

**ATS/CIRA Colloquium**

**Peter Pilewskie**

**Visiting ATS from the University of Colorado Boulder**

**The Sun and Earth's climate from the  
Maunder Minimum to the satellite era**

**Hosted by Tom Vonder Haar and Christine Chiu**

**Friday, March 8, 2019**

**ATS room 101**

**Discussion will begin at 11:15 a.m.**

**Refreshments will be served at 10:45 a.m. in the weather lab**

Radiative energy from the Sun establishes the basic climate of the Earth's surface and atmosphere and defines the terrestrial environment that supports all life on the planet. Solar radiation, nearly four orders of magnitude larger than all other external sources of energy, fuels atmospheric dynamics and chemistry along with photosynthetic processes in the biosphere, and drives interactions among the atmosphere, oceans, ice, and land. Solar variability on a wide range of scales ubiquitously affects the Earth system, and combines with internal forcings, including anthropogenic changes in greenhouse gases and aerosols, and natural modes such as ENSO, and volcanic forcing, to define past, present, and future climates. Understanding these effects requires continuous measurements of total and spectrally resolved solar irradiance that meet the stringent requirements of climate-quality accuracy and stability over time.

Since the late 1970s we have been measuring total and spectral solar irradiance from space. This talk will address improvements that have been made in the data record over that time in addition to a number of related questions: what defines a climate-quality observation? How well do we know the Sun's variability over longer periods, for example, since the Maunder Minimum of the 17th century? How does Earth's atmosphere and climate respond to solar variability and what are the mechanisms of response? And in the context of present day climate change, is measuring solar irradiance really a priority? If time permits, we will examine the other side of the energy budget equation and discuss recent advances in measuring the solar radiation scattered to space.

Link to colloquia page: <https://www.atmos.colostate.edu/colloquia/>