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Raymond Roble Wins Prestigious Arctowski Medal

Raymond Roble, a senior scientist in the High Altitude Observatory (HAO) of the National Center for Atmospheric Research (NCAR), was awarded the 1996 Arctowski Medal by the National Academy of Sciences for his "indispensable contributions to understanding the effects of variable solar inputs on the Earth's atmosphere and ionosphere by powerful global modeling techniques." The medal, given once every three years, carries with it a \$20,000 cash award and an additional \$60,000 awarded in research support. Roble plans to promote and enhance solar-terrestrial research at NCAR with these funds.

A native of Michigan, Roble completed his doctorate in aeronomy at the University of Michigan in 1969. Shortly thereafter, he joined NCAR as a postdoctoral researcher and began work on the thermosphere-ionosphere-mesosphere-electrodynamics general circulation model (TIME-GCM).



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Over the past two decades, Roble and his colleagues refined and expanded the TIME-GCM (used by over 100 scientists and students, world-wide), to simulate the circulation, temperature, and compositional structure of the upper atmosphere and ionosphere. His model made possible studies of the response in upper atmospheric regions to variations in the radiation and plasma emitted by the sun.

"These variable components drive atmospheric circulation, and that can affect weather, change the concentration of chemicals in the upper atmosphere and increase the drag on satellites," explained Roble. "My model is used to calculate the effect of the sun's variability on wind and the rest of the atmosphere. Ultimately, we'd like to have an accurate, working model of the atmosphere from the ground level all the way out."

To that end, Roble and other scientists are attempting to link his model with models of the lower atmosphere now used by meteorologists.

ITM Data and Models Available from NSSDC on CD-ROM and Online

Dieter Bilitza

NSSDC, GSFC, Code 633.9, HSTX, Greenbelt, MD 20771

1. AE-C, D, and E 15-sec data on CD-ROM

The National Space Science Data Center has generated a CD-ROM with the 15-second data from the Atmosphere Explorer C, D and E experiments. These satellites were launched into highly elliptical orbits and were then in the later year maneuvered into circular orbits (300-400 km) with the onboard propulsion system.

Satellite	time period	height range	inclination
AE-C	Dec 73 - Dec 78	130-4300	68.1
AE-D	Oct 75 - Jan 76	150-3800	90.1
AE-E	Nov 75 - Jan 81	160-3000	19.7

More than a dozen experiments were flown on each satellite with almost identical payloads for all three, providing the following measurements:

electron density, temperature	Langmuir Probe (CEP)
ion densities, temperature, drift	Retarding Potential Analyzer
ion densities	BIMS, MIMS Mass Spectrometers
neutral densities	OSS, COSS Mass Spectrometers
neutral densities, wind	NATE instrument
total neutral density	MESA accelerometer
airglow	VAE photometer
UV (nitric oxide)	UVNO, BUV experiments
low-energy electrons/ions (0.2-25 keV)	LEE experiment
photoelectron fluxes	PES spectrometer
solar EUV (40-1850 Angstrom)	EUV spectrometer, photometer

The CD-ROM contains the UA data for all three satellites (9 years) in ASCII format. Additional files on the CD include:

- ☛ experiment/data descriptions provided by the respective Principal Investigator teams;
- ☛ satellite/experiment brief descriptions from NSSDC's Master Catalog;
- ☛ a 150 page listing of references to scientific papers based on the AE data ordered by experiment;
- ☛ the software for several international standard models: IRI-94, MSIS-86, CIRA-86, MSISE90, HWM93, IGRF45-95, Tobiska's EUV model, GEO_CGM conversion software (geographic \leftrightarrow geomagnetic corrected).

Plotting and subsetting software (DOS) was also developed at NSSDC for this data set and can be obtained on floppy disk or can be retrieved from NSSDC's anonymous ftp site ([nssdc.gsfc.nasa.gov, /pub/cdrom/software/dos/ae_z.exe](ftp://nssdc.gsfc.nasa.gov/pub/cdrom/software/dos/ae_z.exe)). The menu-driven system lets a user select the time period and parameters s/he is interested in and then plot the data or store them in a file. The IRI-94 and MSISE90 parameters are part of this menu and by selecting corresponding parameters a user can compare the measurements with the model predictions. (Figures 1a,b show two plot examples.)

The CD-ROM can be ordered from the Request Coordination Office (CRUSO), NSSDC, GSFC, Code 633, Greenbelt, Maryland 20771, USA (request@nssdca.gsfc.nasa.gov).

2. Ionospheric/thermospheric data on NDADS

NDADS is an automated retrieval mail system that stages user-requested data from an optical disk jukebox onto NSSDC's anonymous ftp site. The user can then ftp the data to his/her home account.

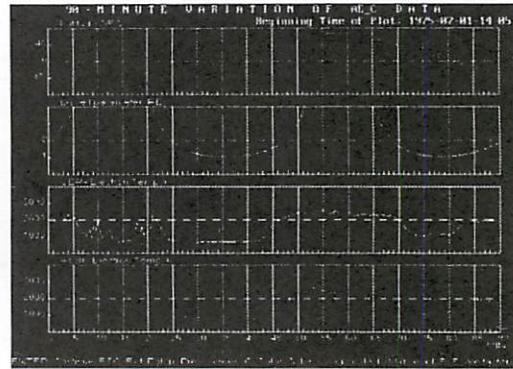


Fig. 1a. Example plots made with the AE data and software.

2.1 Available data

Ionospheric/thermospheric data currently available through NSSDC's NDADS system:

DE-2, Aug 81-Feb 83, 300-1000 km, Inclination: 90
electron density, temperature (LANG), ion densities, temperature, and drift (RPA/IDM), neutral densities and wind (NACS), magnetic field (MAG-B), electric field (VEFI), energetic particles (LAPI), and the 16-second Unified Abstract file with data from LANG, NACS, WATS, FPI, RPA/IDM.
[High resolution WATS and FPI data ingest is in preparation]

San Marco D, Mar 88-Dec 88, 260-620 km, Incl: 2.9
ion densities, temperature, drift (IVI), [EUV (ASSI), neutral density (DBI), electric field (EFI) data ingest is planned].

