SCOSTEP's scientific program VarSITI: Variability of the Sun and Its Terrestrial Impact

K. Shiokawa[1] and K. Georgieva[2]

1. Institute for Space-Earth Environmental Research (ISEE), Nagoya University
2. Space Research and Technologies Institute, Bulgarian Academy of Sciences

VarSITI2016, Albena, Bulgaria, June 6, 2016

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)

1990-1997: STEP (Solar-Terrestrial Energy Program)

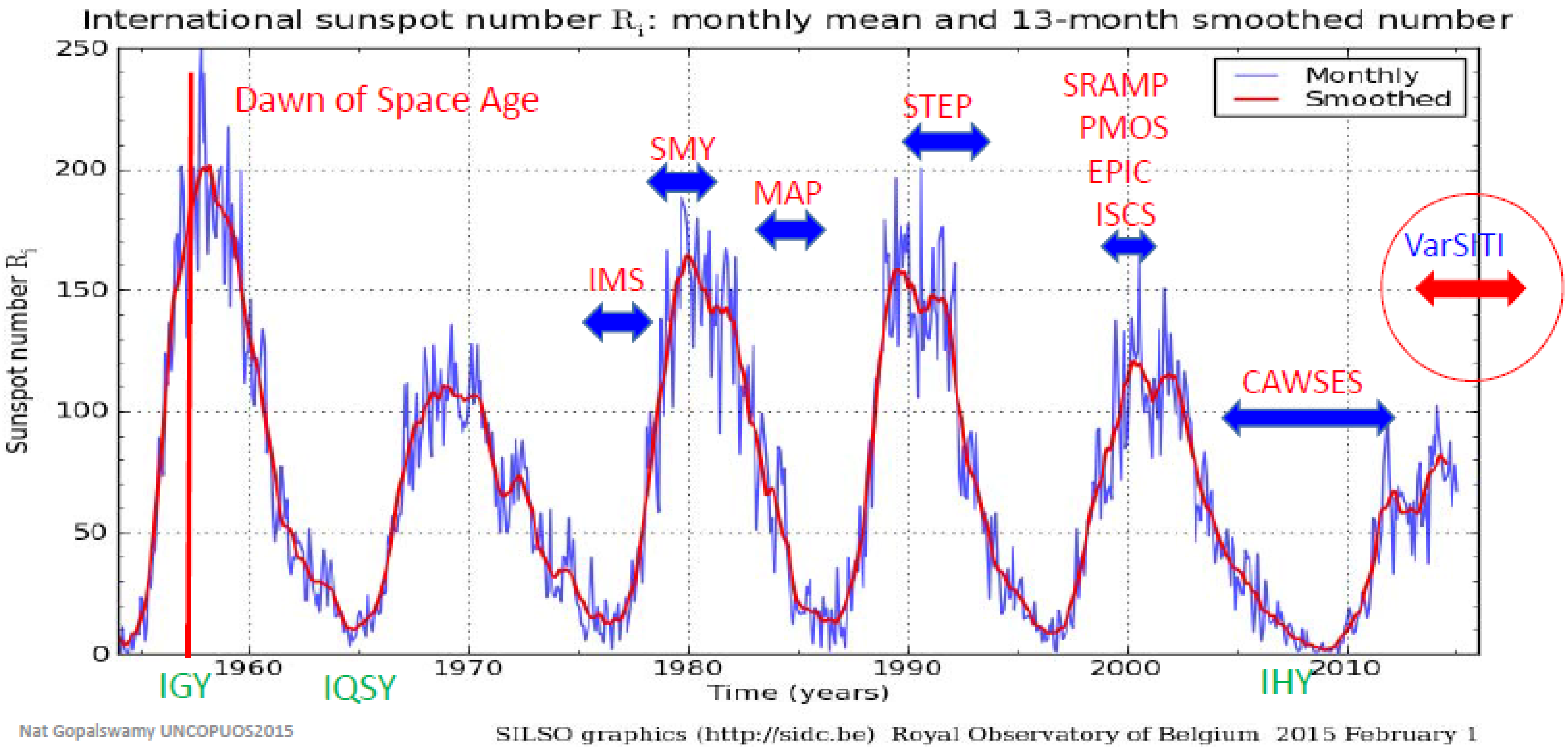
1998-2002: Post-STEP（S-RAMP, PSMOS, EPIC, and ISCS)

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)

Solar Variability and SCOSTEP Scientific Programs



Nat Gopalswamy UNCOPUOS2015

Four Projects of VarSITI and their science questions

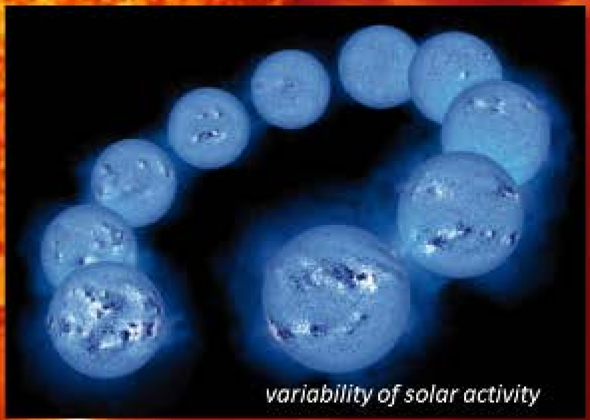
International Study of Earth-Affecting Solar Transients (ISEST)/MiniMax24

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 Members (total: 770) of Four Projects (as of May 21, 2016)

SEE: 429 scientists from 61 countries

Argentina (2), Armenia (1), Australia (4), Austria (1), Azerbaijan (1), Belgium (6), Brazil (12), Bulgaria (7), Cameroon (1), China (49), Cote D'Ivore (4), Cote d'Ivoire (1), Czech Republic (1), Democratic Republic of the Congo (1), Denmark (1), Egypt (4), Ethiopia (4), Fiji (1), Finland (3), France (10), Georgia (1), Germany (6), Greece (1), India (21), Indiea (1), Indonesia (2), Israel (1), Italy (2), Japan (66), Japan/Thailand (1), Kazakhstan (1), Kenya (2), Malaysia (2), Mauritius (1), Mexico (1), Nigeria (52), Norway (1), Pakistan (1), Philippines (3), Poland (2), Republic of Korea (18), Romania (4), Russia (36), Rwanda (2), Siri Lanka (1), South Africa (2), Spain (1), Sudan (1), Sweden (2), Switzerland (5), Taiwan (19), Tanzania (1), Thailand (1), Turkey (2), UK (12), UNKNOWN (2), USA (37), Uganda (1), Ukraine (2), Vietnam (1), Zambia (1)

ISEST/Minimax24: 534 scientists from 65 countries

Argentina (2), Armenia (1), Australia (4), Austria (16), Belgium (5), Brazil (11), Bulgaria (3), Cameroon (2), China (70), Cote D'Ivore (5), Cote d'Ivoire (1), Croatia (6), Cuba (1), Czech Republic (2), Democratic Republic of the Congo (1), Denmark (3), Egypt (3), Ethiopia (4), Fiji (1), Finland (1), France (14), Georgia (1), Germany (6), Greece (4), India (35), Indiea (1), Indonesia (4), Ireland (2), Israel (1), Italy (7), Japan (70), Japan/Thailand (1), Kazakhstan (1), Kenya (2), Malaysia (3), Mauritius (1), Mexico (17), New Zealand (1), Nigeria (53), Nigreria (1), Norway (1), Pakistan (2), Peru (1), Philippines (3), Poland (2), Republic of Korea (18), Romania (2), Russia (36), Rwanda (2), Siri Lanka (1), Slovakia (2), South Africa (2), Sudan (1), Sweden (3), Switzerland (4), Taiwan (20), Tanzania (1), Thailand (2), Turkey (3), UK (14), UNKNOWN (2), USA (52), Uganda (1), Vietnam (2), Zambia (1)

SPeCIMEN: 397 scientists from 56 countries

Argentina (2), Australia (3), Austria (1), Belgium (2), Brazil (12), Bulgaria (2), Cameroon (1), Canada (2), China (38), Cote D'Ivore (4), Cote d'Ivoire (1), Czech Republic (3), Democratic Republic of the Congo (1), Egypt (3), Ethiopia (4), Fiji (1), Finland (1), France (6), Germany (4), Greece (1), India (22), India/Japan (1), Indiea (1), Indonesia (4), Israel (2), Italy (3), Japan (70), Japan/Thailand (1), Kenya (2), Malaysia (3), Mauritius (1), Mexico (1), New Zealand (4), Nigeria (52), Norway (1), Pakistan (1), Peru (1), Philippines (3), Poland (1), Republic of Korea (12), Russia (27), Rwanda (1), Siri Lanka (1), South Africa (3), Sudan (1), Sweden (2), Switzerland (3), Taiwan (21), Tanzania (1), Thailand (1), UK (15), UNKNOWN (2), USA (40), Uganda (1), Vietnam (3), Zambia (1)

ROSMIC: 498 scientists from 62 countries

Argentina (2), Australia (4), Austria (2), Belgium (3), Brazil (16), Bulgaria (3), Cameroon (2), Canada (5), China (50), Cote D'Ivore (4), Cote d'Ivoire (1), Cuba (1), Czech Republic (3), Democratic Republic of the Congo (1), Denmark (2), Egypt (3), Ethiopia (4), Fiji (1), Finland (5), France (7), Georgia (1), Germany (20), Greece (2), India (33), India/Japan (1), Indiea (1), Indonesia (4), Israel (2), Italy (2), Japan (80), Japan/Thailand (1), Kazakhstan (1), Kenya (2), Malaysia (4), Mauritius (1), Mexico (1), Nigeria (53), Norway (2), Pakistan (2), Philippines (3), Poland (2), Republic of Korea (20), Romania (2), Russia (35), Rwanda (2), Serbia (1), Siri Lanka (1), South Africa (3), Spain (2), Sudan (1), Sweden (3), Switzerland (3), Taiwan (21), Tanzania (1), Thailand (2), Turkey (2), UK (16), UNKNOWN (3), USA (48), Uganda (1), Vietnam (3), Zambia (1)

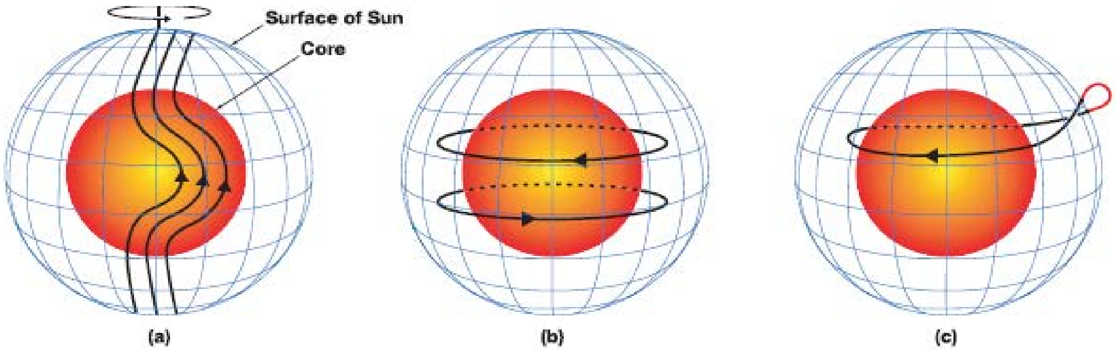
Solar Evolution and Extrema (SEE)

