LWS TR&T Town Hall Meeting
Fall AGU 2011

Brief summary of LWS TR&T Program Status

Lika Guhathakurta, Chuck Goodrich, Bob Leamon
from NASA HQ

AGENDA

Comments on current Focus Team and Strategic Capability activities (Team leads)

Open discussion of LWS TR&T Program and next Focus Topics

TR&T Steering Committee

New Membership for 2012 established

SC has broad science and application community representation and rotating membership, who will support NASA Headquarters in:

- Establishing and continually updating targets and top-level priorities;
- Measuring the progress of the program in meeting science goals and objectives;
- Providing mechanisms for monitoring how well products that result from the program are transferred into societal benefits.

Agency Liasion:

- ***NOAA (Terry Onsager)***
- ***NSF (Farzad Kamalabadi)***
- ***AFOSR (?)***
- ***CCMC (Michael Hesse/ Masha Kuznetsova)***
- ***Neal Zapp NASA (SRAG/JSC)***

New SC Members

Chair & few more membership pending

Bill Abbett, UC Berkeley
Geoff Crowley, ASTRA, LLC
Frank Eparvier, LASP, UC Boulder
Tamas Gombosi, U Michigan
Chuck Goodrich, George Mason U
Justin Kasper, SAO
Barry Mauk, JHU APL
Pete Riley, Pred. Science
Karel Schryver, LMSAL
Nathan Schwadron, UNH
Harlan Spence, UNH

Amitava Bhattacharjee, Outgoing Chair, UNH

Liason to TR&T SC:
Terry Onsager, NOAA SWPC
Farzaad Kamalabadi, NSF
?, AFOSR
Masha Kuznetsova, CCMC
Neal Zapp SRAG

Project & Mission Scientists
Dean Pesnell, Dave Sibeck, Adam Szabo,
Chris St.Cyr, Nicky Fox

Ex Officio:
Lika Guhathakurta, Lead
Program Scientist, NASA HQ
Bob Leamon,
LWS Discipline Scientist
Mona Kessel,
RBSP Program Scientist
Jeff Newmark, Solar & Helio
Discipline Scientist

Proposals and Awards 2010

- 4 New Focus Teams in 2011
  - Jets in the Solar Atmosphere and their Effects in the Heliosphere. *14 proposals, 6 funded (some partial), average $93 K*
  - Factors that Control the Highly Variable Intensity and Evolution of Solar Particle Events. *17 proposals, 6 funded, average $111 K*
  - Incorporating Plasma Waves in Models of the Radiation Belts and Ring Current. *19 proposals, 5 funded, average $118 K*
  - Low-To Mid-Latitude Ionospheric Irregularities and Turbulence. *21 proposals, 5 funded, average $105 K*

- SDO Data Analysis
  - *47 proposals, 13 funded, average $109 K*
- Sun-Climate Theme
  - *18 proposals, 7 funded, average $128 K*
- Workshops
  - *4 proposals, 2 funded, average $34 K*

Proposal Topics for ROSES 2011

ROSES 2011

- Released Nov. 2011; NOIs due next week, Proposals late Feb. 2012
- 3 FSTs, Sun Climate Theme
  - No Tools and Methods
- New opportunity NASA/NSF Partnership For Collaborative Space Weather Modeling (renamed from Strategic Capability)
- Proposal selection June/July 2012; Funding October 2012 (FY13)