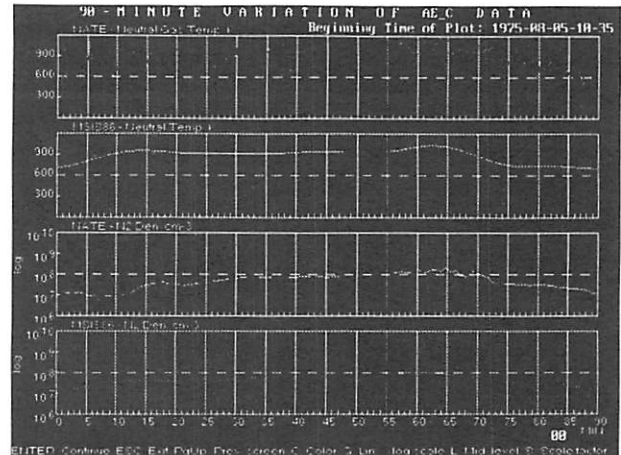


Fig. 1b. More plots made with the AE data and software.

2.2 NDADS Data Request Procedure

To obtain information about NDADS and its data content, send an e-mail message to archives@ndadsa.gsfc.nasa.gov with one of the following words in the SUBJECT line:

INFO	information file will be sent
MANUAL	manual will be sent
HOLDINGS	general holdings file will be sent
HOLDINGS DE	DE holdings file will be sent
HOLDINGS SANMARCO	San Marco Holdings file

To order data, one writes SUBJECT: REQUEST project name data_type (e.g., REQUEST DE LANG_ASCII)
The available data_types are explained in the DE holdings file. In the body of the message the user specifies the particular data file s/he is interested. In many cases data are ordered by year and day of year (yyddd); see holdings file for details. In addition, several of the data sets include documentation, software and inventory files that can be requested with the word DOCUMENT, SOFTWARE, INVENTORY in the body of the message. The message could, for example, look like this:

```
document, software
inventory, 81355, 82001
83068
```

The requested files will then be staged to NSSDC's anonymous ftp site and the requester will receive an e-mail message with a list of staged files including their names, location and size.

2.3 Data through WWW

The NDADS data can be also obtained through the WorldWideWeb at http://nssdc.gsfc.nasa.gov/about/about_ndads.html

3. IRI, MSIS, IGRF and GEO_CGM on the WWW

NSSDC has developed WorldWideWeb interfaces for interactively running the International Reference Ionosphere (IRI95) model, the Mass Spectrometer and Incoherent Scatter (MSISE90) atmosphere model, the International Geomagnetic Reference Field (IGRF, Nov 95, see EOS, April 16, 1996), the Tsyganeko magnetic field model and the program GEO_CGM for conversion from geographic to corrected geomagnetic coordinates and vice versa.

All models: http://nssdc.gsfc.nasa.gov/space/model/models_home.html
IRI direct: <http://nssdc.gsfc.nasa.gov/space/models/iri.html>
MSIS direct: <http://nssdc.gsfc.nasa.gov/space/models/msis.html>
IGRF direct: <http://nssdc.gsfc.nasa.gov/space/models/igrf.html>
Tsyganeko: <http://nssdc.gsfc.nasa.gov/space/cgm/ext.html>
GEO_CGM: <http://nssdc.gsfc.nasa.gov/space/cgm/cgm.html>

New Program at NRL on Empirical Models of the Thermosphere

Dr. Alan Hedin, originator of the Mass Spectrometer Incoherent Scatter (MSIS) Model of thermospheric composition and temperature and the (thermospheric) Horizontal Wind Model (HWM), retired from the NASA Goddard Space Flight Center in 1995. In recognition of the importance of Dr. Hedin's work to the upper atmospheric physics scientific and operational communities, NRL is undertaking a pilot program (FY97-98) to maintain, revise and enhance both classes of models. Under the leadership of Dr. Michael Picone and Dr. Robert Meier (Upper Atmospheric Physics Branch, NRL Space Science Division) and with consultation by Dr. Hedin, this program will permit continuity in the thermospheric empirical model development activity. Upgrades of the model will involve both expanded use of the traditional data sources (e.g., incoherent scatter radar (ISR), Fabry-Perot Interferometry (FPI), satellite drag), upon which past model development has rested, and incorporation of new data sets, such as the global, multiyear, ultraviolet remote sensing data to be generated in the future by both experimental systems (e.g., MSX, ARGOS, RAIDS, TIMED) and operational DMSP systems (e.g., SSULI, SSUSI).

The most important objective initially is to incorporate all available upper atmospheric data sets into the models with the goal of making new versions available for use by the community within two years or less. These data sets primarily include ISR data (for computing neutral temperature and possibly atomic oxygen density), satellite drag data, and FPI data. The ISR data are of great interest, since a number of data sets have not yet been processed to produce neutral temperature profiles, and since some ISR data have been recently reprocessed to produce more accurate plasma temperatures and composition (e.g., the Arecibo ISR data sets). Professor W. L. Oliver of Boston University and NCAR/HAO has been working on a number of aspects regarding the retrieval of neutral temperature and composition from ISR data, and we anticipate working closely with him to produce a new, comprehensive ISR neutral temperature (and possibly atomic oxygen density) database for use in updating MSIS. The retrieval process, based on energy balance considerations, is not without its complications. To address these issues, we wholeheartedly invite your attendance at the MSIS Update Workshop, a Friday afternoon session of the upcoming NSF CEDAR meeting in Boulder.

Another key element of the NRL program is the incorporation of new proxies for the Solar extreme ultraviolet (EUV) flux, which drives thermospheric variability. Drs. Judith Lean, John Mariska, and Harry Warren of the Solar-Terrestrial Relationships Branch, NRL Space Science Division, are presently developing a number of alternative proxies for incorporation into new thermospheric models, based on the following data sources, among others: (1) He 1083 nm equivalent width, (2) Mg 280 nm core-to-wing ratio, (3) Ca K 390 nm core-to-wing ratio, (4) GOES x-ray flux and images, and (5) sunspot areas and disk locations. During the initial two years of the project, we anticipate producing a revised MSIS-type model based on such proxies.

The project has NASA funding this year to cover the transfer of Dr. Hedin's technology and databases to NRL and to continue his scientific studies. From the standpoint of Navy sponsorship, the key requirement for the program to continue receiving support is the clear demonstration of paths for transition of the models to operational users. Presently the most promising Department of Defense transition path for MSIS and its descendants will be in the computation of accurate drag force estimates for improved orbital tracking and prediction of both space debris and operating spacecraft (including the International Space Station). The HWM model has found uses in ionospheric modeling and in algorithms for retrieving ionospheric composition from future DMSP satellite-based remote sensing data. While NSF does not provide funding to NRL for this project, we encourage potential contributors of data for input to the models to apply for NSF support; NASA is also a potentially promising source of support.