Solar Evolution and Extrema
SEE

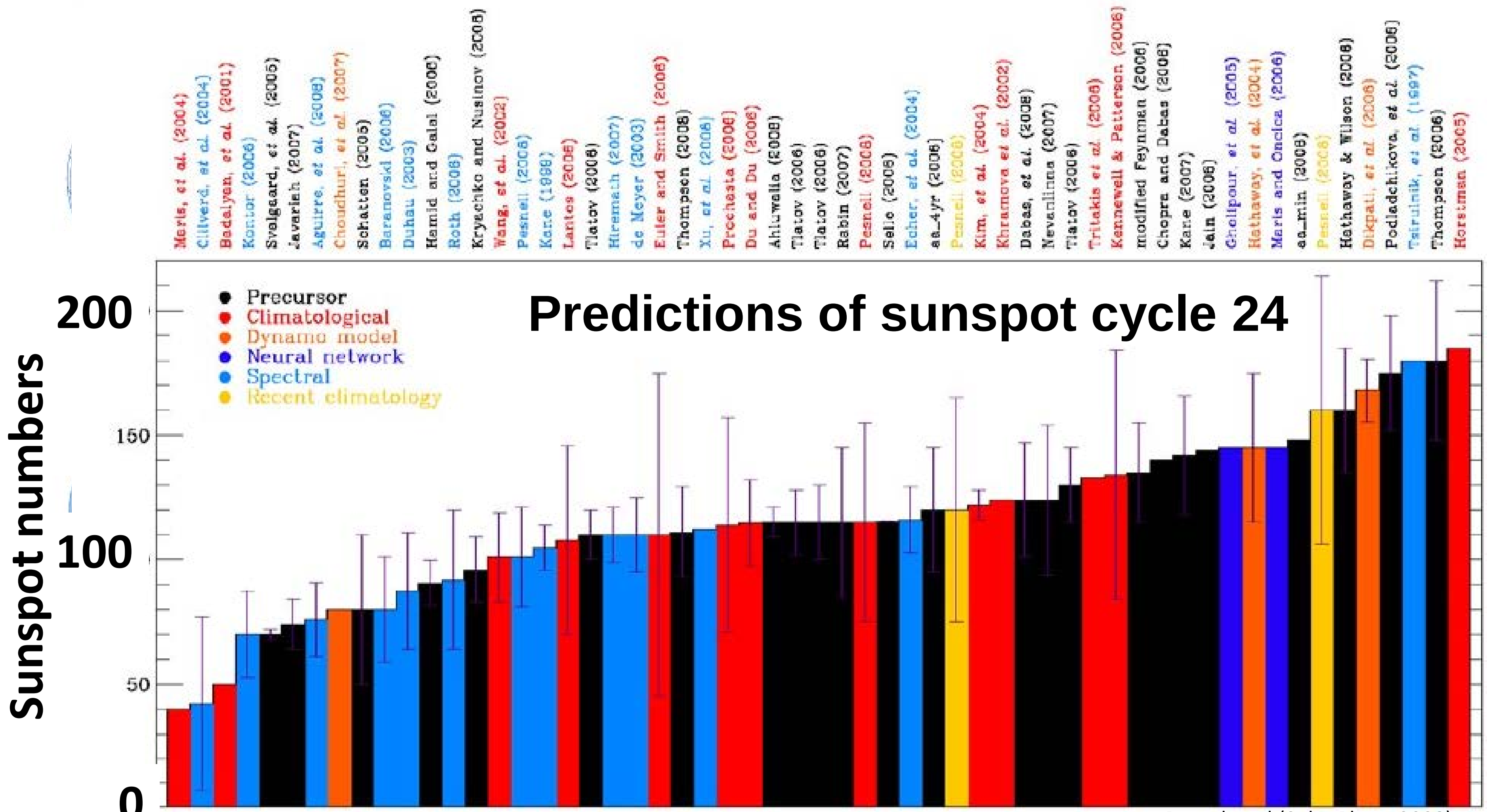
Piet Martens,
(Smithsonian Astrophysical Observatory, USA)

Vladimir Obridko,
(IZMIRAN, Russia)

Dibyendu Nandi,
(IISER Kolkata, India)

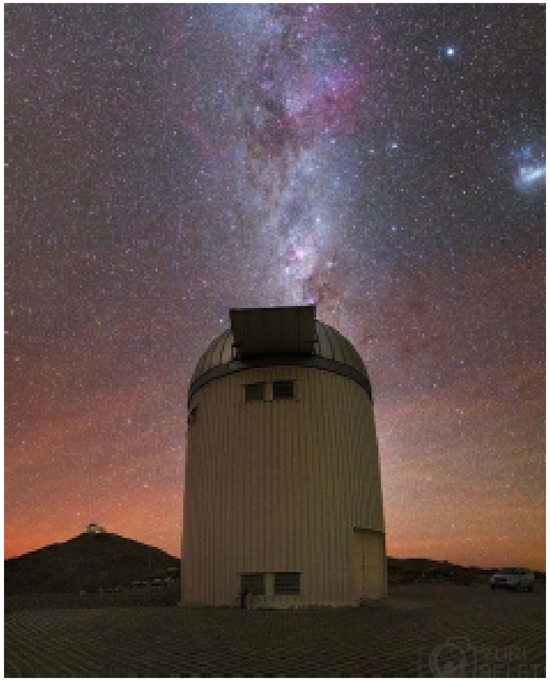


Dynamo modeling of solar magnetic field (Dikpati and Gilman, 2006)



Pesnel et al (Solar Phys., 2008)

VarSITI explores Sun-like Stars to understand Extreme Events



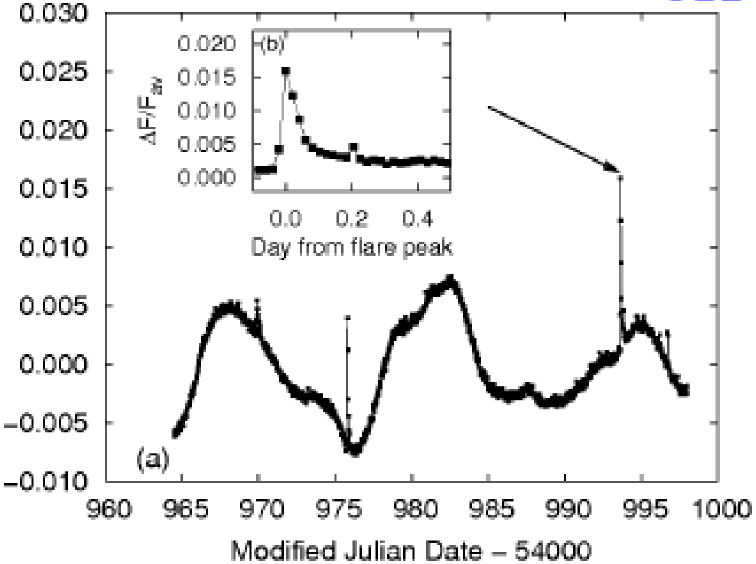
The OGLE Telescope with Milky Way
courtesy: Yuri Beletsky

Kepler Mission
NASA

Maehara et al. (Nature, 2012)

K. Shibata

SEE



Japanese scientists have identified flares that are 1000 times more powerful than solar flares on scores of Sun-like stars observed by NASA's Kepler mission.

There is a small probability that such flares can occur on the Sun

Hotta et al. (APJ, 2015; Science 2016): Hi-resolution modeling of solar dynamo processes.

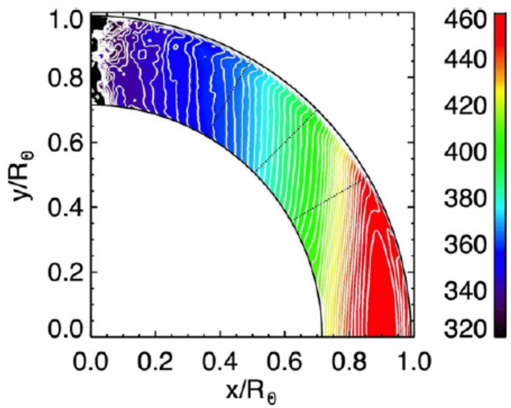


Figure 8. Averaged angular velocity ($\langle\Omega\rangle/(2\pi)$) over 200 days in units of nHz. The black dashed lines show the selected colatitude in Figure 9.

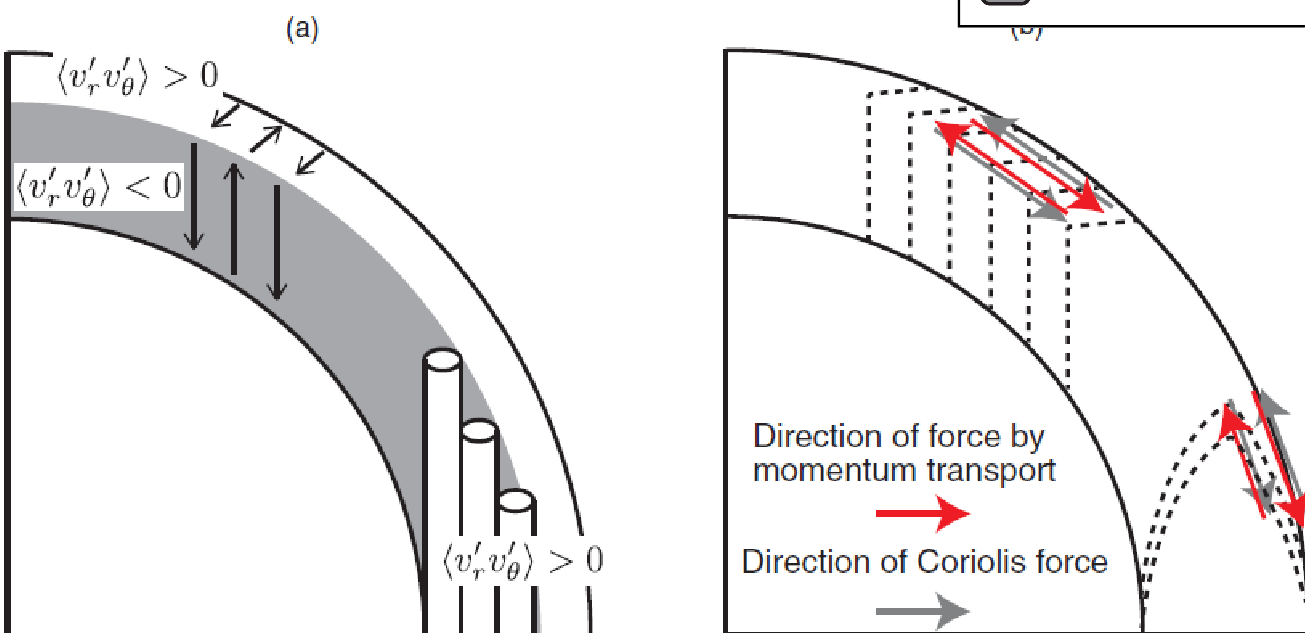
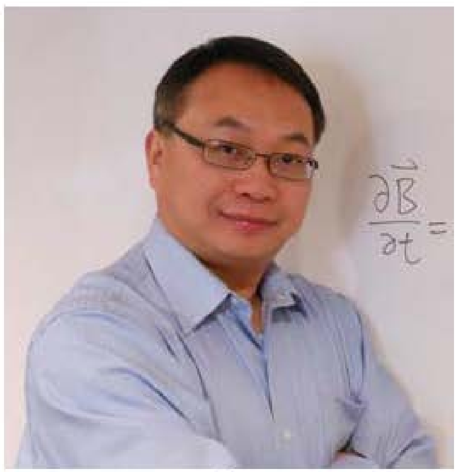


Figure 19. Summary of our findings in the schematic picture. In this figure, we only discuss Reynolds-stress related balances, i.e., we do not show the thermal wind balance in the bulk of the convection zone. Panel (a) shows the distribution of the correlation $\langle v_r' v_\theta' \rangle$. The gray area indicates the strong influence of the rotation. Panel (b) shows the force balance on the meridional plane. The gray and red arrows show the direction of the Coriolis force and the force by the momentum transport. Regarding the Coriolis force, the latitudinal component is shown. The dashed lines are the contour lines of the angular velocity.

