017, Prague

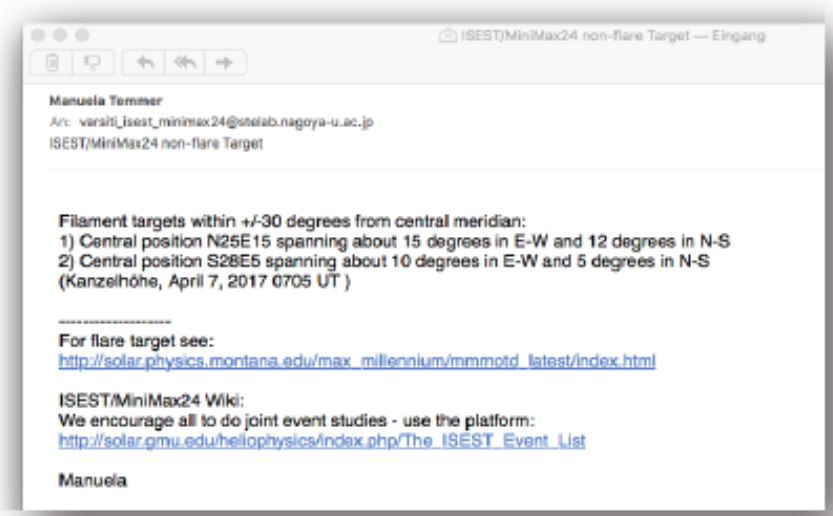
ISEST Ongoing campaign

through the whole duration of VarSITI

KARL-FRANZENS-UNIVERSITÄT GRAZ
UNIVERSITY OF GRAZ

Daily email from MiniMax24

- 1. Non-flare Target – selected by the MiniMax24 campaign team (large coronal holes close to central meridian, large filaments within +/- 30° of central meridian likely to erupt)
- 2. Information on current flare activity (MaxMillenium)
- 3. We encourage the community to initiate joint event studies*


ISEST/MiniMax24 non-flare Target — Eingang

Manuela Temmer
An: varsiti_isest_minimax24@stelab.nagoya-u.ac.jp
ISEST/MiniMax24 non-flare Target

Filament targets within +/-30 degrees from central meridian:
1) Central position N25E15 spanning about 15 degrees in E-W and 12 degrees in N-S
2) Central position S28E5 spanning about 10 degrees in E-W and 5 degrees in N-S
(Kanzelhöhe, April 7, 2017 0705 UT)

For flare target see:
http://solar.physics.montana.edu/max_millennium/mmmotd_latest/index.html

ISEST/MiniMax24 Wiki:
We encourage all to do joint event studies - use the platform:
http://solar.gmu.edu/heliophysics/index.php/The_ISEST_Event_List