*Mike Picone, Naval Research Laboratory
picone@uap.nrl.navy.mil*

SPIDR on the Web!

NGDC's On-Line Space Physics Data Resource and Analysis Tool

The National Geophysical Data Center's innovative Space Physics Interactive Data Resource (SPIDR) is a multi-disciplinary on-line system to search, browse, and access space weather and environmental datasets over the Internet. SPIDR is a tool for the on-line user to select data or imagery by date and geographical location and deliver an image to the user over the Worldwide Web (<http://www.ngdc.noaa.gov/stp/stp.html>).

Currently, Defense Meteorological Satellite Program (DMSP) satellite imagery, geomagnetic variations, and ionospheric vertical incidence databases can be accessed by the Space Physics Interactive Data Resource. DMSP imagery displays aurora, city lights, fires, lightning strikes, and cloud coverage. Ionospheric and Geomagnetic data can be plotted from interactive menus and Solar and Geomagnetic indices can be generated as plots for comparison. The web user selects the month and year from pull-down menus and clicks the worldwide map in the region of interest. Worldwide contour maps of maximum electron density can also be generated from a global model of the ionosphere.

Internally, NGDC needs flexibility in the management of the analysis, to assess the quality manipulate instrumental data SPIDR also fulfills NGDC's to inventory, catalog, and to search our datasets, to create the archives, and to on the Internet has been opened



ibility provided by the SPIDR systemational archives to conduct data of the archives, and to extract and for input into physical models. need for an easy-to-use mechanism search the archives. This capability at a data display "on the fly," to conduct interdisciplinary analysis up for everyone to use.

Navigating the relational database with the SPIDR Worldwide Web tool will assist scientists and researchers in analyzing space weather and environmental data. At NGDC, SPIDR is used as a tool for data management, analysis, and investigations of space environment effects on man's technology in space and on Earth.

The average user is in the SPIDR system for a full hour browsing, retrieving, and manipulating images and plots. Users may capture and download images for later use or request digital values using e-mail. SPIDR is being used for atmospheric physical sciences homework assignments in the classroom from elementary through graduate levels! Space physics effects seen in the ionosphere can be analyzed in a multi-disciplinary environment through the on-line manipulation of the database management tool. The database management system will enable global quality control both by comparing data and through providing input from the database management system to physical models and comparing the model output with the observed values.

DMSP polar orbiting satellites collect visible, thermal infrared, and microwave imagery in global coverage along a 3000-km-wide swath with the Operational Linescan System (OLS). Internet users may select imagery by date and geographical position anywhere on the Earth. DMSP visible and infrared images are returned along with a map of the satellite path and a button tool for navigating the database of worldwide satellite coverage. The button tool allows users to "fly" one of four DMSP satellites about the globe.

Users can plot ionospheric vertical sounding data from four full solar cycles of data (1950 through 1996) from a global network of up to 101 different ionosonde stations, including near-real-time data from the NOAA Space Environment Laboratory Data Acquisition and Display System (SELDADS). The web user chooses the month and year from the pull-down menus. An "on the fly" map is generated with the stations containing data for the period selected. The user clicks the map in the region of interest and the closest station with data available is automatically plotted. Currently foF2 (maximum electron density) plots are generated with monthly medians plotted as a red line overlaying the daily values. Other scaled and derived parameters including the true height of maximum density (hmF2) are planned for future SPIDR developments.

Digital data from ionosonde stations around the world are added to the SPIDR database as they are received, processed, and passed through quality control filters. Each month NGDC receives near-real-time data from the SELDADS network for the previous month and places them in the SPIDR database tagged as preliminary data.

The internet user may also choose to generate a Worldwide Contour Plot computed from the Ionospheric conductivity and Electron Density (ICED) global model of the ionosphere. The user completes the selection form and SPIDR then displays a color contour map of maximum electron density (foF2) based on month and sunspot number.

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CEDAR WORKSHOP DESCRIPTIONS

Arecibo Friends

Convenor: C. A. Tepley

This is a gathering of Arecibo users and those interested in its latest scientific results or its potential for new investigations of the atmosphere and ionosphere. This year half the time allotted will be open discussion of what potential users would like to see or do with the New and Improved Arecibo Observatory. We will also solicit ideas for a separate experimental planning workshop to be organized in the future.

Auroral Arcs - Radar/Optical Observations

Conveners: G. Swenson, S. Solomon

Analysis of radar and optical measurements of auroral arcs made during the winter of 1996 is our focus, in particular the March 1996 Sondrestromfjord/Godhavn campaign. Contributions on other multi-location experiments and ground/space coordination studies are welcome, as are descriptions of theoretical and modeling work. We will plan for future experiments, including the International Auroral Study in winter 1997 which involves coordination between ground-based observations and satellites such as FAST, POLAR, and MSX.

CEDAR Data Base Access

Conveners: R. Barnes, S. Cariglia

One-on-one, hands-on sessions for those who want to learn how to access the CEDAR Data Base. Roy Barnes of NCAR and Steve Cariglia of Millstone Hill will be on hand to help users. We will be located in the Engineering Building, using Zenith 486 Pcs. See agenda (pgs. 9,10) for times. Handouts will be available.

CEDAR/TIMED

Conveners: J. E. Salah,
J. W. Meriwether

An opportunity to discuss the planned collaboration between the CEDAR ground-based, observing and modeling community, and the NASA TIMED satellite program. TIMED scientists will review the TIMED focal science objectives and the need for ground-based support. Participants will then be invited to discuss methods to coordinate ground-based observations and modeling with the TIMED program, and to provide input from the CEDAR community into planning for the TIMED collaboration.

Collision frequency

Convenor: J. E. Salah

Is it time to revise the CEDAR interim standard for atomic oxygen collision frequency?

This standard was adopted in 1992 to facilitate comparisons between models and observations using a consistent value of this parameter. Based on available measurements at that time, the standard used the "Burnside factor," namely 1.7 times the value obtained from theory and laboratory measurements. In the past few years, results from new studies and calculations suggest that the adopted standard may be too high. The results from such studies are the topic of a special session at the Spring 1996 AGU meeting. This CEDAR workshop will review the new results and consider whether the CEDAR standard should be revised at this time.