- TR&T email: lws.trt@nasa.gov

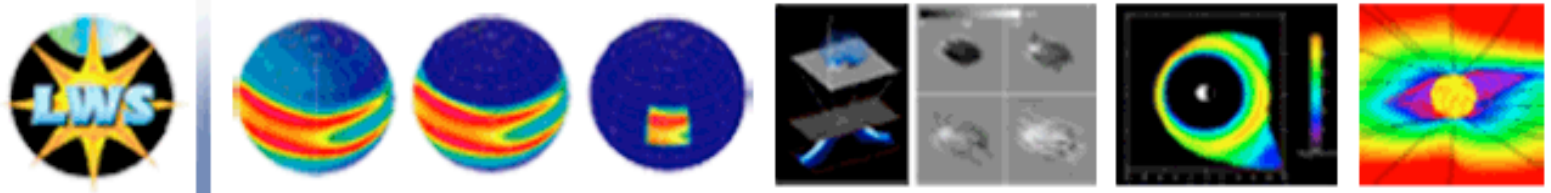
LWS TR&T Focus Topics

2006	2007	2008	2009	2010	**2011**
Predict emergence of solar active regions before visible	Magnetic Connection of **Photosphere and Low Corona**	Properties of the **Solar Dynamo** that affect Irradiance and Active Regions	Behavior of the **Plasmasphere** and its Influence on the **Iono-/ Magnetosphere**	**Jets** in the **Solar Atmosphere** and their Effects in the **Heliosphere**	**Interaction between the magnetotail and the inner magnetosphere and the impact of that interaction on the radiation belt environment**
Understand how **flares** accelerate particles near the Sun and contribution to large **SEP events**	Modulation of Galactic Cosmic Rays,… due to **Long-term Solar Activity**	Use Inner Heliosphere Obs. to Better Constrain CME and SEP Models	Origin and Nature of the Slow Solar Wind, and its effect on Helio Structures, and SEP Transport	Factors that Control the Highly Variable Intensity and Evolution of **Solar Particle Events**	**Atmosphere-Ionosphere Coupling During Stratospheric Sudden Warmings**
Plasma redistribution during storms in the **ITM** system	Daily Variability in the Thermosphere and Ionosphere	Integrate Non-MHD/Kinetic Effects into Global Models	Predict the Onset and Space Weather Impacts of Fast CMEs/Eruptive Flares	Incorporating Plasma Waves in Models of the **Radiation Belts** and Ring Current	**Flare Dynamics in the Lower Solar Atmosphere**
Middle and low latitude sources, effects, and distribution of large electron density gradients	Combined Modelling of Loss, Acceleration, and Transport of Magnetospheric Electrons, Protons	Response of ITM Composition and Temperature due to Solar XUV and Energetic Particle Variation	**Plasma-Neutral Gas Coupling**	Low-To Mid-Latitude **Ionospheric** Irregularities and **Turbulence**	
Solar origins of irradiance variations	Prediction of the Interplanetary Magnetic Field Vector Bz at L1		**The Sun-Climate Strategic Theme**	**The Sun-Climate Strategic Theme**	**The Sun-Climate Strategic Theme**

NASA/NSF Partnership For Collaborative Space Weather Modeling (ROSES 2011)

- **New opportunity for development of Strategic Capabilities addressing goals of the LWS and NSWP programs.**
  - Funding (~$4 M) to start in FY2013
  - 5-8 awards of up to 5 years each
  - Mid term review
- **Proposals must specify the science focus of project**
  - Should address problems poised for major advance
  - Demonstrate the transformative nature of project
  - Demonstrate critical contribution to LWS and NSWP
- **Proposals must specify specific deliverables and provide a development/management plan for their development and delivery**
  - Demonstrate how deliverables will provide a transformative step toward LWS/NWSP goals
  - Demonstrate need and importance of deliverables to scientific and operation communities
- **Proposals should specify how results of LWS Focused Science Teams and other current research will be assimilated**

Living With a Star
Targeted Research and Technology



HOME | proposals | science results | reports | news | related sites | contacts

- strategic capability
- focus teams
- steering committee
- mowg

LWS TR&T Strategic Capability:

TR&T website: http://lws-trt.gsfc.nasa.gov

2008

- Integrated Model of the Atmosphere and Ionosphere
- Solar Spectral Irradiance Models on Multiple Time Scales for Coupling to Atmospheric/Climate Models

2006

- 3D Model of an Active Region Coronal Magnetic Field

2005

NASA/NSF (AFOSR) Partnership for Collaborative Space Weather Modeling

- A Comprehensive Magnetosphere-Ionosphere Model
- Time-Dependent 3D Model for the Corona and Ambient Solar Wind
- Earth – Moon – Mars Radiation Model

