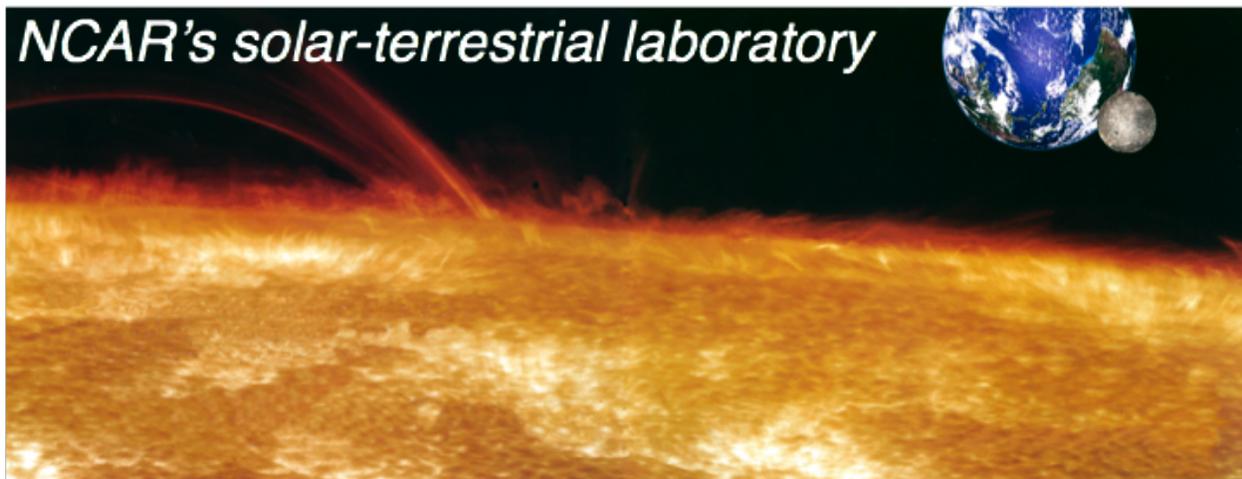


**The NCAR High Altitude Observatory.** HAO's mission is to understand the behavior of the Sun and its impact on Earth, to support, enhance, and extend the capabilities of the university community, and to foster the transfer of knowledge and technology.



## OPPORTUNITIES

**Graduate Fellowship and Newkirk Fellowship.** HAO graduate fellowships are awarded on the basis of academic excellence, scientific potential, and compatibility of student interest in current HAO research pursuits. To be eligible for the fellowship, the student must be enrolled full-time in a university graduate program having common interest with HAO research goals and must be working on a project in cooperation with an HAO staff member. It is expected that the student will spend a significant portion of time in residence at HAO. Positions are dependent upon funding. Please check the HAO website for current opportunities

More information:

[www2.hao.ucar.edu/partnerships/visitor-program/graduate-fellowship](http://www2.hao.ucar.edu/partnerships/visitor-program/graduate-fellowship)

**Postdoctoral Fellowships.** HAO solicits applicants who are interested in pursuing research related to solar physics and terrestrial atmosphere/ionosphere/magnetosphere dynamics. Projects involving radiative transfer, hydrodynamics, magnetohydrodynamics, plasma physics, and other topics are pursued both out of fundamental physics interest and for their applications to the research areas. The postdoctoral positions offered by HAO vary from year to year, depending on funding availability. Please check the HAO website for current opportunities.

More information:

[www2.hao.ucar.edu/partnerships/visitor-program/postdoctoral-fellows](http://www2.hao.ucar.edu/partnerships/visitor-program/postdoctoral-fellows)

## COMMUNITY RESOURCES

**Mauna Loa Solar Observatory. MLSO** provides a variety of solar observations to the community. Our online data archive provides the most complete set of ground-based coronal and h observations, dating back to 1980. Additional data available online include: observations from space-based coronagraphs, solar eclipses, CME event lists, forward-modeling code, and synoptic maps. HAO has an open-data policy for all observations acquired at Mauna Loa. No registration is required and no computer account is needed to download any of the data served from the MLSO website. HAO also provides all available images dating back to 1980. This extensive archive allows researchers to study events from multiple solar cycles and to examine changes in solar structures and properties over three solar cycles. HAO also invites scientists to submit requests for special observing campaigns with MLSO instruments. More information: [www2.hao.ucar.edu/mlso/mlso-home-page](http://www2.hao.ucar.edu/mlso/mlso-home-page)

**Community Spectro-polarimetric Analysis Center. CSAC** provides a centralized portal for all the Stokes polarization data produced with HAO participation. It also offers a comprehensive collection of manuals and tools for the manipulation, calibration, and analysis of spectro-polarimetric data, including data reduction and calibration, spectral line inversion, magnetic field disambiguation, and data visualization codes. Spectral line inversion codes and other analysis tools useful for handling Stokes polarization data are available online. The data stream of the spectro-polarimeter on board the Hinode satellite is also maintained and curated through CSAC and made available through the CSAC website. More information: [www.csac.hao.ucar.edu](http://www.csac.hao.ucar.edu)

### **Thermosphere-Ionosphere Electrodynamics General Circulation Model.**

**TIE-GCM** is a comprehensive, first-principles, three-dimensional, non-linear representation of the coupled thermosphere and ionosphere system that includes a self-consistent solution of the low-latitude electric field. The model solves the three-dimensional momentum, energy, and continuity equations for neutral and ion species at each time step, using a semi-implicit, fourth-order, centered finite difference scheme, on each pressure surface in a staggered vertical grid. It has 29 constant-pressure levels in the vertical, extending from approximately 97 km to 500 km in intervals of one-half scale height, and a 5° x 5° latitude-longitude grid in its base configuration. The time step is typically 120 s. A high-resolution version (e.g., in 2.5° x 2.5° latitude-longitude and 1/4 scale height) is also available. Visit: [www.hao.ucar.edu/modeling/tgcm](http://www.hao.ucar.edu/modeling/tgcm)

### **Whole Atmosphere Community Climate Model with thermosphere**

**extension. WACCM-X** is an alternative atmospheric component of the NCAR Community Earth System Model (CESM), with an extended upper boundary in the upper thermosphere at  $2.5 \times 10^{-9}$  hPa ( $\sim 500$  km). It includes a chemistry module that is interactive with the dynamics through transport and exothermic heating. A unique feature of WACCM-X is that neutral and ion species are self-consistently resolved in the model. Physical processes related to ionospheric electrodynamics and plasma transport are currently under development. Visit: [www2.cesm.ucar.edu/working-groups/wawg](http://www2.cesm.ucar.edu/working-groups/wawg)

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## CONTACT

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