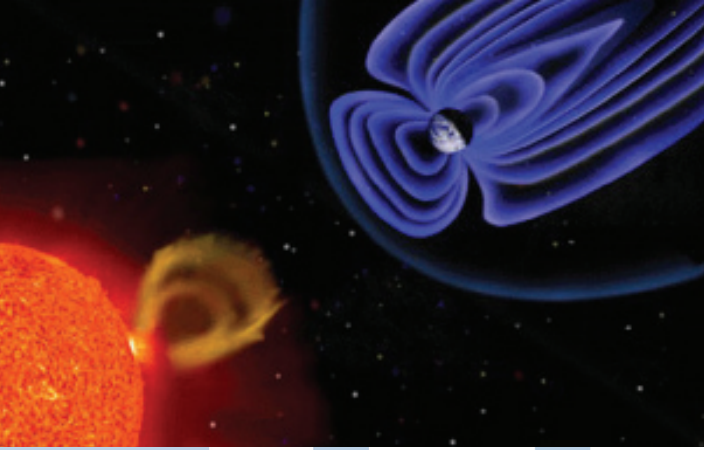


Think

About Space Weather

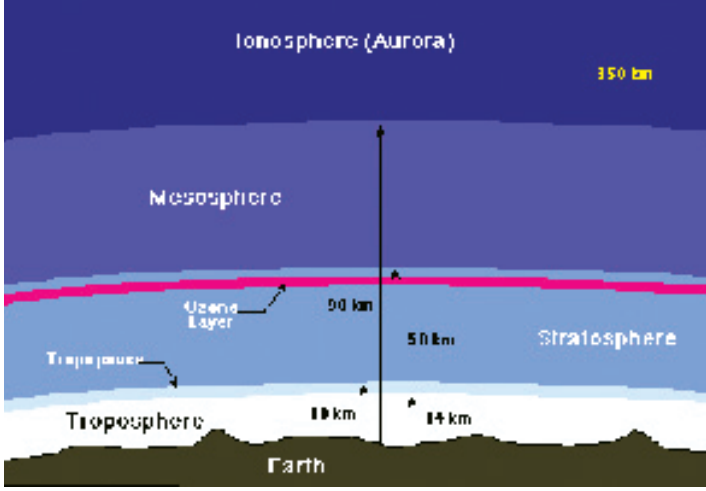
Center for Atmospheric
and Space Sciences (CASS)

Utah State University

The Center for Atmospheric and Space Sciences is recognized both nationally and internationally as a progressive research center with advanced space and upper atmospheric research programs. Today, CASS scientists are tackling the adverse consequences of space weather. Space weather is a result of solar storms that affect satellites, human activities in space, the exploration of the Moon and Mars, communications systems, GPS accuracy, as well as major ground-based technological systems.

Graduate student research opportunities include: development of the world's largest public atmospheric LIDAR system to track the upper atmosphere's response to "global change;" worldwide observational campaigns to track the fleeting upper atmospheric sprites and elves phenomena associated with "upward propagating lightning bolts;" the development of the nation's first ionospheric data assimilation model for the Air Force; the challenge of analyzing thousands of parallel data streams in near-real time to track "space weather," especially those responsible for outages in the Federal Aviation Authority's (FAA) Wide Area Augmentation System (WAAS); and more.

Undergraduates similarly have unique opportunities in the above areas, more to get first-hand exposure to "doing research." CASS has a long heritage in providing undergraduates their first research experience.



Ionospheric Electric Fields from satellites and radars (Bela G. Fejer)

The main focus of this research is the study of global ionospheric electro-dynamic and plasma wave processes from high to equatorial latitudes and the development of empirical predictive models using very large databases of observations from ionospheric radars, optical probes, and satellites. These studies provide an in-depth training on ionospheric physics, on the effective use of optimum analysis techniques for the empirical modeling of very large and complex radar and satellite databases, and on the use of novel data analysis techniques.