Living With a Star
Targeted Research and Technology

TR&T website:
http://lws-trt.gsfc.nasa.gov

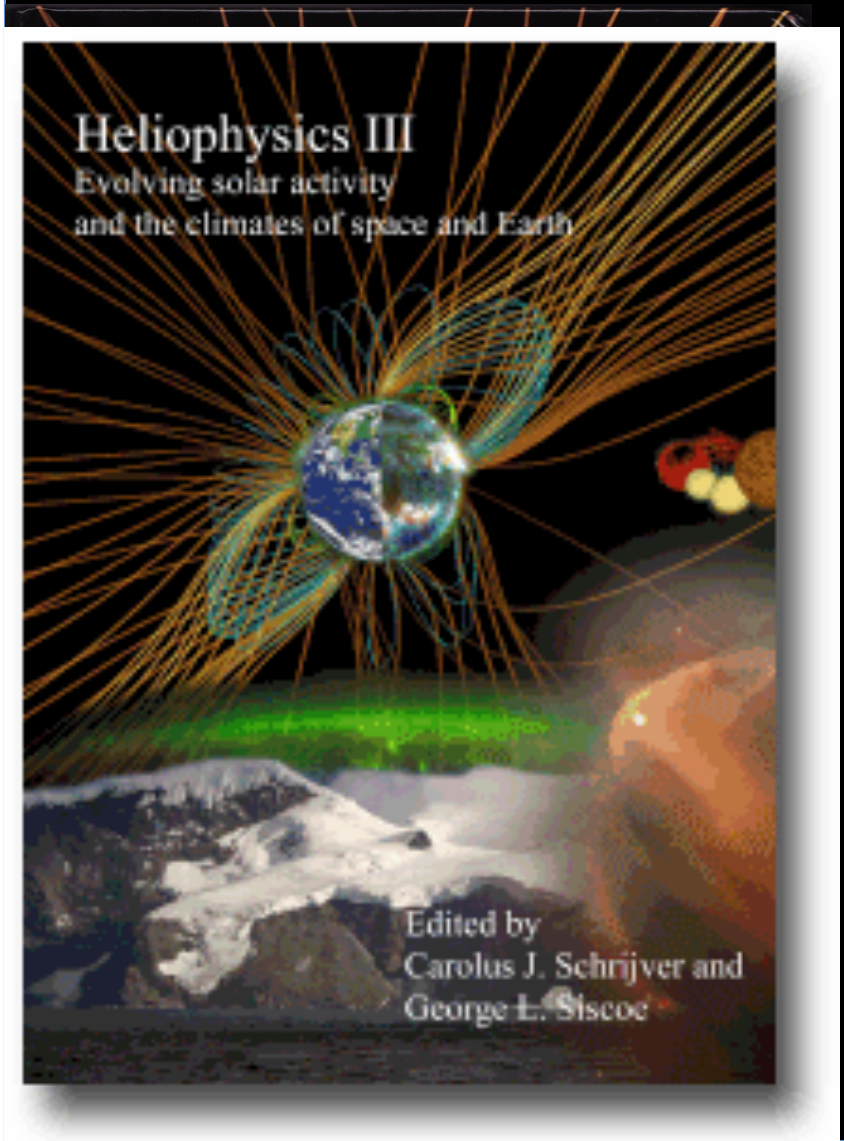
How would you, the community, like to see this improved?

- strategic capabilit
- focus teams
- steering committe
- mowg

Climate

- Earth – Moon – Mars Radiation Model

LWS Graduate Level Education



A three volume Series, an outgrowth of the LWS summer school series.

Vol 1 Plasma Physics of the Local Cosmos

Vol 2 Space Storms and Radiation

Vol 3 Evolving Solar Activity and the Climates of Earth and Space

Summer School Resources:

http/www.vsp.ucar.edu/HeliophysicsSummerSchool

NOTE: The Heliophysics textbooks have been published by *Cambridge University Press*. All appendices are online. The textbooks do not have 'numerical modeling descriptions' nor 'problem sets'.