Data Processing

Convenor: S. Palo

A pilot initiative designed to assess the interest of the CEDAR community in addressing current data processing issues. Our goal is to develop a forum where CEDAR scientists and students

can address possible problems which exist in the processing of data collected by remotely sensing the atmosphere.

GLO: Arizona Airglow Experiment

Convenor: L. Broadfoot

There are two sessions. In the first, we will describe several new observations using two types of imaging, and progress made on data analysis of the dayglow emission spectrum and the solar euv flux. The second workshop session will be for technical discussion and planning. We are making several changes to the GLO experiments for the next flight in July 1997. Is there new science we should be addressing? We would welcome suggestions for particular experiments we might perform. Anyone who wishes to become more familiar with the GLO instrument, the data products, and future possibilities is invited to participate.

HLPS High Latitude Plasma Structure

Conveners: J. J. Sojka, E. J. Weber

We will open with two tutorials on polar cap arcs to provide background, followed by a round-table workshop format of brief presentations of HLPS topics, observational campaigns, modeling, and theory. (If you plan to contribute, please inform one of the co-conveners.) Dr. J. Doolittle will give an overview of the Automated Geophysical Observatories (AGO), of which five are now operational in Antarctica, and discuss the observatory capabilities in the context of HLPS, i.e., polar cap ionospheric and thermospheric physics, with an eye towards conjugate studies. Then we will return to the round-table mode.

1997 Incoherent Scatter World Day Planning Meeting

Convenor: J. M. Holt

An open forum for discussion of the 1997 Incoherent Scatter Coordinated Observation Day Schedule. This schedule must be essentially complete by the end of July, so this will be the last opportunity for a large cross section of the community to meet with representatives of the incoherent scatter radars to discuss the schedule. Ideas for new observation programs are especially welcome.

Jicamarca Radio Observatory

Convenor: D. Farley

The main facility of the Jicamarca Radio Observatory is a large 50 MHz incoherent scatter radar. The Observatory is located in Peru, almost on the magnetic equator. As in previous years, the workshop will first review the status of the Observatory and then describe recent scientific activity, probably via 4-6 separate area presentations.

LIDAR

Convenors: J. Thayer,
J. W. Meriwether

CEDAR scientists interested in lidar and middle atmosphere studies will discuss the leading topics of the field.

LTCS Lower Thermosphere Coupling Study

Convenors: R. M. Johnson,
C. G. Fesen

The LTCS focuses on improving our understanding of the lower thermosphere, including the global scale circulation, electrodynamic coupling, upwardly propagating tides and planetary waves, waves and turbulence, and geomagnetic storm effects. The two primary objectives of the upcoming workshop are (1) to review

the significant accomplishments made since the last meeting, including an update on the LTCS-9 10-day run interval and other on-going work, and (2) to discuss future planning for LTCS, including optimum timing of experiments and finalizing the selection of group collaborative efforts.

Millstone Hill Observatory

Convenor: J. C. Foster

Science, facilities, optics, radar, coordinated observations, user issues – all these will be covered. Hot topics include progress on the lidar facility at Millstone, telescience developments, and discussions of the first East Coast Coordinated Campaigns. Friends and users of the Millstone Hill data are sure to find something of interest.

MISETA - Multi-Instrumented Studies of Equatorial Thermosphere Aeronomy

Convenor: J. W. Meriwether

Objectives: (1) review the results from the MISETA II campaign that took place in April, 1996, with emphasis upon large scale nighttime equatorial thermal structure, and (2) firm up final plans for the MISETA III campaign. This latter observing effort will represent a collaboration among NSF/CEDAR PIs, Jicamarca Radar Observatory staff, and scientists from the Phillips Laboratory (Hanscom). This campaign will take place from 30 Sept. to 14 Oct., involving both optical and radar instrumentation located in Chile and Peru (and including Arecibo, if possible).

MSIS Update

Convenors: M. Picone,
W. L. Oliver

The MSIS model will be updated at the Naval Research Lab during the next two years, with an improved exospheric temperature data base as

priority. We will discuss sources of those data, the technique for deriving neutral temperature from incoherent scatter radar data (including questions on collision frequency, light ions, and hot oxygen), and the need for reprocessing of older data.

MSX

Convenors: G. Romick, R. O'Neil,
M. J. Taylor

The BMDO MSX satellite was launched successfully from Vandenberg AFB, CA on 24 April, 1996 at 08:27:40 EDT into a near sun-synchronous orbit of inclination 99.4°, eccentricity 0.0006 and altitude of 903.5 km (nodal period 6184.6 s). Full scale operations are planned from mid-June onwards. The first half of this workshop will provide a detailed report on the spacecraft and sensor status including some first-look, spectral/imager data. The second half will be devoted to detailed planning for coordinated, auroral, nightglow and twilight measurements over the next year.

POLITE - Plasmaspheric Observations of Light Ions in the Topside Exosphere

Convenor: P. J. Erickson

This short workshop will assist in coordination efforts for the recently initiated series of topside ionosphere and exosphere World Day experiments known as POLITE. We will briefly present results from the February POLITE runs, and discuss outstanding logistical and cooperative analysis issues affecting future planned experiments. In particular, we'll focus on the upcoming Nov. 11-14, 1996 POLITE run, during which we hope to have enhanced optical support. Anyone involved in topside issues, or who just wants to find out what the topside community is doing in the near future, is encouraged to attend both this workshop and the topside workshop organized by Sixto Gonzalez.

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Workshop Descriptions (cont. from page 7)

PRIMO - Problems Related to Ionosphere Modeling and Observations

Convenors: D. N. Anderson, T. J. Fuller-Rowell,
J. J. Sojka

Our purpose is to identify and try to resolve, significant discrepancies which exist between theoretically-calculated ionospheric parameters (such as F-region peak electron densities and altitudes, NMAX and HMAX), and global observations of these quantities. The first two PRIMO workshops (1991 and 1992) compared various model results with each other and with observations during equinox and solstice, solar maximum. As a result, a number of modifications were made to the models which improved agreement with the observations. This year the emphasis will be on ionosphere/plasmasphere coupling and comparisons with O+ and H+ observations. In addition, there will be discussions on how PRIMO topics can fit in with National Space Weather Program (NSWP) issues and needs.