Manuela

*ISEST wiki platform

http://solar.gmu.edu/heliophysics/index.php/The_ISEST_Event_List

ISEST Ongoing campaign

through the whole duration of VarSITI

KARL-FRANZENS-UNIVERSITÄT GRAZ
UNIVERSITY OF GRAZ

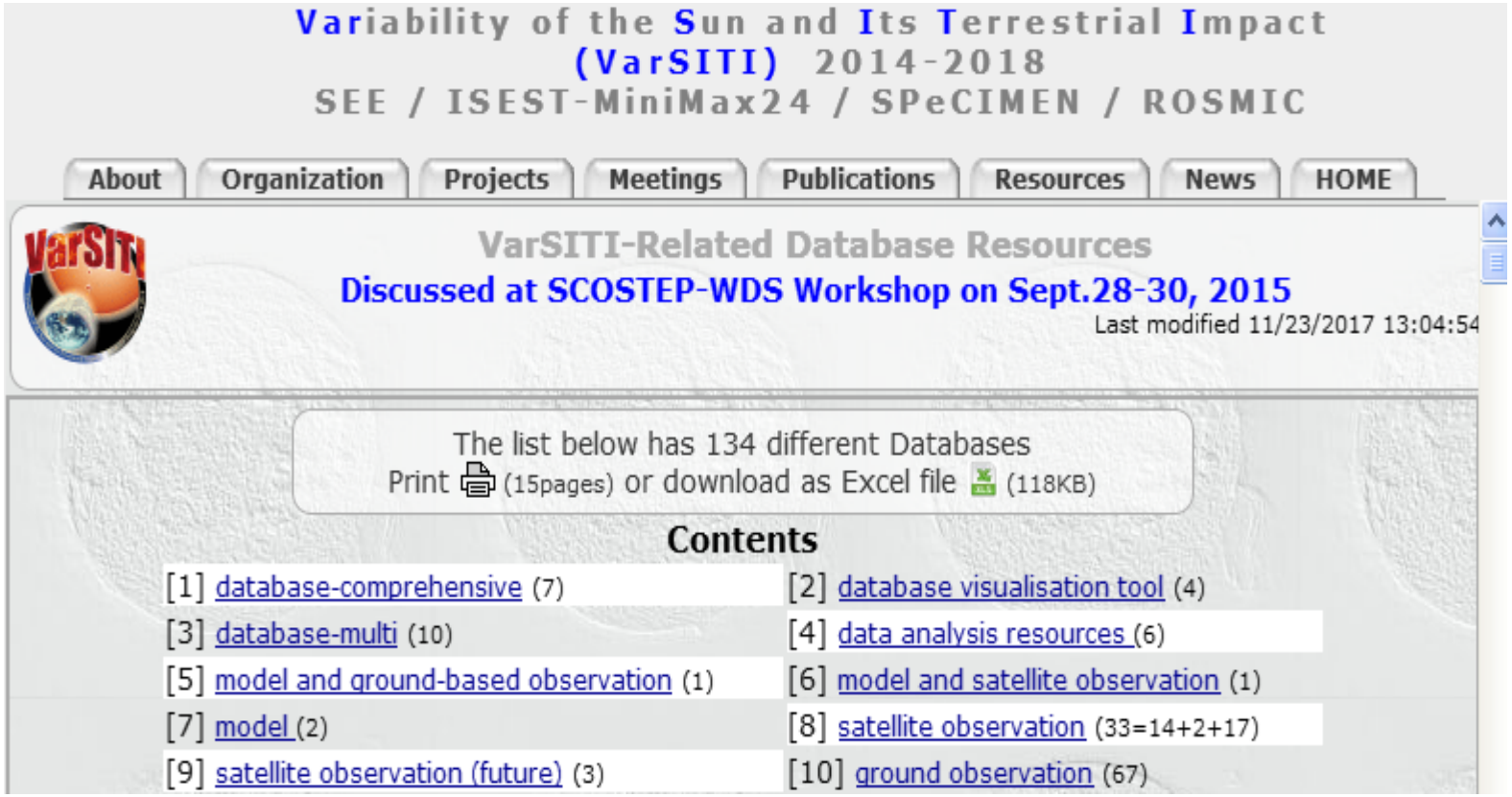
Diversity of VARSITI

- The MiniMax24 email list reaches more than 500 participants from more than 60 countries.
- Huge platform of experts in different fields of solar and heliospheric physics – we communicate daily!
- Emails are sent by a team of about 7 persons (UNI Graz, Kanzelhöhe Observatory, UNI Zagreb)

Databases

- **principal objectives**
- to stimulate **interaction** among data providers, data scientists, and data-oriented researchers of the SCOSTEP community
- long-term **preservation** and **provision** of quality-assessed data and information
- development of **advanced data systems** to enable scientists to perform multidisciplinary data-analysis
- **A collection of solar-terrestrial databases**
  provided freely available online from VarSITI's web-site
- **Development of new databases**

A collection of solar-terrestrial databases at VarSITI's web site



Development of new databases supported by VarSITI – 5 in 2017

VarSITI Grants

Creation of databases supported by VarSITI in 2017

Databases

Database for Assessment of Radiation Doses in the Earth's Atmosphere, Related to GLE events

