TSIS News

Total & Spectral Solar Irradiance Sensor – NASA missions to study solar irradiance

October 2021

2022 Sun-Climate Symposium –

Please mark your calendar <u>today</u> to join us in May 2022! Our focus topic for this 3.5-day symposium is ***"Improved Climate-Record Reconstructions from Solar Variability and Earth System Observations"*** This meeting is sponsored by the Sun-Climate Research Center – a joint venture between NASA GSFC and LASP at the University of Colorado.

Call for Abstracts ☼ Due Feb. 4

The abstract form and submittal instructions are available on the meeting website. We encourage your participation and hope that you will send in an abstract and share this announcement with your colleagues. Invited speakers will be posted to the website as they accept. Join us for a great meeting in a beautiful location!

Science Overview

Climate studies require records of longer duration than most direct individual measurements provide. These records can be created by combining measurements from different observers, sites, or instruments. Correlations between various measurements similarly enable extending climate-data records over the long timescales needed. Such reconstructions enable lengthier indicators of the climate itself as well as the natural and anthropogenic influences on climate. We explore such reconstructions and the understanding that can be gained from them, with emphasis on links between climate influences – particularly the natural driver provided by solar variability – and the Earth-climate system. These studies include improvements in recent and upcoming climate, atmosphere, and radiative observations and models, as those are often the most accurate tie points of historical reconstructions; correlations between various records used as proxies for historical reconstructions, as those provide the long-duration records needed for climate studies; new methodologies for extending or combining records; and studies of the climate variability associated with these records.

Sessions and Descriptions

The agenda for this interactive meeting consists of invited and contributed oral and poster presentations. Six sessions will focus on different science topics.

The Beautiful Night Skyline of Madison

1. Recent Observations and Methods for Improving Climate-Record Reconstructions

This session will examine the current long- term climate records and the reconstruction methods for producing the next generation records. The long-term reconstructions needed for climate studies invariably require multiple input data sets. Combining such data sets necessitates accounting for biases, drifts, and spurious signals in overlapping data as well as approaches to span data gaps, such as via proxies and models. Discussion topics include updates to observational data, methods of producing composites both temporally and spectrally, gap filling, and temporal extensions via models. Examples include historical reconstructions of solar activity; regional and global Earth temperatures, rainfall amounts, and sea levels; ocean circulation and weather patterns; atmospheric greenhouse gas constituents; and methodologies involving data or models for combining multiple records to provide extended climate-record reconstructions.

Madison, Wisconsin
May 16-20, 2022

https://lasp.colorado.edu/home/meetings/2022-sun-climate-symposium/

Join us! Submit your abstract today!

2. Measurements and Models of Solar and Climate Variability

This session will discuss the challenges and accomplishments in measurements and models of Sun and Earth's system, and possible links in Sun-Earth connection. Observations of the Sun from space have provided a new insight in solar variability and its influence on terrestrial atmosphere for more than three solar cycles. We may see how the Earth system is changing with the accurate amount of total and spectral solar energy input, and also with the knowledge of chemical, dynamical, and thermal processes of the Earth system. What are the key science questions that will advance our understanding of Sun, Climate, and Climate variability? What are the currently known uncertainties in measurements of Sun and Climate and how well are climate models able to capture those questions?

3. Long Term Atmospheric Measurements

As meteorological satellites evolved from the early imaging satellites (e.g., TIROS-1) in 1960 to include atmospheric sounding capabilities, advanced computers combined with better atmosphere radiative transfer theory enabled important contributions to weather forecasting and global climate change research. The global observations enhanced monitoring of the global atmospheric state (temperature, moisture, wind), predicting weather processes and events, estimating the global radiation energy budget, monitoring global ocean conditions and ocean–atmosphere interactions, observing land and biosphere seasonal trends, evaluating the changes in atmospheric trace gases, monitoring global climate change, and many more. This session will look at the long term changes observed in the earth-atmosphere system by satellites as well as in situ observations and try to put them in the context of simultaneous solar changes.

4. Stellar Variability and Connections to the Sun

Stellar variability and asteroseismology, quickly growing fields due to recent photometric studies from exoplanet-finding missions, give insights into solar variability as well as effects on planetary climate and habitability. Selection effects involving stellar rotation rates and metallicities help refine the list of solar-like stars and indicate how "star-like" the Sun is and where it lies on its evolutionary activity and spin-down track. This session will discuss these new stellar-variability findings and their insights into the Sun.

5. Next-generation Observations and Models for Sun and Earth

This session will examine what is planned for the next generation of solar and terrestrial observations and models. Those in development now and concepts for future Sun and Earth observations, missions, and models will be discussed. The implementation strategies for the next-generation observing system is ever evolving to meet the future challenges facing climate change studies. For example, small satellite instruments could enable lower cost constellations to provide more complete global and temporal coverage. It is important that the observing strategies provide continuity for the climate records while also providing new observables to address the many questions about climate change and its relevance for our society.

6. Improved Solar Reference Spectra: Implications for Remote Sensing and Radiative Transfer

Top-of-atmosphere solar reference spectra are a required boundary condition for many applications in remote sensing and radiation transfer. Uncertainties in these spectra can have significant impacts on theoretical and experimental applications ranging from upper atmospheric photochemistry to Earth's radiation budget. This session discusses new high accuracy solar reference spectra along with their use in and effects on remote sensing and radiative transfer.

Confirmed Invited Speakers (as of October 25, 2021)

Presentation Titles and Abstracts will be posted online in early 2022.

Airapetian, Vladimir (Session 4)
Bhatt, Raj (Session 6)
Borbas, Eva (Session 3)
Chance, Kelly (Session 5)
Chatzistergos, Theodosios (Session 1)
Garraffo, Cecilia (Session 4)
Hakuba, Maria (Session 2)
Harvey, Lynn (Session 2)
Heidinger, Andy (Session 3)
Jull, Tim (Session 1)
Kataoka, Fumie (Session 6)
L'Ecuyer, Tristan (Keynote)
Lefevre, Laure (Session 1)
Loeb, Norman (Keynote)
Marsh, Dan (Session 2)
Martins, Vanderlei (Session 5)
Mlynczak, Marty (Session 2)
Montet, Benjamin (Session 4)
Platnick, Steve (Session 3)
Revercomb, Hank (Session 5)
Roman, Jacola (Session 3)
Shapiro, Sasha (Keynote)
Sledd, Anne (Session 3)
Smith, Paul (Session 6)
Stephens, Graeme (Session 5)

Location / Venue

Set on an isthmus between two scenic lakes, the city of Madison is Wisconsin's second largest city and the state capital. Madison is home to many different attractions including the State Street pedestrian mall, many restaurants, great lakes, world class bike paths, great museums and galleries, and so much more. In addition to this list of possible activities and notable places, more information about Madison can be found on their Visitors Bureau web site (https://www.cityofmadison.com/visit-play)

Logistics and Registration

Please visit the 2022 Sun-Climate Symposium website for logistical information, including maps and transportation options. Note that this meeting is planned as an in-person meeting. Registration and lodging reservations will be available in February 2022.

https://lasp.colorado.edu/home/meetings/2022-sun-climate-symposium/

Please mark your calendar today to join us in May 2022 for this interesting symposium!