Solar Physics (Jan J. Sojka)

Sunspot is a solar observatory in southern New Mexico to which our graduate students in space science go for summer observing programs carried out in collaboration with scientists of the National Solar Observatory. The topics of interest include the initiation of solar flares and coronal mass ejections, and their propagation to Earth, where they cause space weather phenomena.

Did You Know?

• Utah State University has carried out space science research since 1969 through CASS.

• CASS supports graduate students to conduct space research in association with dissertation work.

• CASS scientists have active collaborations with international and national space researchers in over 30 countries.

• CASS Scientists operate two observatories in northern Utah, fielding both optical and radio instruments to remote sense the upper atmosphere and ionosphere.

• Scientists and their students in CASS publish more than forty papers annually.

• The first ionospheric data assimilation model to be used by the US Air Force on behalf of the Department of Defense is GAIM, which is being developed in CASS.

Interested?

Center for Atmospheric and Space Sciences (CASS)
Utah State University
4405 Old Main Hill
Logan, UT 84322-4405
435.797.2962
cassusu@cc.usu.edu

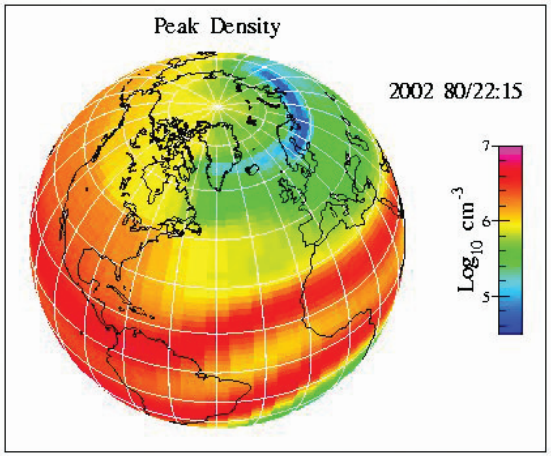
Think Utah State University
www.usu.edu

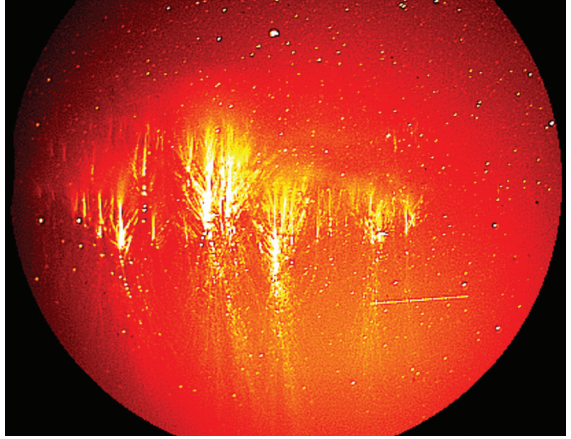
Atmospheric Lidar Observatory (ALO) (Vincent B. Wickwar)

Lidar is a radar-type technique that uses powerful lasers and large telescopes. Since 1993, the ALO has measured temperatures, densities, and waves in the mesosphere and looked for evidence of global warming. The ALO is currently being upgraded to make it the most powerful lidar in the world.

Physics-Based and Data Assimilation Modeling (Robert W. Schunk)

Global physics-based numerical models and data assimilation models of the near-Earth space environment have been developed and are being used to study space weather phenomena. This program produced an operational, ionospheric, data assimilation model for the Air Force called Global Assimilation of Ionospheric Measurements (GAIM).





Upper Atmosphere All-Sky Low Light Level Observations (Michael J. Taylor)

This research effort focuses on the development and utilization of imaging systems and novel infrared cameras to study atmospheric optical phenomena. These include noctilucent clouds, aurora, meteor storms, and lightning-induced optical transients termed “sprites” and “elves.” In current operation are CCD imagers at Bear Lake Observatory, Utah; Haleakala Crater, Hawaii; Halley Station, Antarctica; and ALOMAR Observatory, Norway.

Bear Lake Observatory (Michael J. Taylor, Director)

The Bear Lake Observatory (BLO) is a mid-latitude upper atmospheric-ionospheric observatory that also supports satellite and other ground-based measurement campaigns.