Topic: Ground Levels Enhancement (GLE) events, ISEST/Minimax24
Developer: University of Oulu, Finland
Report (Nov 22, 2017) Look at

Database for atmospheric and whistler events detected in the Russian Far East

Topic: VLF whistlers and atmospherics, SPeCIMEN
Developer: IKIR, FEB RAS, Russia
Report (Dec 14, 2017) Look at

Database on the Forbush effects and interplanetary disturbances to study Solar-Terrestrial relationship

Topic: Cosmic Ray, ISEST/Minimax24
Developer: IZMIRAN, Russia
First Report (Apr 25, 2017) Look at

Complex Catalogue of High Speed Streams and Geomagnetic Storms During Solar Cycle 24 (2009 - 2016)

Topic: high-speed stream and storm, ISEST/Minimax24
Developer: Institute of Geodynamics of the Romanian Academy (IG-AR), Romania

Database of Directivity Functions for neutron monitors

Topic: Cosmic Ray, ISEST/Minimax24
Developer: Yerevan Physics Institute, Armenia
Results Look at

Development of new databases supported by VarSITI 6 in 2018

VarSITI Grants

Creation of databases supported by VarSITI in 2018

Virtual Laboratory for the comprehensive analysis of Forbush-Effects and Interplanetary Disturbances (ViLaFEID)

Topic: Forbush effect and interplanetary disturbances , ISEST/Minimax24
Developer: IZMIRAN, Russia **Contact:** Eugenia Eroshenko

Solar energetic electrons and radio emission signatures

Topic: Solar energetic electrons and radio emission signatures, ISEST/Minimax24
Developer: SRTI-BAS, Bulgaria and NRIAG, Egypt **Contact:** Rositsa Miteva

Database of lidar signals at "Paratunka" station

Topic: Lidar signals from middle and upper atmosphere in 2007÷2017 , VarSITI
Developer: IKIR FEB RAS, Paratunka, Russia **Contact:** A.S. Perezhogin

"Ionosphere and Magnetic Data - Klyuchi" (IMD-K)

Topic: Ionosphere and Magnetic Data obtained at the Klyichi station, SPeCIMEN
Developer: IPGG SB RAS, Novosibirsk, Russia **Contact:** Anastasiya Belinskaya

Database of Interplanetary Small-scale Magnetic Flux Ropes

Topic: Interplanetary Small-scale Magnetic Flux Ropes, VarSITI
Developer: Uni of Alabama in Huntsville, USA **Contact:** Qiang Hu

Magnetic station "Baygazan" database

Topic: quartz variometer (since 2010) and induction magnetometer (since Nov 2014), SPeCIMEN
Developer: Gorno-Altaysk State Uni, Altay Rep, Russia **Contact:** Alexey Gvozdarev

9 VarSITI supported meetings in 2017

VarSITI Grants
Meetings supported by VarSITI and its projects in 2017

Meetings (ordered by date)

Data Analysis Workshop on Coronal Mass Ejections and Solar Radio Bursts
Coronal and Interplanetary Shocks: Data Analysis from SOHO, Wind, and e-CALLISTO Data
February 19÷25, 2017, Mekelle University, Mekelle, Ethiopia supported by VarSITI web-address
Short Report here

40th annual Seminar on Physics of the auroral phenomena
March 13÷17, 2017, Apatity, Murmansk region, Russia supported by VarSITI web-address
Short Report here

Workshop on The 10 years of operation of High resolution Neutron Monitor Database-NMDB
March 20÷23, 2017, Athens, Greece supported by VarSITI web-address
Short Report here

ISSI Forum on Consistency of the Solar Radius: outstanding unsolved points
~~*first semester of 2017, Switzerland*~~ supported by VarSITI web-address: none

The 2nd VarSITI Symposium *July 10÷15, 2017, Irkutsk, Russia*
supported by VarSITI web-address **Short Report** here