Sondrestrom Observatory

Convenors: J. Kelly, J. Thayer

We will discuss the capabilities and use of the facility in an open forum. Some specific issues: the "phase three" status of the facility, new measurements, and the possibility of a journal special issue. This facility overview will lead into the more detailed auroral arcs workshop in the second session.

Storms

Convenor: M. J. Buonsanto

The CEDAR Storm Study is a cooperative international effort to study specific storm intervals with particularly good data coverage. Disturbed periods chosen to date are those centered on the March 20-21, 1990 and June 11-12, 1991 Incoherent Scatter Coordinated Observation Days and the November 1993 Space Weather Interval. The CEDAR Storm Study has been very successful so far, with 19 related papers already published or submitted, and many on-going projects on specific topics. This workshop provides an opportunity for participants to identify new projects, and to describe and discuss progress they have made on current projects. We will also discuss future plans, including a proposal for a new CEDAR Storm Study interval (May 1-5, 1995).

CEDAR Student Workshop

Convenors: T. Valentic, J. D. Sahr

We will be hosting a lively panel discussion to help sort fact from fiction when it comes to the job scene. Everyone hears the horror stories that hundreds of people apply for a single faculty position. How can you possibly compete? Come and talk to people who are on the search committees and find out what really happens behind the scenes. Is there a danger of doing too many post-docs? Find out what some current post-docs are doing to find permanent research positions. Does the prospect of spending the rest of your life like your advisor's make you want to pursue a fine arts degree instead? Thought about writing or teaching high-school science? See what alternatives are out there besides the lecture hall or lab. We will also recap the results of John Sahr's survey of recent graduates. The panelists have been instructed to hold nothing back and to be brutally honest! We are planning a tour of LASP to see the facilities for the SNOE (Student Nitric Oxide Explorer) satellite (<http://lasp.colorado.edu/snoe>) afterwards.

Topside

Convenor: S. Gonzalez

The topside ionosphere is the region that links the F region ionosphere to the plasmasphere. There are now a multitude of techniques to study this region (i.e. incoherent scatter radars, satellites (DMSP), optical instruments and numerical simulations). We will discuss the status of the incoherent scatter radar and optical measurements at Arecibo and try to determine useful areas of collaboration between the different research groups.

Midcourse Space Experiment (MSX) Launched

The Midcourse Space Experiment (MSX) satellite was launched successfully from Vandenberg AFB, CA on 24 April, 1996 at 08:27:40 EDT. The ride was smooth and a good circular orbit was achieved:

Inclination 99.374° (desired 99.36°)
Eccentricity 0.0006 (desired 0.0001)
altitude 903.5 km (desired 903 km)
Nodal Period (sec) 6184.6 (desired 6183.8)

Currently the satellite is undergoing intense checkouts which have revealed that the spacecraft and instruments are in excellent health. As of early May the visible-UV imager/spectrometer system (UVISI) has completed checkouts of all 9 sensors each of which is performing well. UVISI covers are now open and the instrument is being used to monitor contamination. The aperture of the cryogenically cooled IR sensor (Spirit III) has been released successfully and all indications are that the instrument is in good health. Already 8 Gbytes of data/day are being transmitted to the ground facility at APL/JHU. However, the spacecraft will continue to undergo testing and instrument calibration for approximately the next 2 months.

Full scale operations are planned from mid June onwards. An MSX workshop will be held at the CEDAR '96 workshop (coordinated by G. Romick, APL; R. O'Neil, PL; and M.J. Taylor, USU) at which a detailed report of the spacecraft and sensor status will be given including a presentation of current MSX mission operations and some first-look, spectral/imager measurements. This workshop is currently scheduled for Thursday 20 June and will be divided into two parts lasting the whole afternoon (4 hrs). A key element of this workshop will include detailed planning and logistics for coordinated, auroral, nightglow and twilight measurements over the next year. CEDAR and other national and international investigators interested in making collaborative measurements with MSX are encouraged to attend this workshop. Alternatively, please contact Mike Taylor at Utah State University regarding your measurement plans as soon as possible. It is important to gain this information early in the mission in order to maximize the potential for coordinated measurements. Further information concerning the status of MSX and early operational plans will be circulated as it becomes available via the CEDAR e-mailing list.

*Mike Taylor (MSX/CEDAR Coordinator)
e-mail: Taylor@psi.sci.sdl.usu.edu*

1996 Annual CEDAR Meeting Plans Sunday, June 16 to Saturday, June 22, 1996 Sponsored by NSF, HAO/NCAR, University of Colorado

There are currently 102 students registered to come to the CEDAR Workshop from 30 different institutions, 4 of them outside the US. Of these, 74 are PhD students, 15 are Masters candidates, and 13 are undergraduates. Only 27 non-students have registered so far. The deadline for early registration is May 31. Student registration packets will be available on Sunday, June 16 at Kittredge, and moved to Math-100 on Monday morning. Parking permits are necessary during the week days, and can be purchased from the campus police located next to lot 436 for \$15/week or \$3.75/day. Lot 436 is east of the Engineering Building. Permits should be purchased right away since tickets can appear on cars within 5-10 minutes, Monday-Friday. Students who have already requested permits will pick them up in their registration packets.

Workshops total 22, including the Student Workshop held on Sunday, June 16 between about 1:30 and 5:30. This

will either be at the Engineering Building or LASP. The other workshops are scheduled for the Engineering Building Monday through Friday except for Tuesday, when there will be a single large poster session from 3-6PM at the University Memorial Center (UMC), along with a reception. Currently, 44 students have asked to present posters along with 3 non-students. The Saturday session is a joint CEDAR/GEM session that is being planned by a joint committee. The buffet will be held on Wednesday June 19 on the Tree Plaza of the NCAR Mesa Lab. Buses will be provided. Any alcohol at the reception and the buffet will come from voluntary contributions sent in with the registration form. We were short last year, so please consider a contribution. The extra-curricular activity this year is dinner and 'My Fair Lady' at the Boulder Dinner Theatre on Thursday, June 20. A bus will be provided for this event.

