Current status of the SCOSTEP's PRESTO program for predictability of the variable solar-terrestrial coupling

Kazuo Shiokawa
(SCOSTEP President)
SCOSTEP
Scientific Committee on Solar-Terrestrial Physics

A thematic organization of the International Science Council (ISC).

Runs long-term (4-5 years) international interdisciplinary scientific programs of solar terrestrial physics since 1966

Interacts with national and international programs involving solar terrestrial physics elements

Engages in Capacity Building activities such as the Space Science Schools with UNOOSA/ISWI.

Disseminates new knowledge on the Sun-Earth System and how the Sun affects life and society as outreach activities.
Current Member Countries and Geographical Regions of SCOSTEP

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<th>Australia</th>
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Challenging topics during and after VarSITI

Sun

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solar total and spectral irradiance
Sun
magnetosphere (MHD)
inner magnetosphere
ionosphere
thermosphere
mesosphere
stratosphere
troposphere

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heliosphere (MHD)

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flare prediction
CME prediction

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IMF-Bz prediction

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flare UV/X-ray spectra
solar energetic particles (SEP)
CIR

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storm/substorm development
radiation belt development
plasma waves
composion
---

dynamics
GWs/tides/PWs
instant
plasma

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plasma damage to space/air vehicles, and astronauts,
geomagnetically induced current (GIC)

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Interference of radio communication GNSS positioning
anthropogenic effect
climate change

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solar dynamo evolution
axial dipole moment

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solar cycle variability
long-term variability
short-term variability
sunspot evolution

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solar total and spectral irradiance

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Earth

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Shiokawa and Georgieva [PEPS, 2021]
International interdisciplinary programs in solar-terrestrial physics operated by SCOSTEP

1976-1979: IMS (International Magnetosphere Study)
1979-1981: SMY (Solar Maximum Year)
1982-1985: MAP (Middle Atmosphere Program)
1998-2002: Post-STEP (S-RAMP, PSMOS, EPIC, and ISCS)
2004-2008: CAWSES (Climate and Weather of the Sun-Earth System)
2009-2013: CAWSES-II (Climate and Weather of the Sun-Earth System-II)
2014-2018: VarSITI (Variability of the Sun and Its Terrestrial Impact)
2020-2024: PRESTO (Predictability of the variable Solar-Terrestrial Coupling)
**PRESTO: Predictability of the variable Solar-Terrestrial Coupling**

PRESTO identifies predictability of the variable solar-terrestrial coupling performance metrics through modeling, measurements, and data analysis and to strengthen the communication between scientists and users.

**Pillar 1: Sun, interplanetary space and geospace**

**Pillar 2: Space weather and the Earth’s atmosphere**

**Pillar 3: Solar activity and its influence on the climate of the Earth System**

For subscription on the SCOSTEP—all mailing list, send e-mail to “scosteprequest@bc.edu”.
SCOSTEP’s international program in 2020-2024

**PRESTO: Predictability of the variable Solar-Terrestrial Coupling**

**PRESTO chair and co-chairs**

Chair
Ramon E. Lopez
USA

Co-chair
Eugene Rozanov
Switzerland

Co-chair
Jie Zhang
USA

Loren C. Chang
(Taiwan)

Duggirala Pallamraju
(India)

Nick M. Pedatella
(USA)

**Pillar 1: Sun, interplanetary space and geospace**

Allison Jaynes
(USA)

Emilia Kilpua
(Finland)

Spiros Patsourakos
(Greece)

**Pillar 2: Space weather and the Earth’s atmosphere**

Odele Coddington
(USA)

Jie Jiang
(China)

Stergios Misios
(Greece)

**Pillar 3: Solar activity and its influence on the climate of the Earth System**
SCOSTEP/PRESTO

Predictability of the Solar-Terrestrial Coupling

PRESTO is a science program that seeks to improve the predictability of energy flow in the integrated Sun-Earth system on times scales from a few hours to centuries through promoting international collaborative efforts. PRESTO is sponsored by SCOSTEP, the Scientific Committee on Solar Terrestrial Physics.

For subscription on the SCOSTEP—all mailing list: drop e-mail to “scosteprequest@bc.edu”.
SCOSTEP/PRESTO Funding Opportunities

• SCOSTEP/PRESTO provides financial support for organizing international campaigns and meetings every year.