IAU Symposium 335 Space Weather of the Heliosphere: Processes and Forecasts
July 17÷21, 2017, Exeter, UK supported by VarSITI web-address **Short Report** here

13th International Workshop on Layered Phenomena at the Mesopause Region (**LPMR**)
Sep 18÷22, 2017, Kühlungsborn, Germany supported by VarSITI web-address **Short Report** here

ISEST/MiniMax24 Workshop on International Study of Earth-affecting Solar Transients
Sep 18÷22, 2017, Jeju Island, Korea supported by VarSITI web-address

AGU Chapman Conference Particle Dynamics in the Earth's Radiation Belts
~~*Sep 25÷29, 2017, Biarritz, France*~~ March 4÷9, 2018 Cascais, Portugal supported by VarSITI web-address

The most important event in 2017

Second VarSITI General Symposium

10-15 July, Irkutsk, Russia

162 scientists from 26 countries

Summarized in: Special Issue of Journal of Atmospheric and Solar-Terrestrial Physics to be published in 2018/2019

International Capacity Building School on Advanced Concepts in Solar-Terrestrial Coupling in the Context of Space Weather

9÷14 July, 2017, Irkutsk, Russia

20 VarSITI supported meetings in 2018

VarSITI Grants

Meetings supported by VarSITI and its projects in 2018

Meetings (ordered by date)

13th conference Plasma Physics in the Solar System *February 12÷16, 2018 Moscow, Russia* supported by VarSITI web-address

Dynamic Sun: II: Solar Magnetism from Interior to the Corona
February 12÷16, 2018 Siem Reap, Angkor Wat, Cambodia supported by VarSITI web-address

AGU Chapman Conference: Particle Dynamics in the Earth's Radiation Belts
March 4÷9, 2018 Cascais, Portugal supported by VarSITI web-address

41th annual Seminar on Physics of the auroral phenomena
March 12÷16, 2018, Apatity, Murmansk region, Russia supported by VarSITI web-address

The 8th biennial VERSIM Workshop: VLF/ELF Remote Sensing of Ionospheres and Magnetosphere
March 19÷23, 2018 Apatity, Murmansk region, Russia supported by VarSITI web-address

DKIST Critical Science Plan Workshop 5: Wave generation and propagation
April 9÷11, 2018, Newcastle upon Thyne, UK supported by VarSITI web-address

4th ANGWIN workshop: Exploration of High-latitude Upper Atmosphere Wave Dynamics
April 24÷26 2018, São José dos Campos, Brazil supported by VarSITI web-address

10th International Workshop on Long-Term Changes and Trends in the Atmosphere
May 14÷19, 2018, Hefei, China supported by VarSITI web-address

20 VarSITI supported meetings in 2018

6th International conference Atmosphere, ionosphere, safety *June 03÷09, 2018 Zelenogradsk, Russia*
supported by VarSITI web-address

7th International HEPPA-SOLARIS Workshop *June 11÷15, 2018, Blacksburg, Virginia, US*
supported by VarSITI web-address is missing

7th IAGA/ICMA/SCOSTEP workshop on Vertical Coupling in the Atmosphere-Ionosphere System *July 2÷6, 2018, Potsdam, Germany* supported by VarSITI web-address

7th Symposium of Brazilian Space Geophysics and Aeronomy Society (SBGEA)
August 6÷10 2018, Santa Maria-RS, Brazil supported by VarSITI web-address

45th European Meeting on Atmospheric Studies by Optical Methods
August 27÷31 2018, Kiruna, Sweden supported by VarSITI web-address is missing

Annual African Geophysical Society (AGS) Conference on Space Weather
September 24÷27 2018, Cairo, Egypt supported by VarSITI web-address

ISEST 2018 Workshop XVIth Hvar Astrophysical Colloquium *September 24÷28 2018, Hvar, Croatia*
supported by VarSITI web-address

15th International Symposium on Equatorial Aeronomy *October 22÷26, 2018, Ahmedabad, India*
supported by VarSITI web-address