Barbara Emery, HAO/NCAR

1996 CEDAR Workshop Agenda University of Colorado June 16-22, 1996

Registration packets are available for students at Kittredge Commons dorm only until Monday morning; then all registration packets will be available Monday-Saturday mornings outside Math-100. Workshops are in the Engineering Building, and the Poster Session/Reception is at the University Memorial Center (UMC). Facilities posters will be on display Mon-Wed outside Math 100 and Satellite posters will be on display Thur-Sat. Parking permits for students who requested them will be in their registration packets. Others must buy them from Campus Police next to Lot 436 east of the Engineering Building. E-mail can be checked in user areas of the Engineering Building. The closest lunch place is the Alfred Packer Grill in the UMC.

Sunday, June 16

01:30-05:30 - Student Workshop at Eng CR1B-40
and/or LASP - Valentic/Sahr

Monday June 17 (Math 100 AM, Eng Bldg PM)

08:30-09:00 - Math 100, Welcome/Introductions
Jeff Forbes/Michael Mendillo
Robert Serafin, Director of NCAR
Michael Knoelker, Director of HAO
Sunanda Basu, Bob Robinson, and
Rich Behnke of NSF

09:00-09:30 - CSC Comments, Introductions of
Post-docs, students by Mendillo

09:30-10:00 - *Phase III*, part 1/5

10:00-10:30 - **Break**

10:30-11:00 - *Phase III*, part 2/5

11:00-11:30 - CEDAR Prize Lecture
The ALOHA/ANLC-93 Campaigns
Chester Gardner, U. of Illinois,

11:30-11:45 - Update on the CEDAR Data Base
Barbara Emery/John Holt

11:45-01:00 - **Lunch**

01:00-05:30 - Eng Bldg (**Break** 3:00-3:25 in room)
Workshops CR1B40:
 Millstone Hill (Foster);
 World Day Scheduling (Holt);
 O+O collision frequency (Salah)
CR200: *HLPS I; II* (Sojka/Weber)
CR245: *GLO-I* (Broadfoot); *Lidar*
 (Thayer/Meriwether)

Tuesday June 18 (Math 100 AM, UMC Ballroom
PM Posters/Reception)

08:30-09:30 - Math 100, *Phase III*, part 3/5, part 4/5

09:30-10:00 - CEDAR Post-doc reports
Susan Nossal, Arecibo Observatory,
 2nd year, 20 min
Jirong Yu, U. of Illinois,
 1st year, 10 min

10:00-10:15 - **Break**

10:15-10:55 - Tutorial #1 Iain Reid, U. of Adelaide
Middle Atmosphere, MF/UARS
Discrepancies, etc. (title TBD)

10:55-11:35 - Panel for Tutorial #1
Discussion of Issues
Mod. Susan Avery, CU

11:35-11:45 - PREASA (Pacific Region Equatorial
Anomaly Studies) Highlights
J. Scali/B. Reinisch/K. Igarashi

11:45-03:00 - Lunch, spontaneous meetings

01:00-03:00 CR239, *CEDAR Data Base Access*
drop-in (Barnes/Cariglia)

03:00~06:00 - Poster session (UMC Ballroom)
Set up posters 2-3 PM; take down
before going to dinner.
Reception during poster session

Wednesday June 19 (Math 100 AM, Eng Bldg in late AM and PM)

08:30-09:00 - Math 100, *Phase III*, part 5/5

09:00-10:00 - TIMED

10:00-10:15 - **Break**

10:20-12:20 - *Workshops* in Eng Bldg
CR1B40: *TIMED/CEDAR*
(Salah/Meriwether)
CR200: *Topside* (Gonzalez)

12:20-01:30 - **Lunch**

01:30-05:45 - Eng Bldg (**Break** 3:30-3:45)
Workshops
CR1B40: *Jicamarca* (Farley);
Arecibo (Tepley)
CR200: *LTCS* (Johnson/Fesen);
open
CR245: *GLO-II* (Broadfoot);
PRIMO (Anderson/
Fuller-Rowell/Sojka)
CR239: *CEDAR Data Base*
Access drop-in (Barnes/
Cariglia)

06:15 **Bus** Kittredge Commons ⇌ NCAR Mesa
06:30-8:30 - Bar-B-Q on Tree Plaza (NCAR Mesa)
08:30 **Bus** NCAR Mesa ⇌ Kittredge Commons

Thursday June 20 (Math 100 AM, Eng Bldg PM)

08:30-09:00 - Math 100, Facilities Reviews, New
Technology Awards, NSF
(Bob Robinson)

09:00-10:00 - Tutorial #2 Bela Fejer, Utah State U.
Ionosphere (Title TBD)

10:00-10:15 - **Break**

10:15-11:15 - 4 CEDAR Science Highlights

11:15-11:30 - Update on Svalbard IS Radar
Anthony Van Eyken, EISCAT
Scientific Association

11:30-11:45 - TBD (or for spontaneous meetings)

11:45-01:00 - **Lunch**

01:00-05:30 - Eng Bldg (**Break** 3:05-3:25)
Workshops
CR1B40: *Sondrestrom* (Kelly/Thayer);
Auroral Arcs (Swenson/
Solomon)
CR200: *MSX I; II* (Romick/O'Neil/
Taylor)
CR245: *POLITE* (Erickson); *Data*
Processing (Palo)
CR239: *CEDAR Data Base Access*
drop-in (Barnes/Cariglia)

06:30 **Bus** Kittredge Commons ⇌ Boulder
Dinner Theatre
~ 6:30-10:15 Extra fare: Dinner, 'My Fair Lady'
(Show starts at 8:00)
10:15 **Bus** Boulder Dinner Theatre ⇌ Kit-
tredge Commons

Friday June 21 (Math 100 AM, Eng Bldg PM, may be of interest to GEM)

08:30-09:00 - Math 100, Student poster awards

09:00-09:30 - Space Weather, Rich Behnke, NSF

09:30-10:00 - Report on GEM program, TBD

10:00-10:15 - **Break**

10:15-11:15 - Tutorial #3 - Richard Wolf, Rice U.
Magnetospheric models and their
relationship to the ionosphere and
space weather

11:15-11:25 - NASA Funding, Mary Mellott, NASA
Headquarters, TBD

11:25-11:40 - POLAR Update, Glynn Germany,
U. of Alabama, Huntsville

11:40-12:05 - ISTEP/GGS Update (WIND, GEOTAIL,
CLUSTER plus Equator-S)
George Parks, U. of Washington

12:05-01:30 - **Lunch**

01:30-05:45 - Eng Bldg (**Break** 3:30-3:45)
Workshops
CR1B40: *Storms I; II* (Buonsanto)
CR200: *MISETA I; II* (Meriwether)
CR245: open; *MSIS Update*
(Picone/Oliver)

Saturday June 22 (with GEM - see page 12)

CEDAR-GEM Workshop on the National Space Weather Initiative (NSWI)

J. Hughes (GEM Steering Committee Chair)
M. Mendillo (CEDAR Steering Committee Chair)
H. Spence (GEM Meetings Coordinator)

As part of this June's CEDAR and GEM activities, a joint workshop on Space Weather will be held. For the National Space Weather Initiative to succeed within CEDAR and GEM, it must focus on science-driven activities. The workshop will address how NSF's contributions are unique and important. To help achieve this, the workshop will strike a balance between data/event-driven activities, and discussion of crucial science issues in the field. Theoretical uncertainties, modeling dilemmas, and instrumentation/observational needs will be discussed.

