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NCAR Hosts Upper Atmosphere Research Satellite (UARS) Validation Workshop

Nearly 50 scientists from throughout the United States, Canada, and Great Britain will attend an Upper Atmosphere Research Satellite (UARS) validation workshop in Boulder to be held October 12–17, organized by John Gille, a principal investigator on the UARS project and a section head with NCAR's Atmospheric Chemistry Division (ACD).

Observing, understanding and predicting the effects of human activity on the earth's upper atmosphere are a goal of NASA's Mission to Planet Earth. UARS, launched in September 1991 aboard the space shuttle Discovery, is the first major flight element of that 20-year program.

Since 1991, UARS has been gathering data on 15 stratospheric species (O_3, NO, NO_2, N_2O, HNO_3, N_2O_5, H_2O, CH_4, CO, CFC-11, CFC-12, HCl, ClO, $ClONO_2$, and HF)—compounds that are thought to contribute to the growing problem of ozone depletion. Two or more UARS instruments simultaneously measure nine of those constituents.

One of the UARS experiments is a remote-sensing instrument called CLAES (cryogenic limb array etalon spectrometer) that was developed and built by Lockheed's Palo Alto Research Laboratory with assistance from a team of scientists, led by Gille, at NCAR in collaboration with the University of Denver. The CLAES instrument can identify gases and measure their concentrations and distribution at heights varying from 6 to 50 miles (10 to 80 kilometers) above the earth's surface from the UARS satellite orbit, 360 miles (580 kilometers) in outer space.

In addition to the UARS instruments, correlative measurements from a variety of ground, balloon, and other spacecraft-borne instruments are providing data for intercomparison. Ground-based lidars and microwave sounders provide temperature and ozone profiles. The National Meteorological Center provides temperature-pressure profiles, and several balloon payloads have made flights coinciding with UARS overpasses. Later on, the ATMOS experiment, which flew on the space shuttle in April, will provide mixing-ratio profiles for nearly all of the 15 stratospheric constituents.

To obtain consistent data, there is built-in redundancy in the UARS complement of instruments. Four experiments measure ozone mixing-ratio vertical profiles, using different techniques. One goal of the workshop is to intercompare the constituent retrievals of the various instruments. Specific intercomparison dates have been selected, and the participants will electronically exchange their results, perform intercomparisons of the data at their home institutions, and discuss the comparisons at the workshop.

Meaningful interpretation of the UARS data will take place only after the data are validated by these ongoing data intercomparisons. Data collected from UARS, combined with data taken by the other space observations, ground-based instruments, aircraft, and balloon-borne instruments, will form an extensive data base used by more than 20 scientific teams in improving theoretical models of the upper atmosphere.

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