International Study of Earth-Affecting Solar Transients ISEST/MiniMax24

International Study of Earth-affecting Solar Transients
ISEST

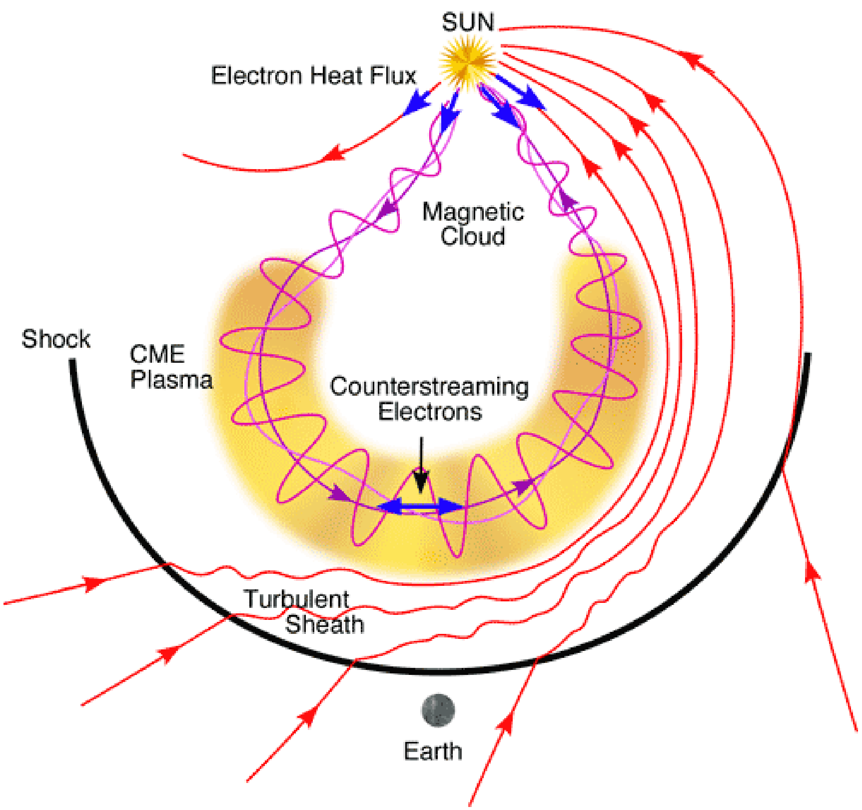


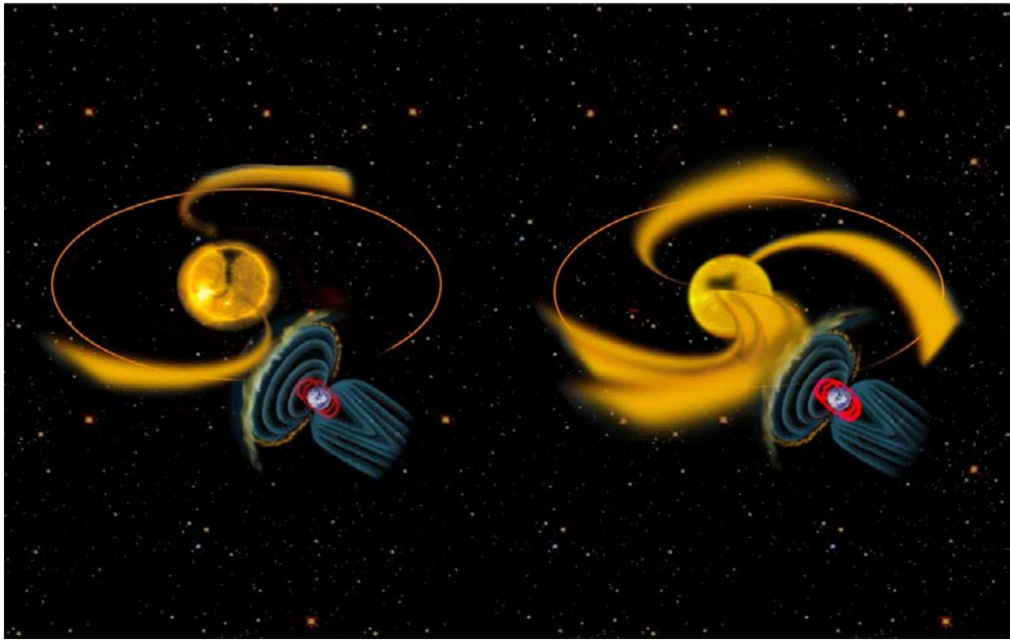
Jie Zhang,
(George Mason University, USA)

Manuela Temmer,
(UNIVERSITY OF GRAZ, Austria)

Nat Gopalswamy,
(Lab. for Solar & Space Physics, NASA/GSFC, USA)

How well do we understand the relation between solar events and the geoeffective disturbances?





Can we predict a CME's magnetic field based on its solar origin?

Can we predict a high speed stream's speed?

Do we know what happens to them during their way from the Sun to the Earth?

Evolution of the photospheric magnetic field.

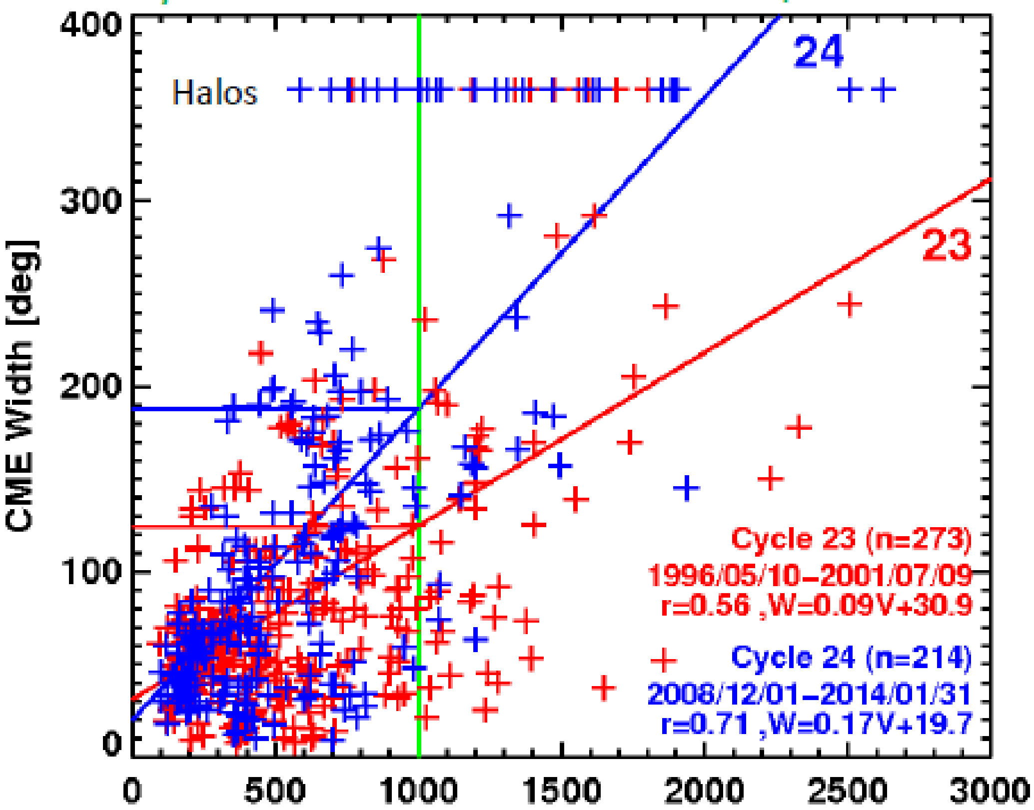
Emergence and formation of the Twisted Flux Rope.

Amari et al. (Nature Letter, 2014): Observation and modeling of magnetic flux rope as a origin of CME.

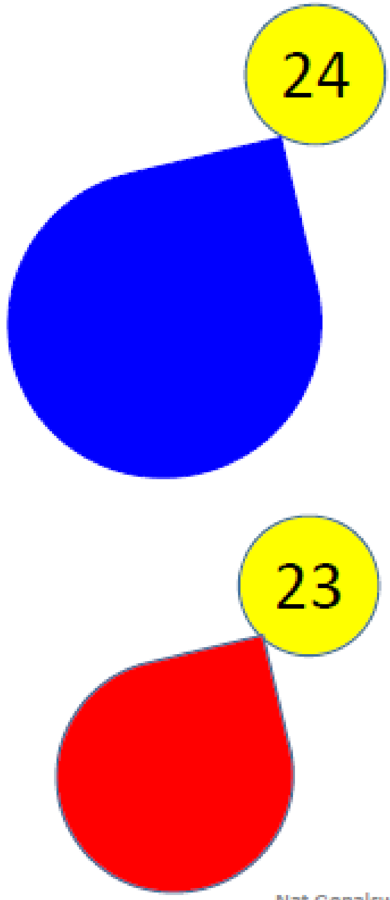
Anomalous Expansion of CMEs in Cycle 24

ISEST/MiniMax24

Cycle-24 CMEs are 52% wider for V=1000 km/s



Gopalswamy et al. 2014 GRL

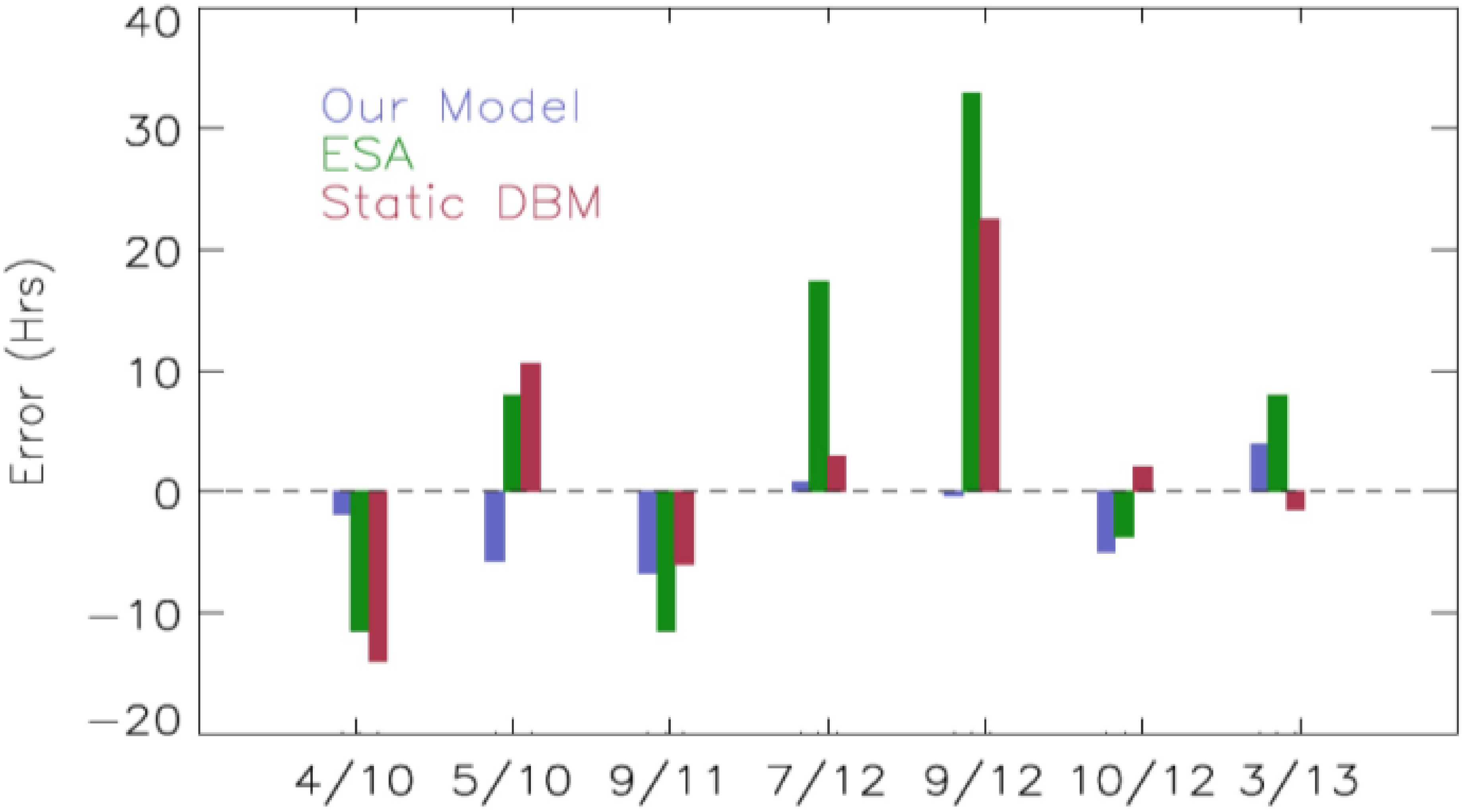


Lower outside Pressure --> larger CMEs

Higher outside Pressure --> Smaller CMEs

Nat Gopalswamy UNCOPUOS2015

Gopalswamy et al. (GRL, 2014): CME size difference by different background pressure condition in Cycle 23 and 24.