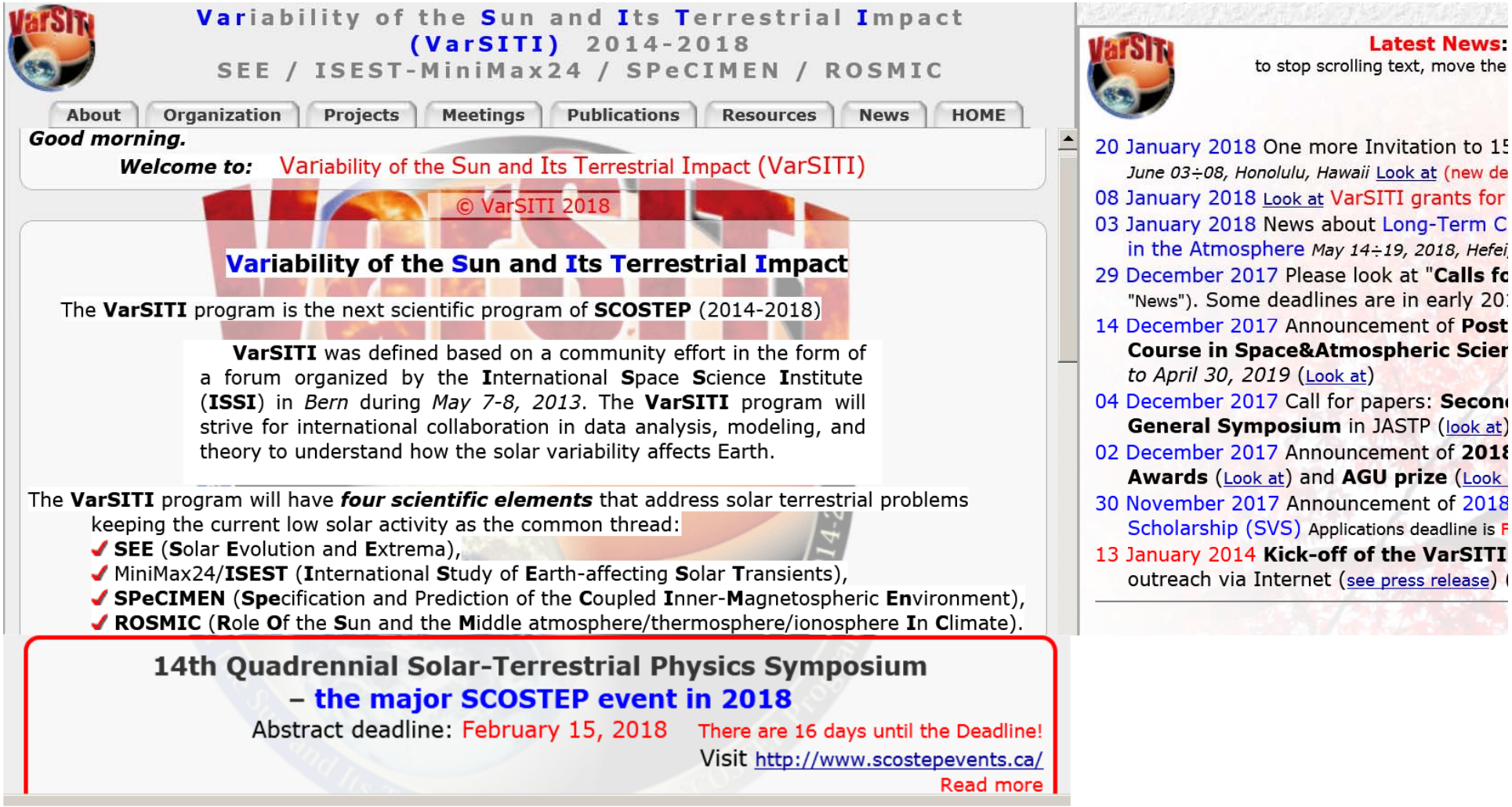
Consistency of the Solar Radius: outstanding unsolved points
without date, ISSI, Bern, Switzerland supported by VarSITI contact name: Jean-Pierre Rozelot