A new set of Heliophysics summer schools are developing 'numerical modeling descriptions' and 'problem sets' to aid in teaching.

The Heliophysics Postdoctoral Fellowship Program: Renamed to the Jack Eddy Postdoctoral Fellowship

- In 2009, the NASA Living With a Star joined with the UCAR Visiting Scientist Programs (VSP) to create the *Jack Eddy Postdoctoral Fellowship Program*. The program matches early career PhDs with experienced scientists at U.S. research institutions. Hosting scientists mentor the postdoctorates during their two-year fellowships. The goal of the program is to train the next generation of researchers needed for the emerging field of Heliophysics.
- John "Jack" Eddy was a pioneering solar researcher, and he is being honored with the debut of the Jack Eddy Postdoctoral Fellowship.
- Among his many contributions to solar & climate research, Jack served as editor of *The Sun, the Earth, and Near-Earth Space: A Guide to the Sun-Earth System,* published by NASA and the Living with a Star program shortly before his death.
- **2011 Fellows:**

1. **Narayan Chapagain, Host:** Jonathan Makela, U. Illinois at Urbana-Champaign
2. **Andrés Muñoz-Jaramillo, Host:** Edward DeLuca, Harvard-Smithsonian CfA
3. **Neel Savani, Host:** Angelos Vourlidas, U.S. Naval Research Laboratory

- **2010 Fellows: Nicholas Bunch, Host:** Dr. Maria Spasojevic, Stanford University, **Liang Zhao:** Dr. Sarah Gibson, National Center for Atmospheric Research, High Altitude Observatory

STRATEGIC CAPABILITY REPORTS

- *Ongoing* Projects
  - **The Comprehensive Corona and Heliosphere Model (CCHM)** – *Gombosi*
  - **Physical Modeling of the Radiative Sun-Earth Connection** – *Fontenla*
  - **Integrated Model of Atmosphere and Ionosphere** – *Garcia*

Separate presentation for

GOMBOSI

Separate presentation for

RIDLEY

Separate presentation for

GARCIA

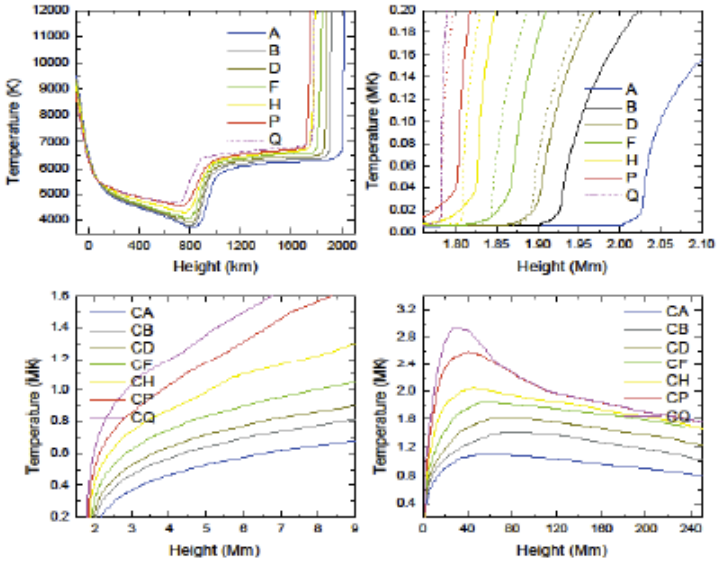
PHYSICAL MODELING OF THE RADIATIVE SUN-EARTH CONNECTION

- **PI: Juan Fontenla, Period: 2009-2014**
- **Overall Project Tasks:**
  - **Improvement, extension, and application of the Solar Radiation Physical Modeling (SRPM) tools and the previous physical semi-empirical models, to compute Solar Spectral Irradiance (SSI) at high-resolution between 2Å and 100 μm and for short and long term.**
  - **Use these results in numerical simulations of general circulation climate, and atmospheric transmission codes to define the key aspects, solar processes, and mechanisms that affect different layers of the Earth atmosphere and climate on multiple time-scales.**
  - **Transfer the methods and results to the Sun-Earth community.**
- Collaborators, in alphabetical order: **AFRL: G. Anderson; CORA: C. Lindsey; CNRS: E. Quemerais; IAFE: M. Vieytes; LASP: P. Chamberlin, J. Harder, R. Hock, J. Mason, M. Rast, M. Snow, T. Woods; NCAR: A. Conley, R. Garcia, D. Marsh , L. Quian, S. Solomon; NSO: I. Gonzalez-Hernandez**, W. Livingston; **NOAA: T. Fuller-Rowell; ONAR: S. Criscuolli, I. Ermolli**