Hess and Zhang (ApJ, 2015): The prediction of CME arrival at 1 AU. The time of Arrival (TOA) prediction errors are shown for the Empirial Shock Arrival model (ESA), static drag-based model (DEM), and advanced drag-based model.

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

Specification and Prediction of the Coupled Inner-Magnetospheric Environment
SPeCIMEN

Jacob Bortnik,
(Dept. of Atmospheric and Oceanic Sciences
UCLA, USA)

Craig Rodger,
(University of Otago,
New Zealand)

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

Craig J. Rodger[1] **and J. Bortnik**[1]

1. Physics Department, University of Otago, Dunedin, New Zealand.

2. Dept. of Atmospheric and Oceanic Sciences UCLA, United States of America.

UNIVERSITY of OTAGO
Te Whare Wānanga o Otāgo
NEW ZEALAND
SAPERE AUDE

AOS UCLA

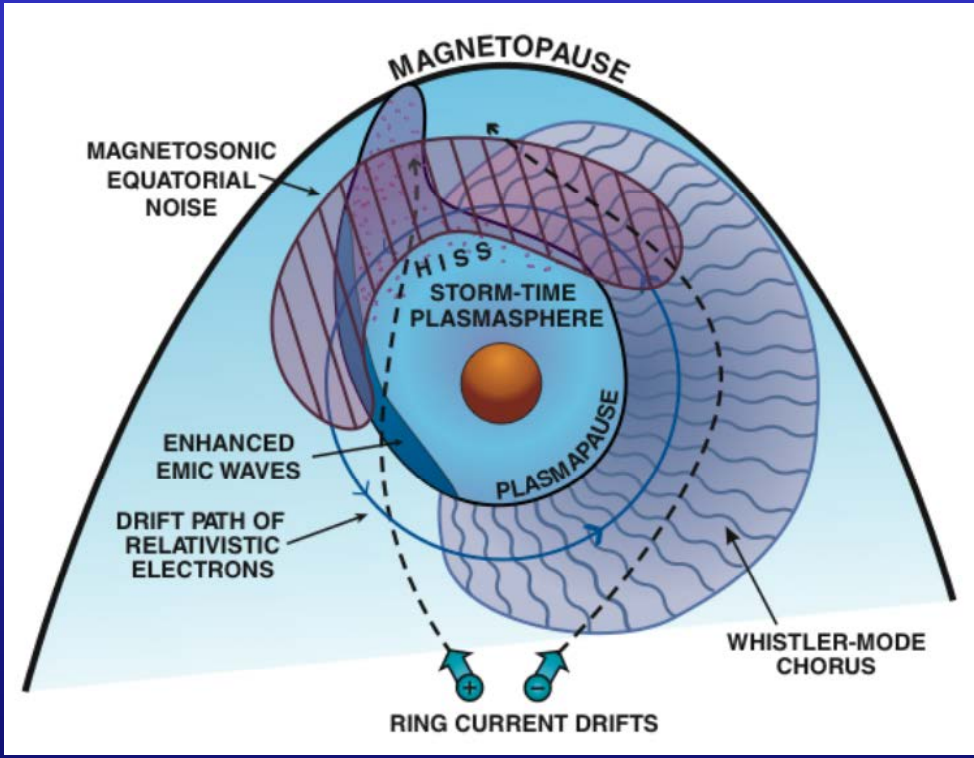
VarSITI

First VarSITI General Symposium
VarSITI2016 inaugural session
Bulgaria
6 June 2016

SPeCIMEN Objective

Prediction and specification of the Earth's inner magnetospheric environment

1. To high accuracy,
2. Based on inputs from the Sun and solar wind,
3. Employing a combination of physical and statistical predictive modeling.



Thorne [2011] GRL "frontiers" review

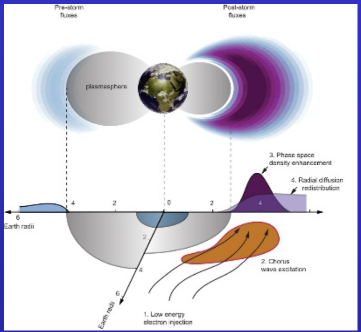
Science highlights

A huge amount of activity in the community right now. This area is very vibrant, with multiple activate missions and some up-coming plans as well (e.g.,

* ERG [Japan] later in 2016?
* USAF DSX [USA] March 2017).

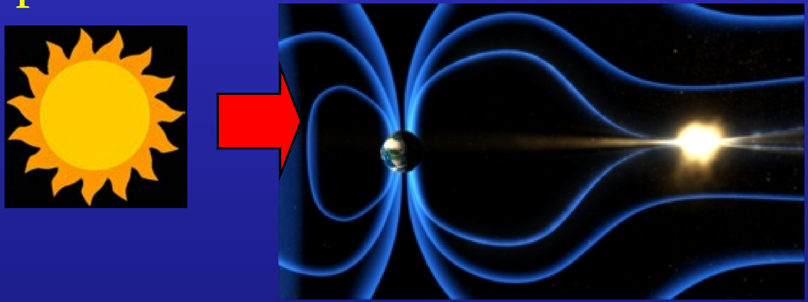
Just looking at the THEMIS and Van Allen Probes (RBSP ECT) publication lists for 2015-2016 shows >240 papers, mostly in JGR and GRL.

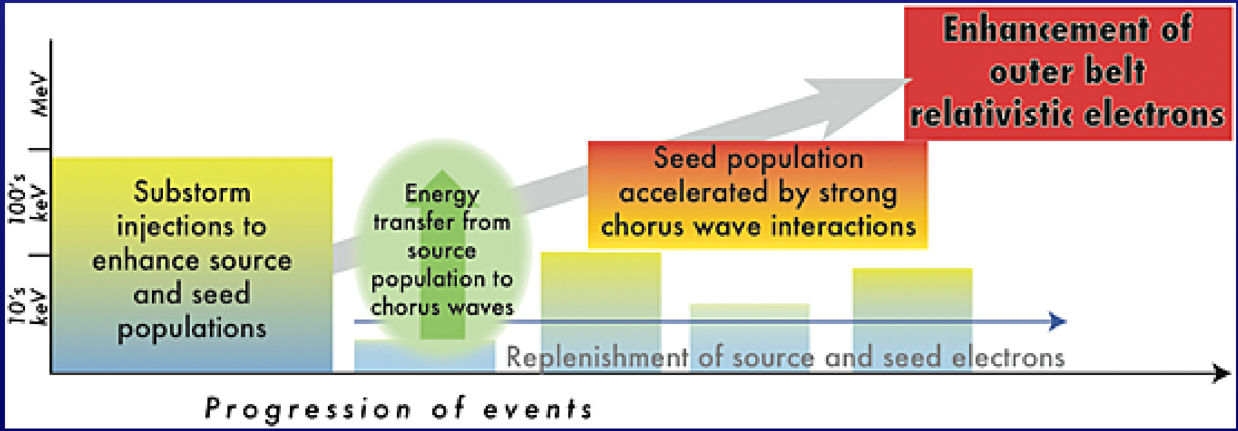
Science highlights



Growing evidence of the complex linkages between different parts of the inner magnetosphere. Previously noted the strong evidence that whistler mode chorus is a vital component to accelerate relativistic electrons.

New evidence that repeated substorms (themselves triggered by the solar wind) needed to produce the chorus.

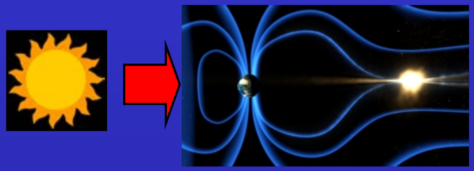


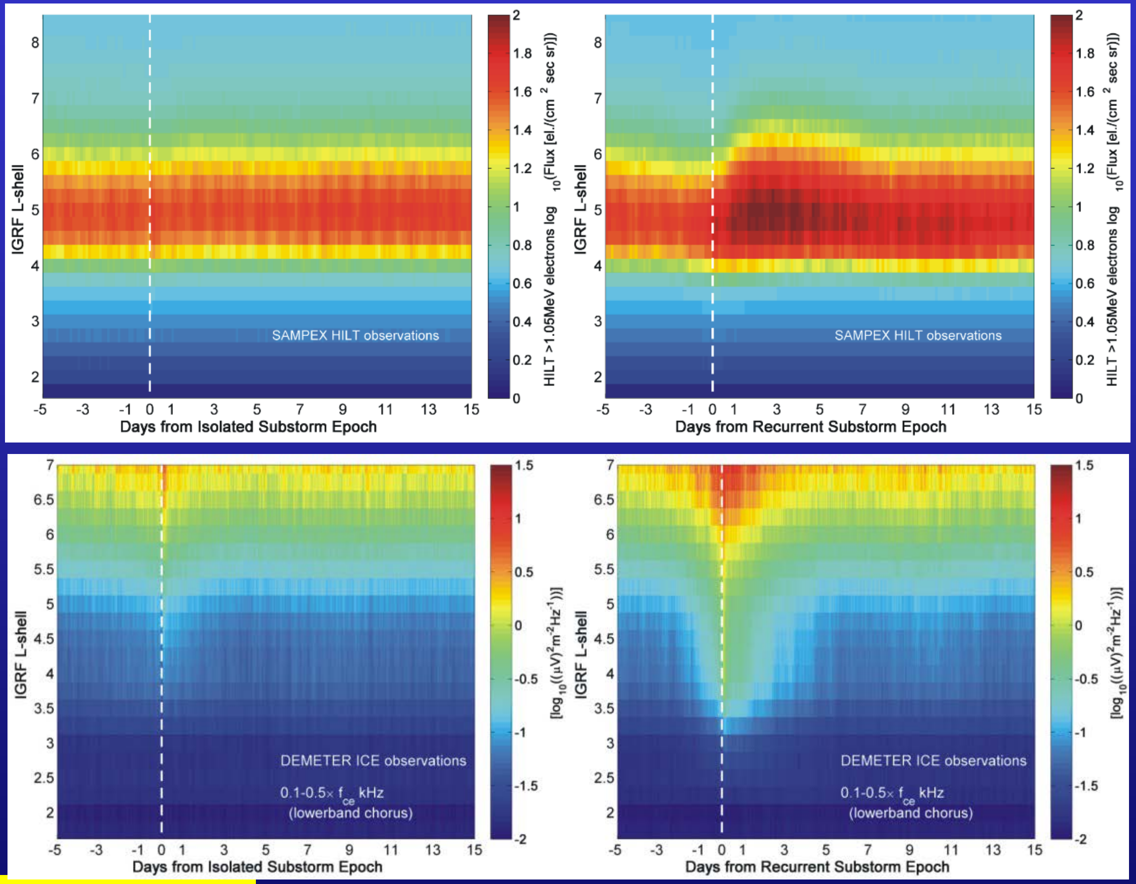


RBSP case study:
Jaynes, A. N., et al. (2015), *J. Geophys. Res.*, 120, 7240–7254, doi:10.1002/2015JA021234.