VarSITI SEE project meeting
without date, without place supported by VarSITI contact name: Dibyendu Nandi

For the total duration of VarSITI

- **64** topical **meetings** and sessions in general meetings
- Creation and distribution of **16 databases** of solar-terrestrial data
- Support for **3** capacity-building **schools**
- **1** observational **campaign** and **1 permanent campaign** ongoing through the whole VarSITI duration

VarSITI web-site



Variability of the Sun and Its Terrestrial Impact (VarSITI) 2014-2018

SEE / ISEST-MiniMax24 / SPeCIMEN / ROSMIC

About | Organization | Projects | Meetings | Publications | Resources | News | HOME

Good morning.

Welcome to: Variability of the Sun and Its Terrestrial Impact (VarSITI)

Variability of the Sun and Its Terrestrial Impact

The **VarSITI** program is the next scientific program of **SCOSTEP** (2014-2018)

VarSITI was defined based on a community effort in the form of a forum organized by the **I**nternational **S**pace **S**cience **I**nstitute (**ISSI**) in *Bern* during *May 7-8, 2013*. The **VarSITI** program will strive for international collaboration in data analysis, modeling, and theory to understand how the solar variability affects Earth.

The **VarSITI** program will have ***four scientific elements*** that address solar terrestrial problems keeping the current low solar activity as the common thread:

- ✓ **SEE** (**S**olar **E**volution and **E**xtrema),
- ✓ MiniMax24/**ISEST** (**I**nternational **S**tudy of **E**arth-affecting **S**olar **T**ransients),
- ✓ **SPeCIMEN** (**Spe**cification and Prediction of the **C**oupled **I**nner-**M**agnetospheric **En**vironment),
- ✓ **ROSMIC** (**R**ole **O**f the **S**un and the **M**iddle atmosphere/thermosphere/ionosphere **I**n **C**limate).

14th Quadrennial Solar-Terrestrial Physics Symposium – the major SCOSTEP event in 2018

Abstract deadline: February 15, 2018 There are 16 days until the Deadline!

Visit http://www.scostepevents.ca/

Read more

Latest News:

to stop scrolling text, move the

20 January 2018 One more Invitation to 15
June 03÷08, Honolulu, Hawaii Look at (new de
08 January 2018 Look at VarSITI grants for
03 January 2018 News about Long-Term C
in the Atmosphere *May 14÷19, 2018, Hefei*
29 December 2017 Please look at "**Calls fo**
"News"). Some deadlines are in early 20
14 December 2017 Announcement of **Post**
Course in Space&Atmospheric Scier
to April 30, 2019 (Look at)
04 December 2017 Call for papers: **Secon**
General Symposium in JASTP (look at)
02 December 2017 Announcement of **2018**
Awards (Look at) and **AGU prize** (Look
30 November 2017 Announcement of 2018
Scholarship (SVS) Applications deadline is F
13 January 2014 **Kick-off of the VarSITI**
outreach via Internet (see press release)

VarSITI web-site http://www.varsiti.org/

53 499 visits from October 1, 2013 to January 22, 2018

monthly visits

Geographical distribution of visits

Four days (January 19-22, 2018)

VarSITI newsletters

SCOSTEP

Variability of the Sun and Its Terrestrial Impact (VarSITI)
SEE / ISEST-Minimax24 / SPeCIMEN / ROSMIC
http://www.varsiti.org/

Vol. 11, November 2016

VarSITI Newsletter

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Project SPeCIMEN/ISEST/ROSMIC

Article 1:

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

Libo Liu[1] and Baiqi Ning[2]
[1]Institute of Geology and Geophysics, Chinese Academy of Sciences, China

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.