The plan decided upon was to bridge the CEDAR and GEM meetings using a three-part, two-site format. The all-day Saturday session is the prime day for joint activity. The limited Friday items are intended primarily for GEM outreach to CEDAR and likewise, those on Wednesday are for CEDAR outreach to GEM. Registration fees are waived for these days.

Friday, 21 June 1996 Final Day of CEDAR Workshop (Boulder - see page 11)

The "normal tutorial" for this day will be on a topic representative of the magnetospheric physics community's approach to Space Weather. A summary will be given of how a state-of-the-art model uses solar/solar wind input to produce magnetospheric and ionospheric effects for a "generic event."

A presentation on the RICE Convection Model will be given by R. Wolf.

Saturday, 22 June 1996 Joint CEDAR-GEM Workshop in Boulder on CU campus.

MORNING SESSION - Math 100

- 8:30 - 8:40 Introduction: Brief outline of Workshop goals
 CEDAR/GEM Chairmen: M. Mendillo, J. Hughes
- 8:40 - 9:40 Space Weather Drivers: How do they rank in importance?
 Speakers: G. Siscoe, R. Schunk
- 9:40 - 10:10 Case Study Activities: synthesis and discussion of focused science issues
 that have emerged from activities to date on 11/93 period.
 Speakers: D. Knipp, M. Buonsanto
- 10:00 - 10:30 **BREAK**
- 10:30 - 12:00 New Frontiers: Magnetosphere/Ionosphere/Thermosphere Coupling
 Speakers (Tentative): T. Killeen, C. Russell

12:00 - 1:00 LUNCH BREAK

AFTERNOON SESSION

- 1:00 - 2:00 Panel Discussion: What are the critical problems? What is needed to
Math 100 solve them?
 Moderators (Tentative): C. Russell/T. Killeen
 Panel Members (Tentative): P. Reiff, A. Rodger, J. Fedder, Sa. Basu,
 M. Kelley
 Brief initial presentation by each panelist commenting on the morning
 presentations, followed by general discussion with audience participation.
- 2:00 - 4:00 Working Groups (Titles and locations TBD)
- 4:10 - 4:30 **BREAK**
- 4:30 - 5:00 Summing Up - J. Hughes and M. Mendillo

CEDAR-GEM Workshop *(continued)*

Wednesday, 26 June 1996 Middle Day of GEM Workshop (Snowmass)

A companion to Friday, this is an opportunity for GEM participants to learn about the ionospheric physics community's approach to Space Weather through invited tutorials. Topics to be covered include non-solar wind-induced perturbations in the ionosphere, and classic, state-of-the-art modeling of ionospheric storms driven by solar wind/magnetospheric processes.

- 1) Equatorial Spread-F: Semi-predictable disruptions of the low latitude ionosphere with severe effects on radio propagation; observational and modeling approaches.
Speaker: M. Mendillo
- 2) First-Principle Models of Ionospheric Disturbances: A status report on thermospheric and ionospheric storm-time effects capable of being modeled from solar and magnetospheric input parameters.
Speaker: A. Richmond



(continued from page 5)

Geomagnetic one minute variations data for 1990 through 1996 from up to 61 observatories worldwide reside in a database management system. Users can interactively search the database for the date and location of interest. Geomagnetic one minute variation data are selected, plotted, and distributed over the web. The effect of geomagnetic activity on the aurora can be quickly accessed through links to the DMSP browse imagery.

Digital hourly values NRL New Program dating back to 1902 from 223 different geomagnetic observatories will be loaded into the SPIDR system in the future. Planned also is the ability to create plots for multiple observatories stacked one above the other for comparison. Geomagnetic indices Ap and Kp are available on SPIDR as well.

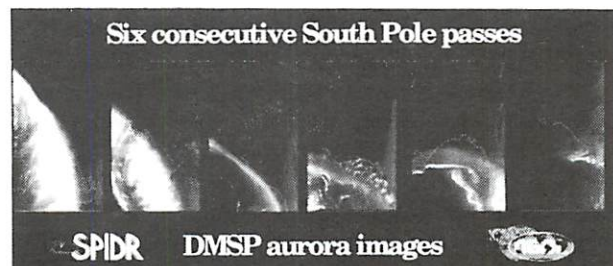
Just added to the SPIDR system is the ability to create plots of Geomagnetic and Solar indices. The web user specifies the search criteria by completing a form over the worldwide web. Geomagnetic Kp sum and Ap indices and solar sunspot number and 10.7 cm flux are arrayed for comparison.

The SPIDR system is an actively evolving data access and visualization tool. Input from scientists and other users around the globe has and will continue to shape the development of the SPIDR system. The needs of both external and NGDC users set the priorities for SPIDR, with the goal being to satisfy both external and internal users through a single interface.

In addition to future developments mentioned above, projects in the immediate future include data delivery for SPIDR datasets and the addition of GOES satellite space environment monitor data. Additional databases and capabilities will be added subsequently including DMSP global daily maps, solar cosmic ray plots, ionospheric indices, and ionospheric parameter generation and "on the fly" contour maps.