Science highlights

New evidence that repeated substorms (themselves triggered by the solar wind) needed to produce the chorus.



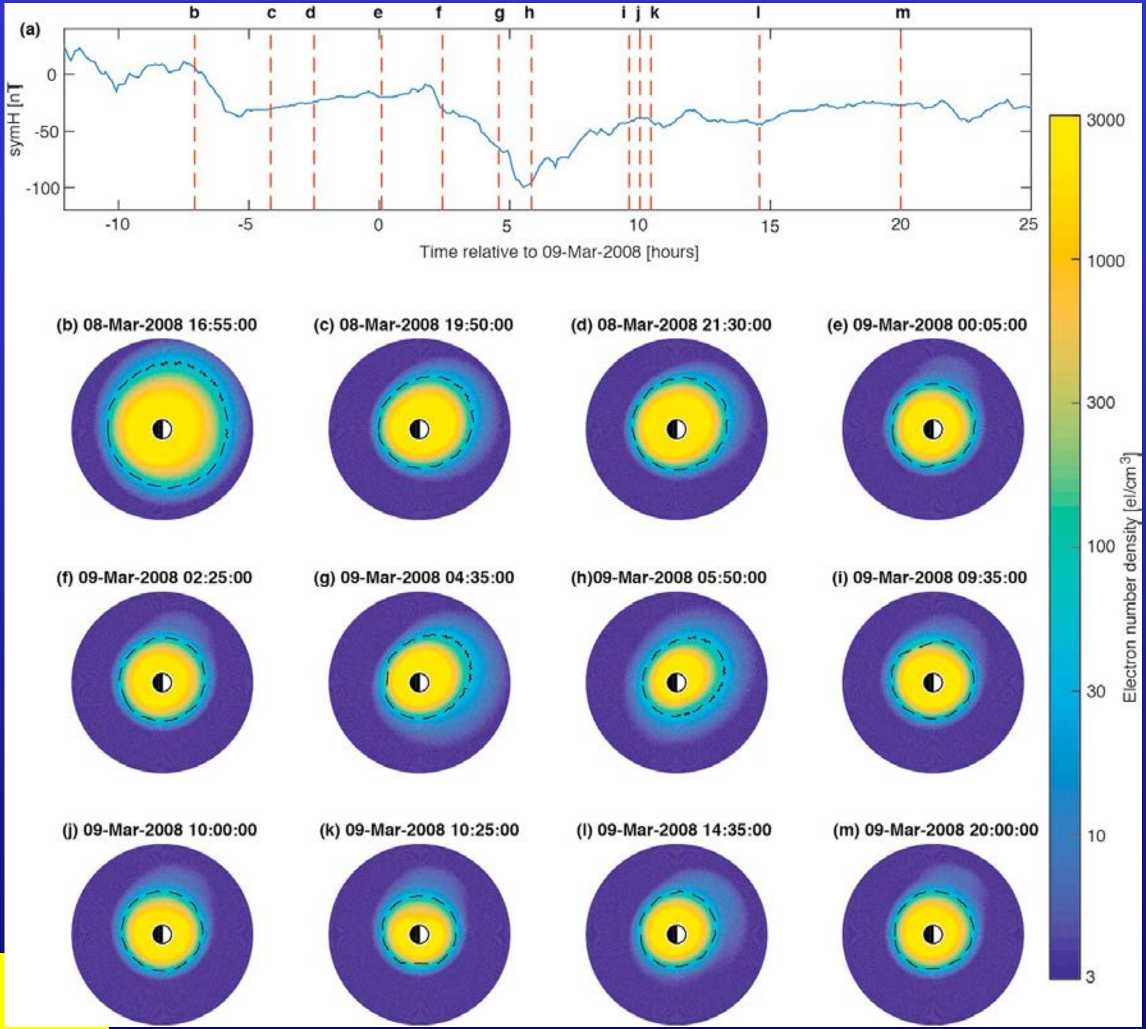


Statistical study:
Rodger, Cresswell-Moorcock, and Clilverd (2016), *J. Geophys. Res*, 121, 171–189, doi:10.1002/ 2015JA021537.

Appeared in the JGR Special Issue: Variability of the Sun and Its Terrestrial Impact VarSITI

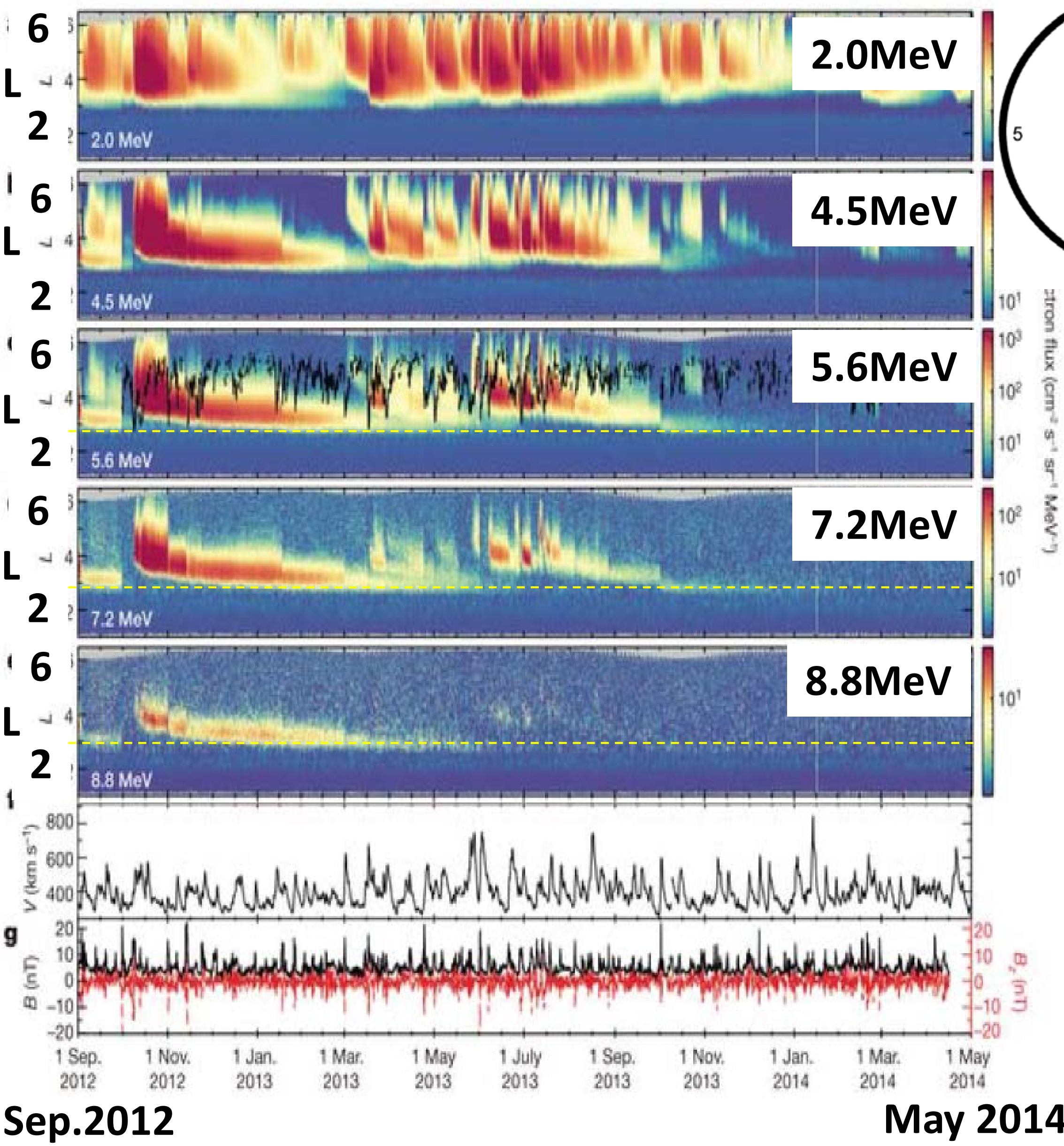
Science highlights

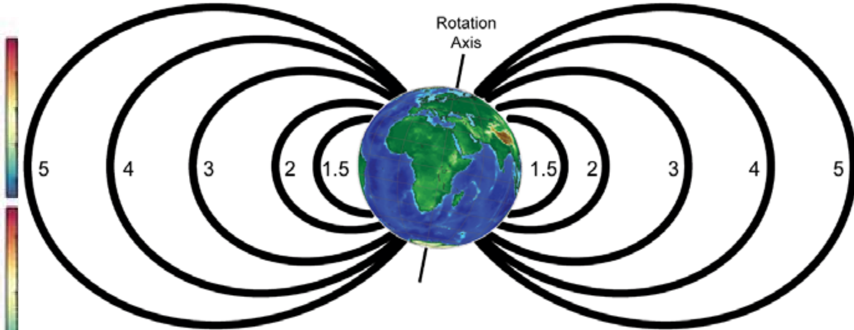
New approach developed to machine learning the inner magnetospheric environment from spatio-termporal satellite data. This already has the capacity to “specify and predict” which is a part of SPeCIMEN, and to be included into physics-based models



Bortnik, J., W. Li, R. M. Thorne and V. Angelopoulos (2016), A unified approach to inner magnetospheric state prediction, J. Geophys. Res. Space Physics, 121, 2423–2430, doi:10.1002/ 2015JA021733.