It is impossible to show in a few viewgraphs all the progress made, only a few follow:

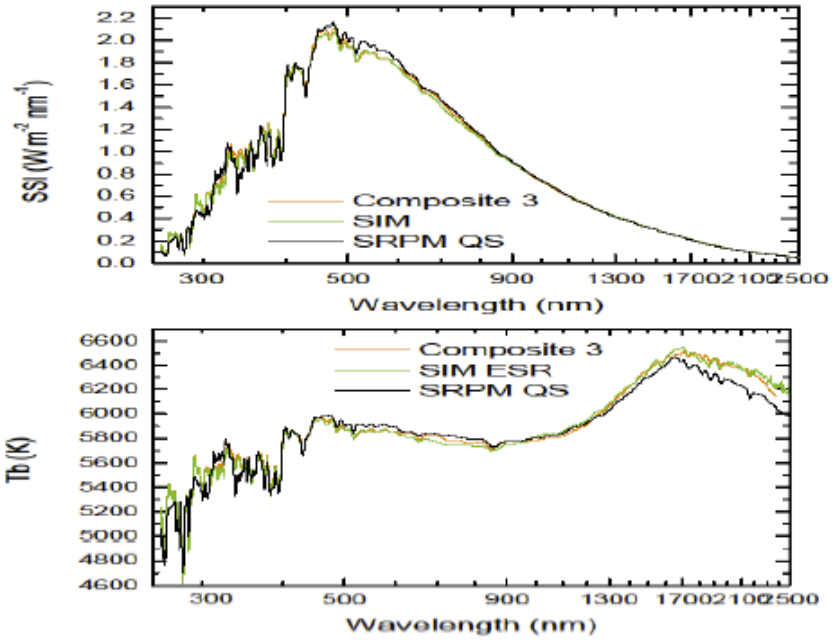
Fontenla, J. M., J. Harder, W. Livingston, M. Snow, and T. Woods (2011), High-resolution solar spectral irradiance from extreme ultraviolet to far infrared, J. Geophys. Res., 116, D20108, doi:10.1029/2011JD016032.