• SCOSTEP also provides financial support for capacity building activities.
1st SCOSTEP/PRESTO Online Seminar  
Title: A challenge to Physics-based Prediction of Giant Solar Flares  
Author: Kanya Kusano (Institute for Space-Earth Environmental Research, Nagoya University, Japan)  
Date/time: May 26 (Tue), 2020, 12:00-13:00 UT  

2nd SCOSTEP/PRESTO Online Seminar  
Title: Extreme solar events: A new paradigm  
Author: Ilya Usoskin (University of Oulu, Finland)  
Date/time: July 20 (Mon), 2020, 12:00-13:00 UT  

3rd SCOSTEP/PRESTO Online Seminar  
Title: Developing a Highly Predictable Geomagnetic Index to Gauge Magnetospheric Activity and Space Weather  
Author: Joe Borovsky (Space Science Institute, USA)  
Date: September 10, 2020, 22:00-23:00 UT  

4th SCOSTEP/PRESTO Online Seminar  
Title: The Ionospheric Connection Explorer - Results from the first year on orbit  
Author: Thomas Immel (University of California Berkeley, USA)  
Date: November 17, 2020, 23:00-24:00 UT  

5th SCOSTEP/PRESTO Online Seminar  
Title: Magnetospheric Response to Interplanetary Shocks: ULF Wave-Particle Interaction Perspective  
Author: Q.-G. Zong (Peking University, China)  
Date and Time: Jan 14 (Thu), 2021, 00:00-01:00 UT  

6th SCOSTEP/PRESTO Online Seminar  
Title: Utilizing galactic cosmic rays as signatures of interplanetary transients  
Author: Mateja Dumbović (University of Zagreb, Croatia)  
Date and Time: Jan 19 (Tue), 2021, 12:00-13:00 UT  

7th SCOSTEP/PRESTO Online Seminar  
Title: Physics at the edge between Earth's atmosphere and space  
Author: Franz-Josef Lübken (Leibniz-Institute of Atmospheric Physics, Germany)  
Date and Time: May 21 (Fri), 2021, 12:00-13:00 UT
1st SCOSTEP Online Capacity Building Lecture
Speaker: David G. Sibeck, NASA Goddard Space Flight Center, USA
Date and Time: Jan 22 (Fri), 2021, 01:00-02:00 UT
Topic: "Motivation for soft X-ray imaging and plans for the STORM global imaging mission"

2nd SCOSTEP Online Capacity Building Lecture
Speaker: Ulrich Taubenschuss, Institute of Atmospheric Physics AS CR, Czechia
Date and Time: Mar 5 (Fri), 2021, 11:00-12:00 UTC
Topic: "Processing of electric and magnetic signals onboard the THEMIS spacecraft and applications of polarization analysis"

3rd SCOSTEP Online Capacity Building Lecture
Speaker: Jacob Bortnik, UCLA, USA
Date and Time: Mar 29 (Mon), 2021, 23:00-00:00 UTC
Topic: "Machine-learning based reconstruction of the inner magnetosphere"

4th SCOSTEP Online Capacity Building Lecture
Speaker: Alphonse C. Sterling, NASA Marshall Space Flight Center, USA
Date and Time: Apr 29 (Thu), 2021, 00:30-01:30 UTC
Topic: "An Overview of the Sun's Structure, and a Closer Look at Solar Magnetism and Activity"
Capacity Building schools

In 2020:
• Capacity Building workshop at COSPAR, 6-17 Jan. 2020, Bangalore, India

In 2021:
• The 44th Annual Scientific Seminar on Physics of Auroral Phenomena, 15-19 March 2021, Apatity, Russia
• The first summer school on space research, technology and application in Bulgaria, 5-11 July 2021, National Observatory Rozhen, Bulgaria
• ISWI/SCOSTEP Iberian Space Weather School, July 21-25, 2021, University of Coimbra, Portugal
• Describing and Analyzing Solar Data for a better prediction of Space Weather, TBD, 2021, Kigali, Rwanda
SCOSTEP - Science Comic Books

What is the Aurora?! (English)

Qu’est-ce que le champ géomagnétique ?! (French)

Co Jsou kosmické paprsky? (Czech)

Erderwärnung - was ist das?! (German)

ओजोन खिड़का क्या है? (Hindi)

Che cosa sono i raggi cosmici?! (Italic)

太陽と地球気候は関係あるの? (Japanese)

فضای که کیا بیا؟ (Urdu)

Korean, Russian, Spanish, and Tamil are also available. https://scostep.org/
Summary

• PRESTO is the new SCOSTEP scientific program to run during 2020-2024 to understand Predictability of the variable Solar-Terrestrial Coupling.

• Scientists from all over the world participate in the PRESTO program to understand predictability of space weather and solar effect on climate.

• Solar terrestrial science will reach as many developing countries as possible via SCOSTEP’s capacity building and outreach activities.

PRESTO: Predictability of the variable Solar-Terrestrial Coupling
SCOSTEP: Scientific Committee on Solar-Terrestrial Physics