Appeared in the JGR Special Issue: Variability of the Sun and Its Terrestrial Impact VarSITI



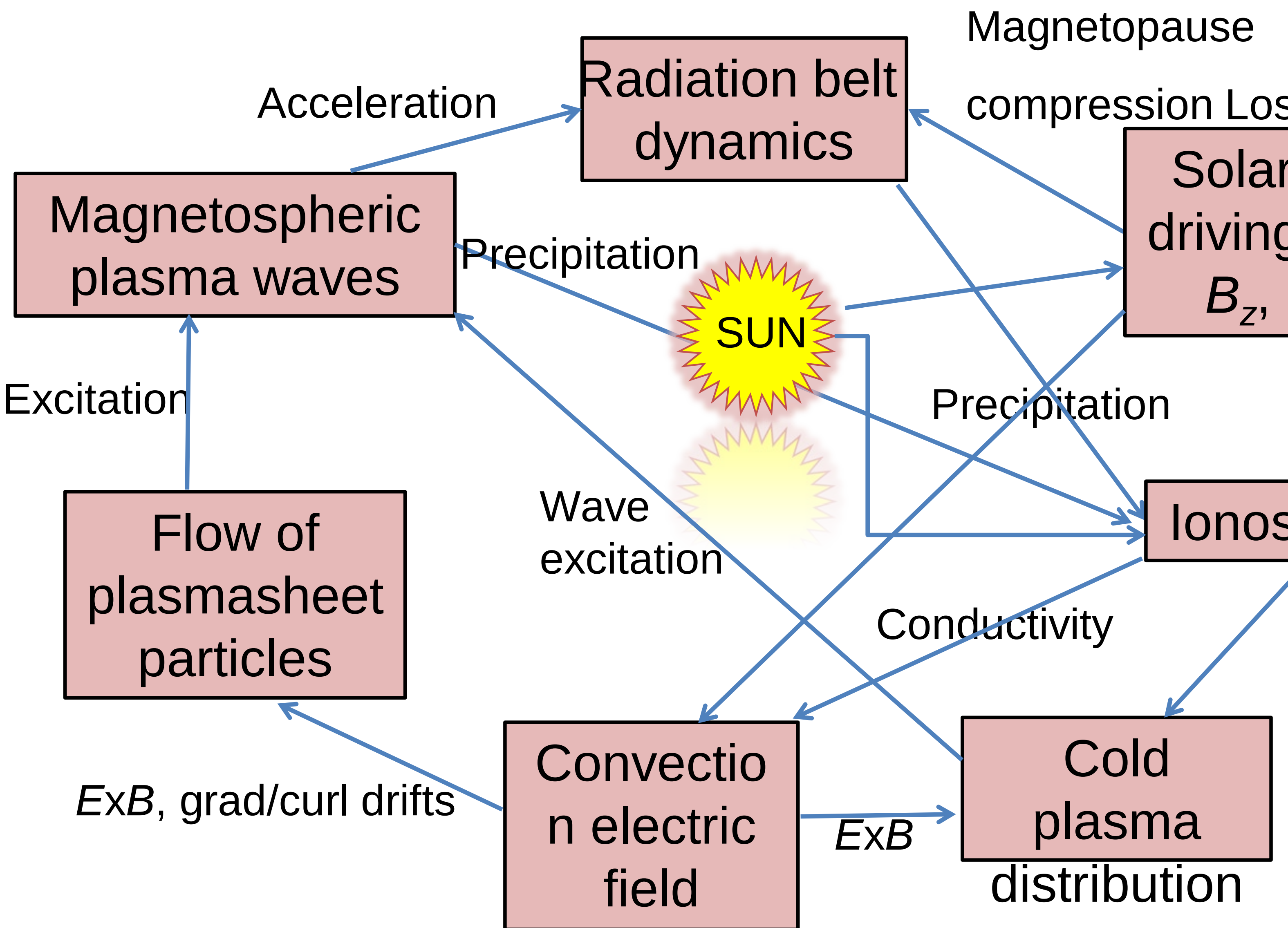


In **a**–**e** the highly energetic electrons measured by REPT sensors throughout the mission never seem to extend inwards of *L* ≈ 2.8. This forms a particularly clear and sharp boundary for the ultrarelativistic electrons as shown in **c**–**e**.

Baker et al. (Nature, 2014): Discovery of sharp inner boundary for the ultrarelativistic (E>5MeV) electrons in the Earth's radiation belts.

It's a complex system!

There is a lot of coupling and lots of observations from space and ground are needed to characterise the processes (remember, we span ~6-orders of magnitude in Energy).



Similarly:
- Ring current
- Substorms
- Etc.

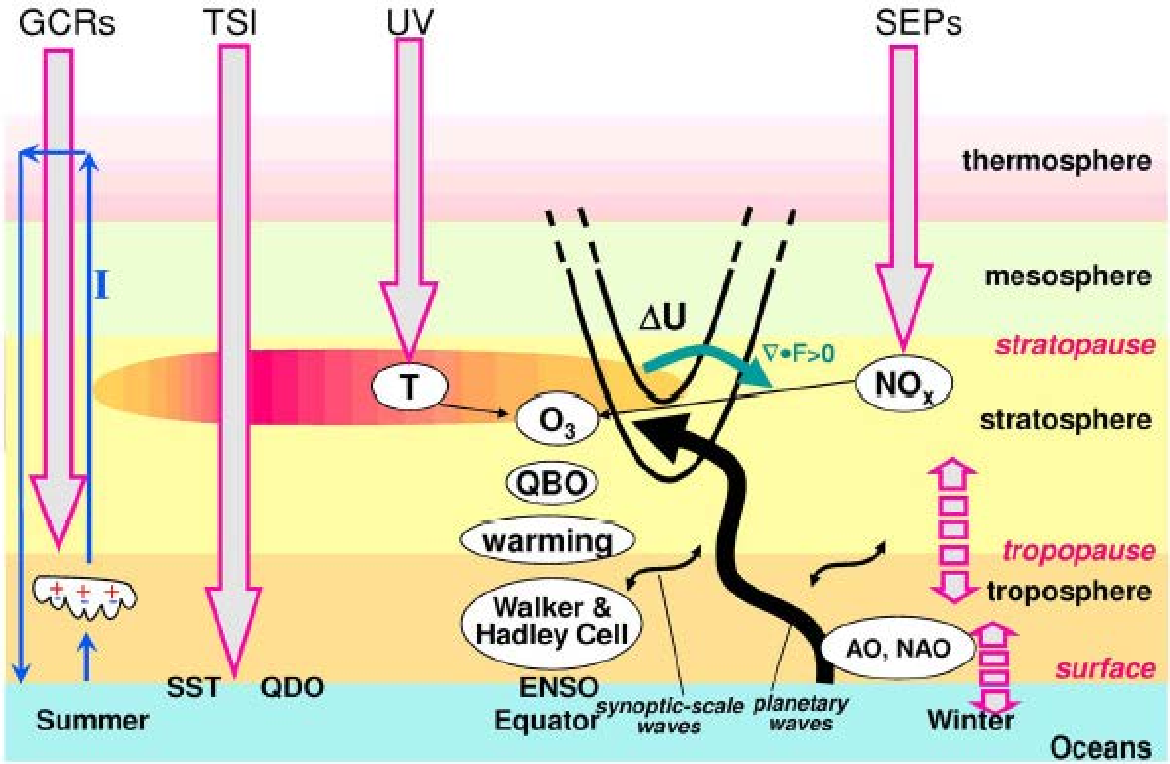
Role Of the Sun and the Middle atmosphere/ thermosphere/ionosphere In Climate (ROSMIC)

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

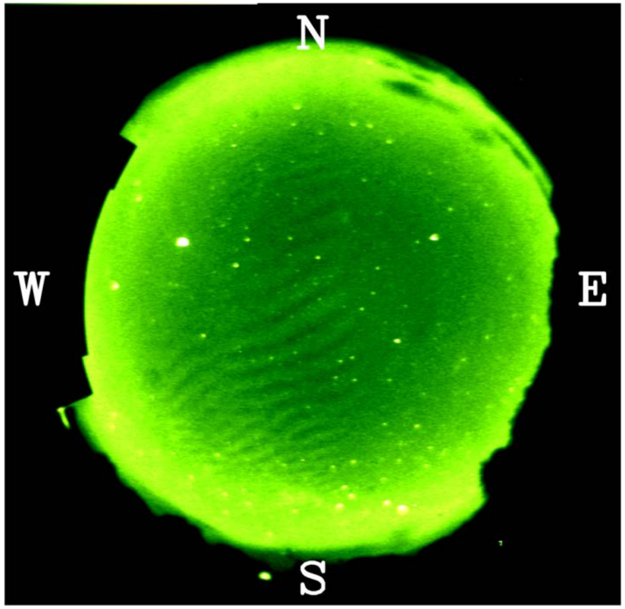
F.-J. Lübken,
(Leibniz-Institut für Atmosphärenphysik,
Germany)

Annika Seppälä,
(Finnish Meteorological Institute,
Finland)

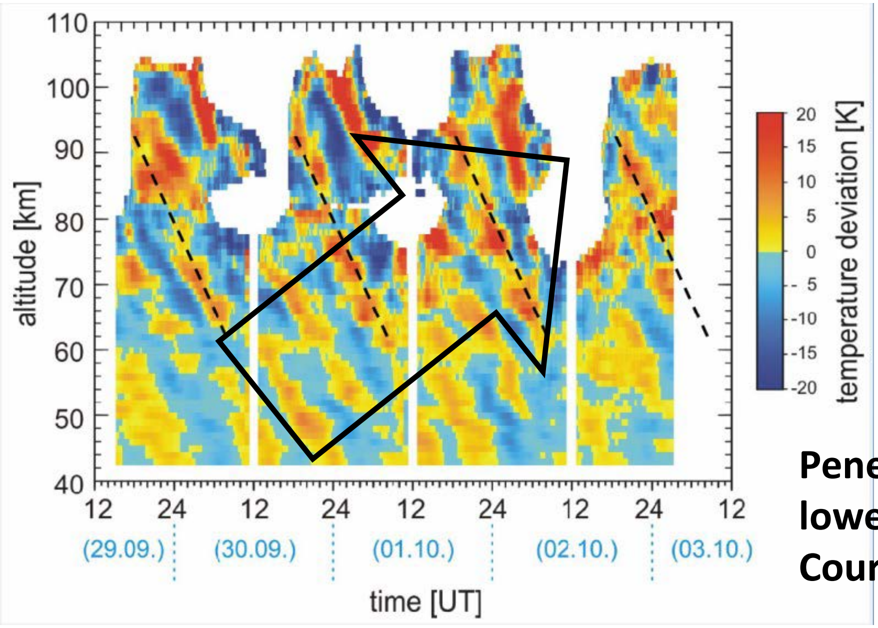
William Ward,
(University of New Brunswick,
Canada)



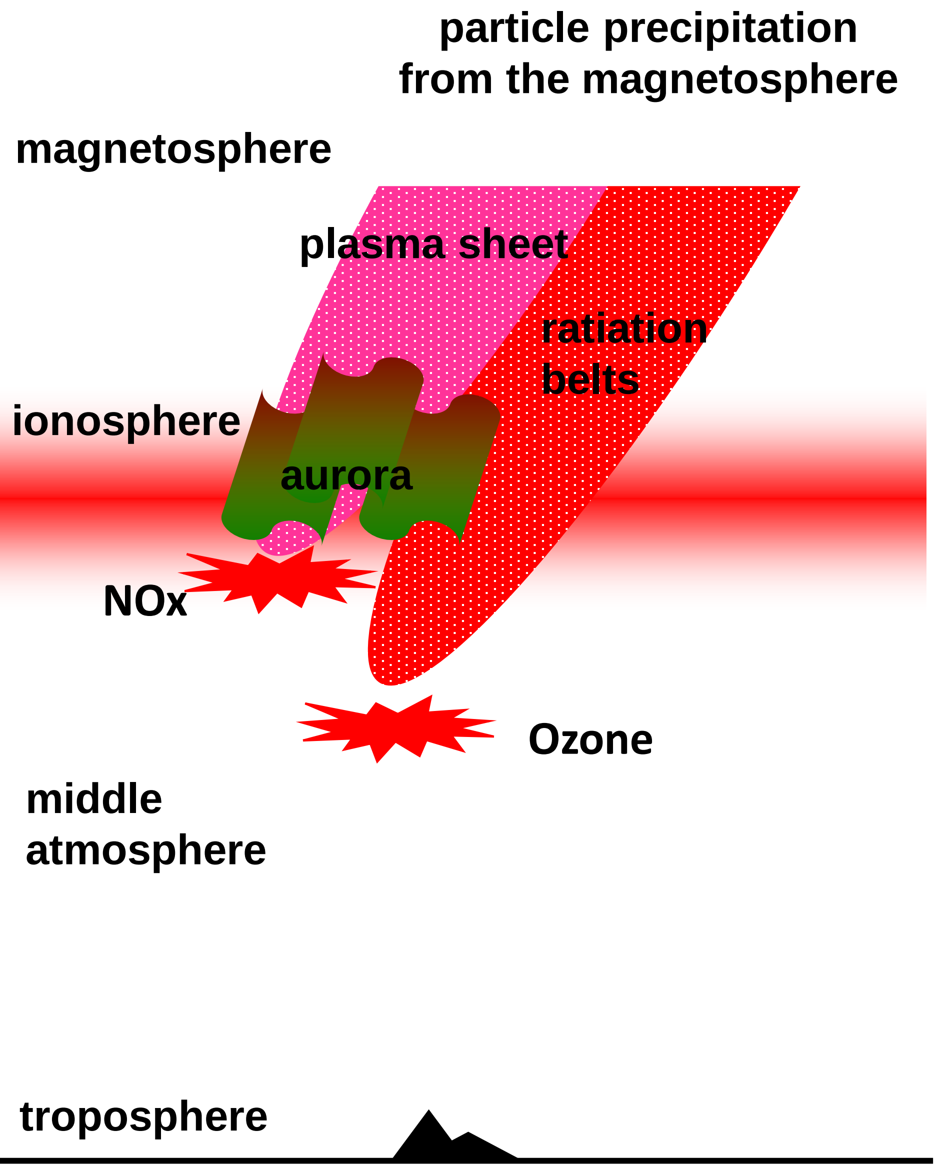
Various solar effects that possibly make climate change (Gray et al., RG, 2010)