Semiempirical model set

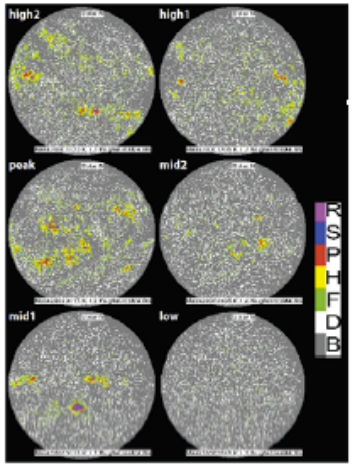


Emitted spectra computed for 10 positions on the disk of each feature

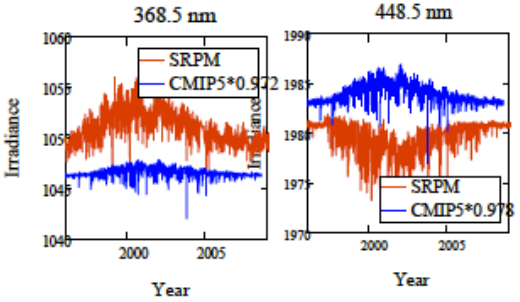
Visible-IR spectrum of the quiet-Sun



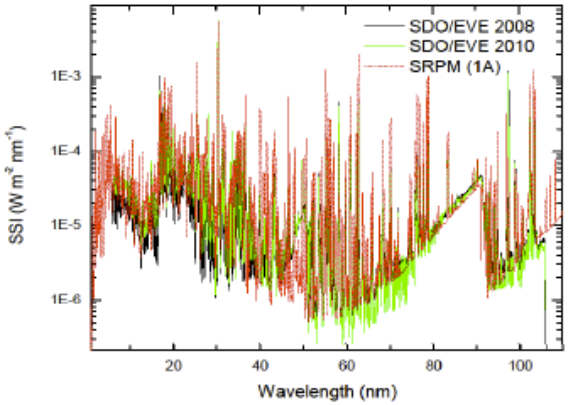
PSPT solar disk features masks



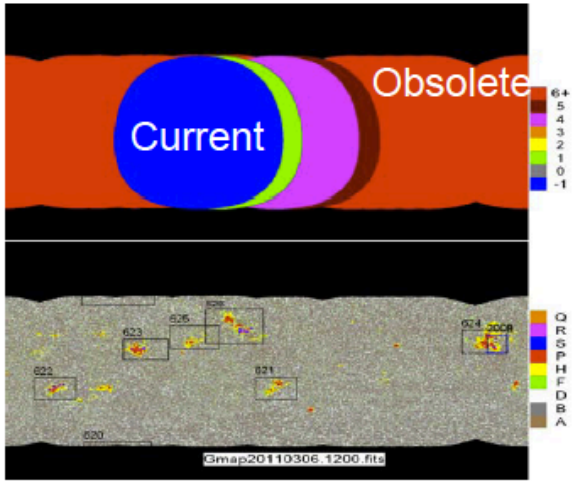
Computed delta.SSI. Similar to measured by Harder et al. 2009 and by Preminger et al. 2011



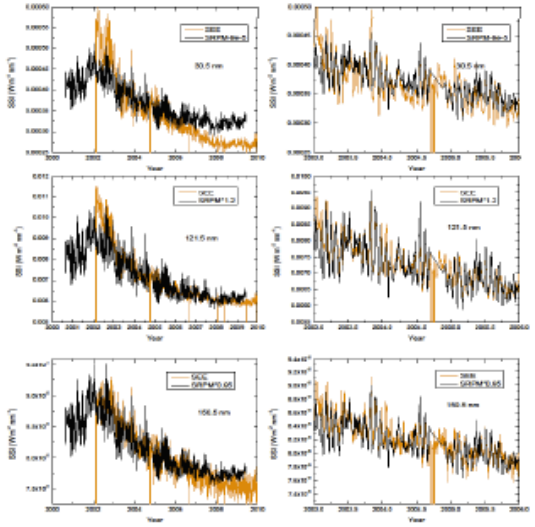
Quiet-Sun EUV spectra compared to EVE rocket



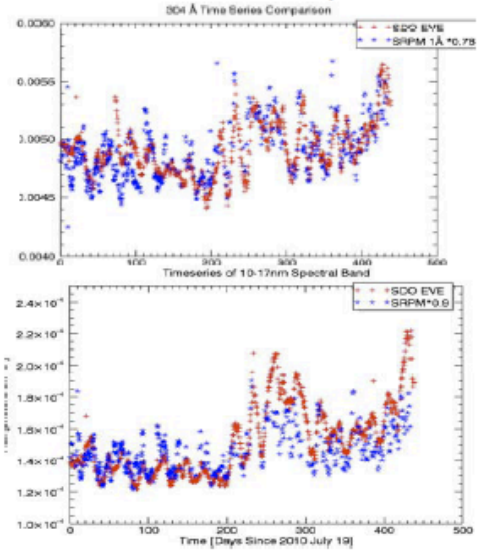
AIA synoptic features



Time series of some EUV bands compared to SEE



Current EUV comparison



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Solar origins of irradiance variations	Prediction of the Interplanetary Magnetic Field Vector Bz at L1		**The Sun-Climate Strategic Theme**	**The Sun-Climate Strategic Theme**	**The Sun-Climate Strategic Theme**

Finished/ Wrapping up in 2011-12