Publish:

- ✓Articles
- ✓Highlights of young scientists
- ✓Short news
- ✓Meeting schedule

16 issues so far

Editors

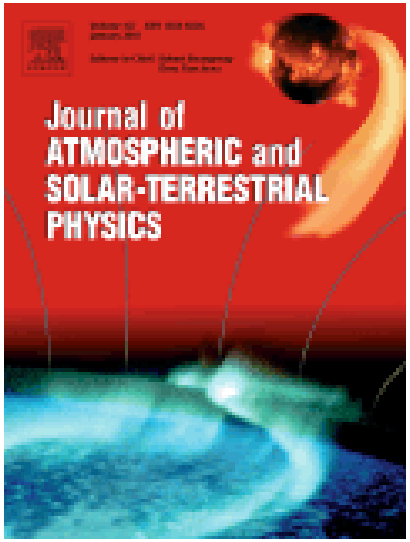
Kazuo Shiokawa

Katya Georgieva

Newsletter secretary

Mai Asakura

Publication activity in scientific journals



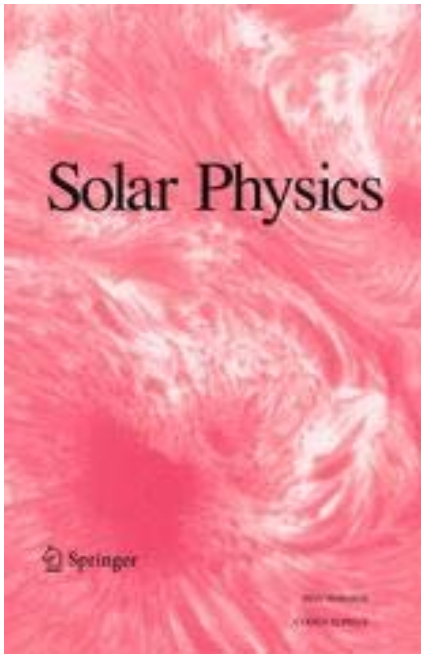
2 special issues in the **Journal of Atmospheric and Solar-Terrestrial Physics**:

- **First VarSITI General Symposium**
- **Solar Activity in the Following Decades**

Promotional access for all VarSITI-related Special Issues:

- Free for the authors
- 9 months free access
- The authors can then upload their papers in institutional and other sites (ADS, arXiv, ResearchGate)

Publication activity in scientific journals



A Topical Issue on "Earth-affecting Solar Transients" is being published in Solar Physics Journal

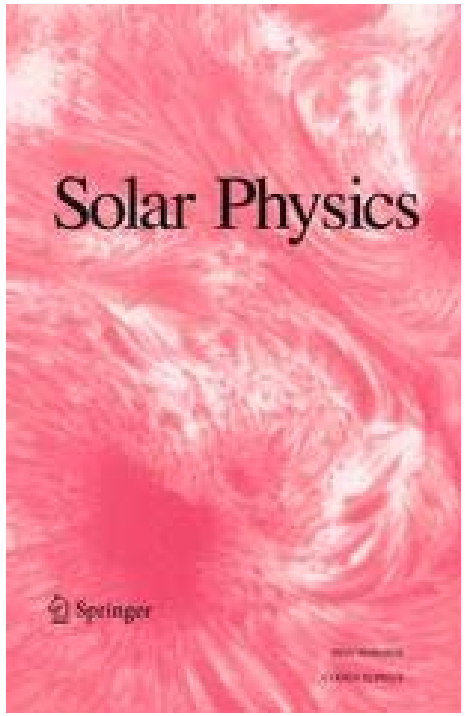
ISEST Topical Issue

- **31 articles published online so far**
- **Some still under review**
- **6 articles rejected**

ISEST Topical Issue

- A Topical Issue on "Earth-affecting Solar Transients" is being published in Solar Physics Journal
- Edited by Jie Zhang, Xochitl Blanco-Cano, Nariaki Nitta, Nandita Srivastva

  - 31 articles published online so far
  - Some still under review
  - 6 articles rejected



A great community effort for space weather studies