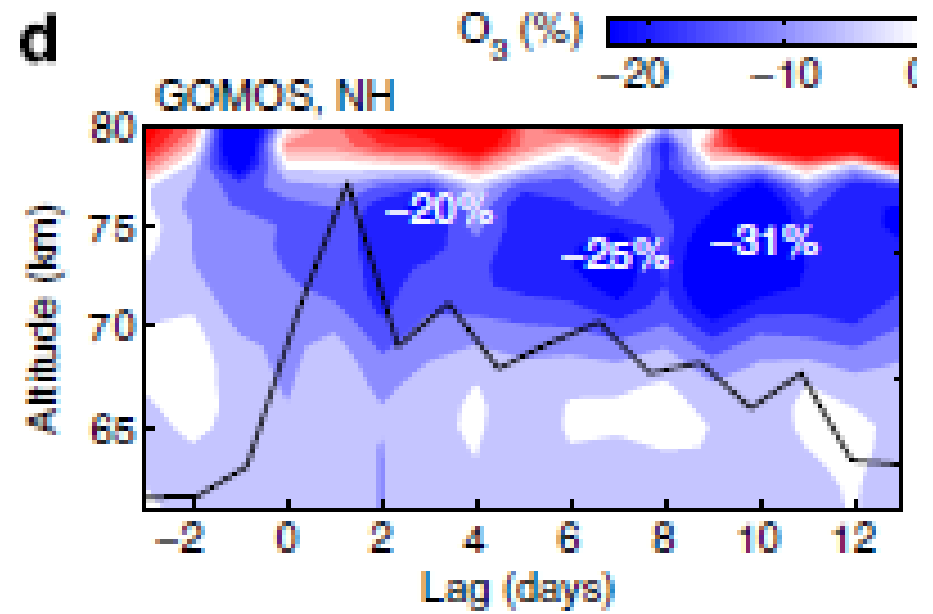
Gravity waves in the mesospheric airglow images. Courtesy of ISEEL, Nagoya University



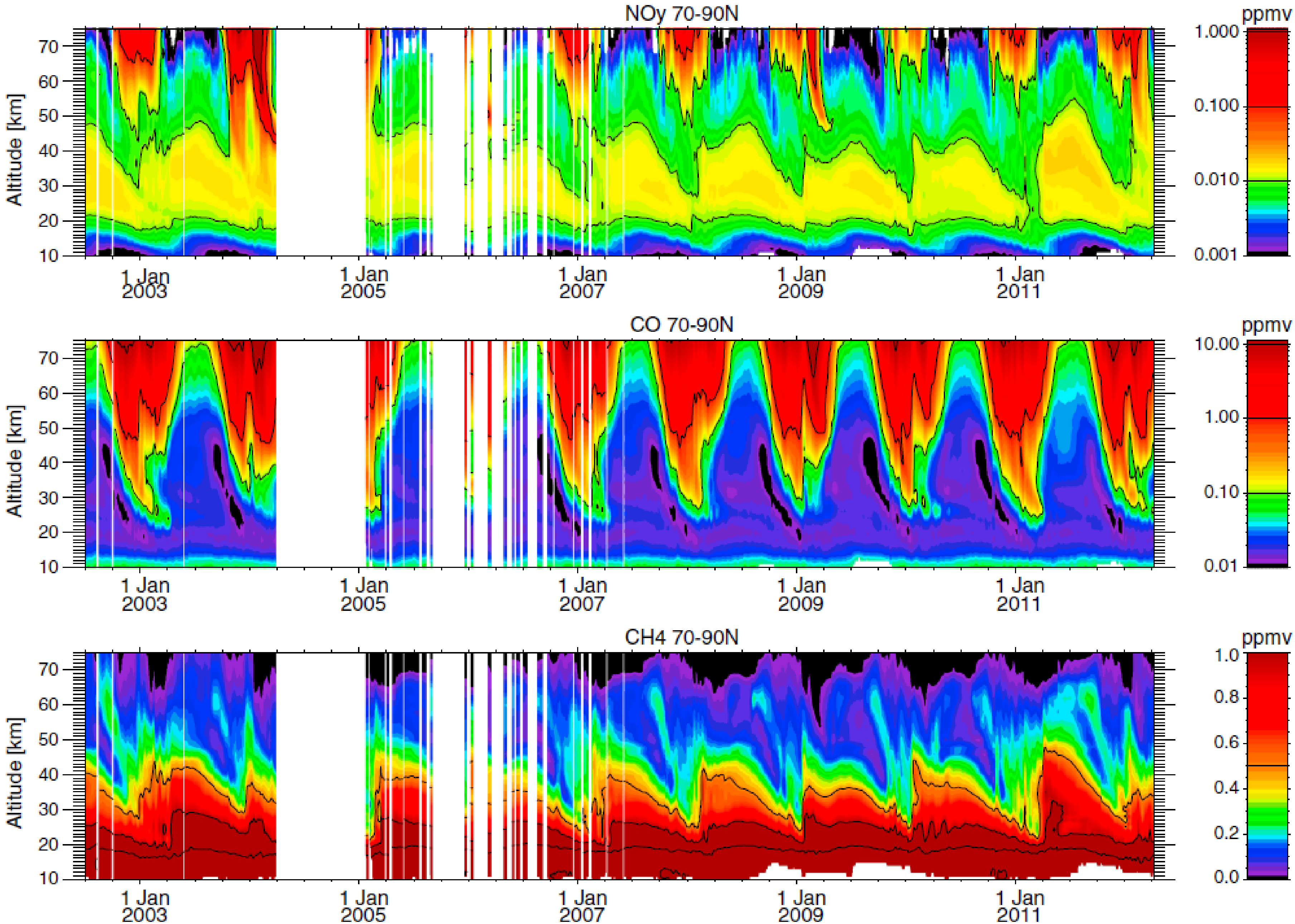
Penetration of gravity waves (in temperature data) from the lower atmosphere into the ionosphere and thermosphere. Courtesy of IAP Kühlungsborn.



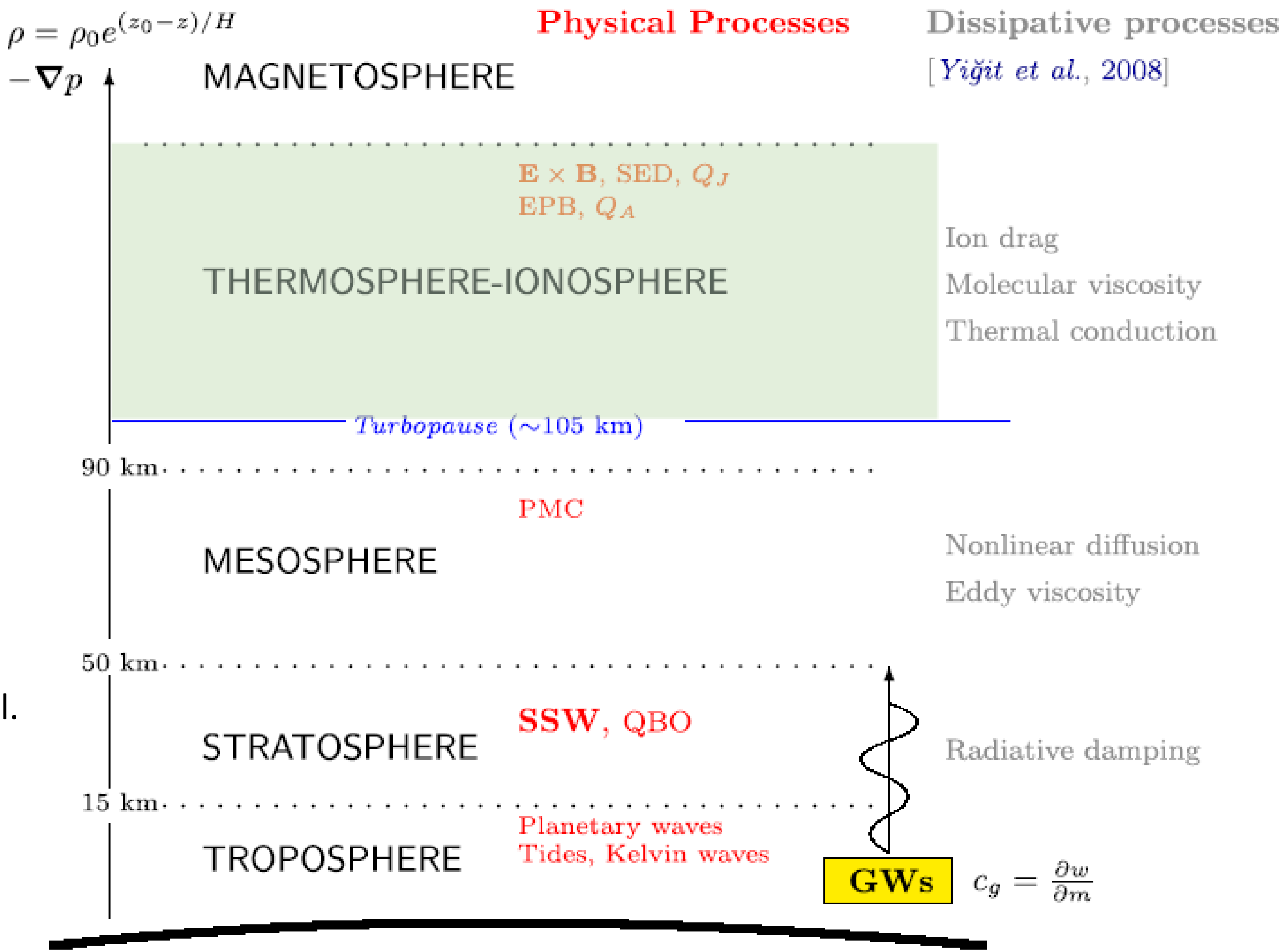
Polar region



Andersson et al. (Nature Comm., 2014): First evidence for radiation belt electron precipitation impact on atmospheric ozone in long term.

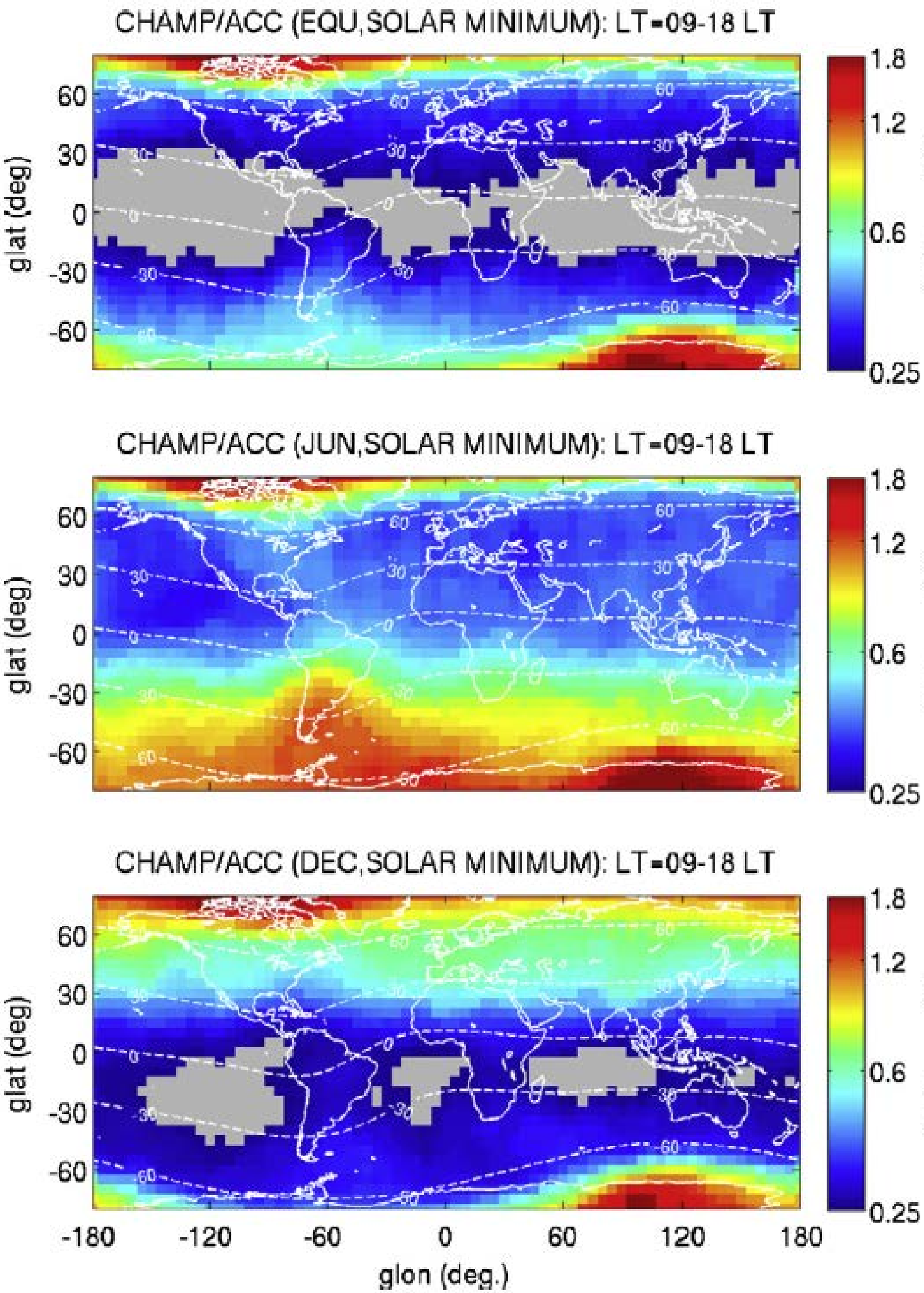


Funke et al. (JGR, 2014): Use of a long satellite dataset to determine the contribution of energetic particle precipitation produced NOy to the total polar atmospheric NOy budget.



Yigit et al. (JASTP 2016)

Oberheide et al. (PEPS, 2015); Yigit et al. (ASR, 2015; JASTP, 2016), : Review of vertical coupling of waves from the troposphere to the ionosphere.



Park et al. (JGR, 2014): Day-time gravity wave activity in terms of relative density perturbations during equinox, June and December solstices based on solar minimum years (2006–2010) obtained from the CHAMP satellite at altitude of 400 km.

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

We encourage more communication between solar and heliosphere scientists and Earth's magnetosphere, ionosphere, and atmosphere scientists.

- Campaign data analysis from the Sun to the Earth
- Web pages (www.varsiti.org)
- Mailing lists (currently 770 mail addresses are registered)
- Newsletters
- Meetings (financial support is available)

www.varsiti.org

VarSITI

Variability of the Sun and Its Terrestrial Impact

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

HOME

Good Afternoon.

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), and
- ✓ **ROSMIC** (**R**ole **O**f the **S**un and the **M**iddle atmosphere/thermosphere/ionosphere **I**n **C**limate).

Meetings supported by SCOSTEP/VarSITI funding in 2016 (total: 18)

title	place or institute	country	date
2016 ILWSWorkshop "Science for Space Weather"	Goa	India	24-29 January 2016
Nigerian Geophysical Society will be holding her 3rd Annual Conference of Nigerian Geophysical Society with the theme "Space-Earth Environment for sustainable national development"	Landmark University	Nigeria	3-4 February 2016
IAGA-IV Symposium: "Influence of short and long term solar variability on climate"	Hurghada	Egypt	20-24 March 2016
6th Space Climate Symposium	Levi	Finland	4-7 April 2016
ANtartic Gravity Wave Instruments Network (ANGWIN) 3rd workshop	British Antarctic Survey, Cambridge	England	12-14, April, 2016
EGU session on the solar deep minimum	Vienna	Austria	17-22 April 2016
Space Wether, Space Climate, and VarSITI Session at JpGU2016	Makuhari	Japan	22-26 May 2016
The 1st VarSITI Symposium	Albena	Bulgaria	6-10 June 2016
6th International HEPPASOLARIS Workshop	Helsinki	Finland	13-17 June, 2016
6th IAGA/ICMA/CAWSES Workshop on Vertical Coupling in the Atmosphere-Ionosphere System	National Central University & National Cheng Kung University	Taiwan	25-29 July 2016
41th COSPAR general assembly Session C2.3: Advances in external forcing studies for the middle atmosphere and lower thermosphere	Istanbul	Turkey	30 July - 7 August, 2016
41th COSPAR general assembly Session E2.2: Formation, destabilization, and ejection of magnetic structures in solar and stellar coronae	Istanbul	Turkey	30 July - 7 August, 2016
International Symposium on Recent Observations and Simulations of the Sun-Earth System III	Golden Sands	Bulgaria	11-16 September 2016
International Symposium on the Whole Atmosphere (ISWA)	University of Tokyo, Tokyo	Japan	14-16 September, 2016
ROSMIC/IAGA workshop on trends and long term variations	K□uhlungsborn	Germany	19-23 September 2016
7th workshop of the VLF/ELF Remote Sensing of Ionospheres and Magnetospheres (VERSIM) working group	Hermanus	South Africa	19-23 September 2016
14th Hvar Astrophysical Colloquium	Hvar Observatory, Faculty of Geodesy, University of Zagreb	Republic of Croatia	25-30 September 2016
2016 African Geophysical Society (AGS) conference	Université FHB Cocody Campus de Bingerville	Cote d'Ivore	7 - 11 November 2016

Databases supported by SCOSTEP/VarSITI funding in 2016 (total: 4)

title	place or institute	country	topic
Construction and dissemination of wave indices as indicators of turbulent energy transfer into the magnetosphere	Institute of the Physics of the Earth (Moscow)	Russia	wave indices in the magnetosphere
web-based database of identi ed EUV global waves (The CorPITA database)	University College London	UK	list of the EUV gllobal waves observed in the sun
Creation of Sunspot Database from Original Drawings	Zurich	Switzerland and US	sunspot number
Creation of catalog of large-scale solar wind phenomena during 2001-2015	Space Research Institute	Russia	large-scale phenomena in the solar wind from OMNI2

VarSITI-related 128 databases are compiled in the VarSITI website.

VarSITI-related Database Resources

Last modified 12/02/2015 21:59:32

Contents

The list below has 128 different Databases
Print (14pages) or download as Excel file (28KB)

DATABASE-COMPREHENSIVE

CDAWeb
WEB address: http://cdaweb.gsfc.nasa.gov/istp_public/
Recomended by: SEE, ISEST, SPeCIMEN, ROSMIC
Description: interactive data plotting tool on web-browser for all NASA satellite data in STP
Region: sun, heliosphere, magnetosphere, ionosphere

OMNIWeb
WEB address: http://omniweb.gsfc.nasa.gov/ow.html
Recomended by: SEE, ISEST, SPeCIMEN, ROSMIC

VarSITI Newsletter (published every 3 months)

Writers from vol.7 (Oct.2015) to vol.9 (Apr.2016): Austria, China, Czech Republic, Egypt, Germany, Greece, India, Israel, Japan, Nigeria, Russia, Slovakia, and USA

VarSITI Registration Sheet for mailing list

VarSITI Registration sheet | **Date:** | **Meeting name:**

Please sign your name and e-mail address to register into the VarSITI mailing list

first name	last name	e-mail address	country	interest of projects (choose as many as you like)
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL
				SEE ISEST/Minimax SPeCIMEN ROSMIC ALL

VarSITI Special Section in JGR-Space Physics (2015)
20 papers are published

AGU PUBLICATIONS

JGR

Journal of Geophysical Research: Space Physics

INTRODUCTION TO A SPECIAL SECTION
10.1002/2015JA021882

Special Section:
Variability of the Sun and Its Terrestrial Impact VarSITI

Key Points:
- Preface to the special collection VarSITI
- Some introduction to the VarSITI program
- Some description of the STP13 meeting

Preface to VarSITI Special Section

Qiang Hu[1]

[1]Department of Space Science/CSPAR, University of Alabama in Huntsville, Huntsville, Alabama, USA

During the week of 17–23 October 2014, the Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) Quadrennial Solar-Terrestrial Physics Symposium (STP13) was held in the ancient city of Xi'an, China, home to the world-renowned Terracotta warriors. The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) was established in 1966 as an interdisciplinary body of the International Council for Science. SCOSTEP is tasked with running long-term scientific programs in Solar-Terrestrial Physics. SCOSTEP has been organizing quadrennial Solar-Terrestrial Physics Symposia such as the one in Xi'an for over 40 years to showcase important results obtained from the long-term scientific programs. Over 260 scientists, including many young researchers and students, gathered at the conference venue right next to the magnificent city wall —one of the oldest and best preserved city walls in China.

Other VarSITI-related special issues (planned)

EPS: Global Data Systems for the Study of Solar-Terrestrial Variability (from SCOSTEP-WDS workshop)

JGR: Geospace system responses to the St. Patrick's Day storms in 2013 and 2015

AnnGeo: International Symposium of Equatorial Aeronomy - 14

JASTP: ISSI/VarSITI FORUM on Expected Evolution of Solar Activity in the Following Decades.

First VarSITI General Symposium

Place: Albena, Bulgaria
Date: 6-10 June, 2016
119 presentations, 115 final registrations from 26 countries
(Australia, Austria, Belgium, Bulgaria, Canada, China, Czech_Republic, Egypt, Finland, France, Germany, India, Japan, Kazakhstan, Nigeria, Republic_of_Korea, Romania, Russia, Rwanda, Serbia, Switzerland, Taiwan, Turkey, UK, USA, Ukraine)

Results will be published to the special issue of JASTP

Summary

- VarSITI is the current SCOSTEP scientific program to run during 2014-2018 (half or it completed)
- About 770 Scientists from more than 65 countries are participating in the VarSITI program to advance Sun-Earth connection studies
- Interesting discoveries are being made and the results published
- Solar terrestrial science will reach as many developing countries as possible via SCOSTEP's capacity building and outreach activities