For on-line WWW access to information on National Geophysical Data Center SPIDR and other programs use:
<http://www.ngdc.noaa.gov/stp/stp.html>

For information about SPIDR and Solar-Terrestrial Physics Division data and products contact:
Eric Kihn, SPIDR Czar
Solar-Terrestrial Physics Division E/GC2



Karen Fay O'Loughlin, NOAA/NESDIS

Boulder Lodging and Local Transportation Information

1996 Summer NSF CEDAR Workshop
June 16-22, 1996

The facilities listed below have blocked rooms for workshop participants between the nights of June 14-22, 1996. Reservations must be accompanied by a credit card charge number or a deposit for the first night's lodging; Visa, MasterCard, American Express, and Discover credit cards are accepted at most of the hotels. Cancellations must be made before 4:00 PM on the arrival day to avoid being charged for the first night's lodging. The blocks of rooms at special workshop rates are only being held until the dates indicated below and they may fill up early. **MAKE ALL RESERVATIONS AS SOON AS POSSIBLE AND SPECIFICALLY MENTION THE CEDAR WORKSHOP HOSTED BY NCAR.** (If using travel agents, have them identify you in the same manner.) Participating hotels and rates for June 14-22, 1996 are:

Hotel	Single*	Double*	Deadline	No. of Rooms
Days Inn 5397 South Boulder Road Boulder, CO 80303 (303) 499-4422; Fax (303) 494-0269	\$74	\$79	May 14	65
Holiday Inn of Boulder 800 - 28th Street Boulder, CO 80303 (303) 443-3322; Fax (303) 443-0397	\$75	\$75	May 16	35
The Broker Inn 555 30th Street Boulder, CO 80303 (303) 444-3330; Fax (303) 444-6444	~ \$72	~ \$82	May 14	30
Courtyard by Marriott 4710 Pearl East Circle Boulder, CO 80301 (303) 440-4700; Fax (303) 440-8975	\$99	\$109	May 17	30
Homewood Suites 4950 Baseline Road Boulder, CO 80303 (303) 499-9922 ; Fax (303) 499-6706 (Group Confirmation #81559537)	\$129 for a Suite w/Kitchen (will accommodate 3-4 people)		May 14	5

RESERVE ROOMS BEFORE DEADLINES TO ASSURE LOWER RATES

All hotels have comfortable accommodations and swimming pools. All of them, except the Courtyard, can provide shuttle service to local meetings if requested by individuals *in advance* (based on availability). Checkout times are 12:00 noon.

*Hotel rates do not include 9.65% sales tax. ~ Government rates, subject to increase without further notice.

UNIVERSITY OF COLORADO DORMITORY ROOMS AND MEALS

	Single	Double	No. of Rooms
Main Campus Conference Housing Area 142 Cheyenne-Arapaho Hall Boulder, CO 80310 Fax: (303) 492-5959 e-mail: TBD (can send to Barbara Emery)	\$223.73	\$126.78/per person	25 (S), 75 (D)

Rates for the dorm campus package include a dorm room for 5 nights from 6/16-6/20 (Sunday-Thursday) and breakfast every day Monday-Friday. Early arrivals or late departures will pay an extra \$38.38 for a single and \$19.19 per person for a double. CU accepts VISA and MasterCard. Please check in at Kittredge Commons. Parking permits for a week can be obtained from campus police or requested by students via the Application for Student Funding. Students staying in a double room will not have to pay lodging upon arrival, but NCAR will pay this bill in lieu of their per diem. Students staying in a single room will have to pay for their lodging upon arrival, and will only be reimbursed about half of the cost after the meeting.

GROUND TRANSPORTATION (Airport). The Boulder Airporter Inc. (303-444-0808, \$16/one way, \$32/round trip) and the Rocky Mt. Supercoach (303-499-1951, 1-800-499-1951, \$19/one way, \$34/round trip) will take reservations for direct transportation between Denver International Airport, the hotels, and the University. Their schedules are staggered so you may find one more convenient for your arrival/departure.

DAY CARE. For child care while you attend the Workshop, Children's World at 5377 Manhattan Circle in Boulder will accept children on a drop-in basis (based on space availability). Children's World also offers summer field-trip programs. If you're interested, please call 303-494-3694. Many other daycare facilities are listed in the Boulder telephone directory under "Child Care."

Registration Form
1996 Eleventh Summer NSF CEDAR Workshop
June 16-22, 1996

1. **PLEASE PRINT**

Name: _____

Institution: _____

Address: _____

Telephone: (_____) _____ Fax: (_____) _____

E-mail: _____ Citizenship: _____

Are you a: Student () Tutorial Speaker () Neither ()

NOTE: Registrations received after **May 31** will be charged a \$15 late fee for non-students and a \$5 late fee for students. This late fee will be waived for those registering **ONLY** for Friday-Saturday.

2. _____ I plan to present a poster on Tuesday, June 18. **NOTE:** Send the title and author list to Dr. Jeffrey Thayer (e-mail is jeff_thayer@qm.sri.com) in order to be considered. Please be sure to indicate whether or not the first author is a student.

3. _____ I plan to attend the Poster Session/Reception at the UMC on Tuesday, June 18. (Time: 3 - 6PM Guests are also invited.)

4. _____ I plan to attend the buffet at NCAR on Wednesday, June 19. (Additional \$15; free for students and tutorial speakers.)

5. _____ I and #____ guests plan to attend the Boulder Dinner Theater Thursday, June 20 for dinner and the musical "My Fair Lady." (Making a lady out of a poor girl. Extra fee of \$23/person payable to Barbara Emery.)

6. _____ I plan to attend the joint CEDAR/GEM session on Saturday, June 22.

7. **FEES:** The regular total fee for the CEDAR Workshop is \$95. It could be more or less depending on attendance at the buffet and assessment of late fees. The fee for attending Friday-Saturday only is \$20. **NOTE 1: ALL FEES ARE WAIVED FOR STUDENTS AND TUTORIAL SPEAKERS. Fees for guests are not waived, nor are late assessments.** [Any voluntary contributions for alcohol will be gratefully accepted.] **NOTE 2: Foreign registrants are not assessed the late fee of \$15, provided they register by May 31; they may wait to pay their fees at the meeting.** **NOTE 3:** Any alcohol at the reception and buffet will be funded strictly out of voluntary contributions (f) below. We need about \$400-\$500, so a suggested voluntary contribution is \$10-\$20.

- | | | |
|-----|---|-------|
| (a) | Regular registration \$80.00 (Sun June 16 - Sat Jun 22) | _____ |
| (b) | Registration for ONLY Fri June 21 & Sat June 22 \$20.00 | _____ |
| (c) | Registration for retirees \$20.00 (June 16-22) | _____ |
| (d) | NCAR buffet \$15.00 (Wed June 19) | _____ |
| (e) | Guests for NCAR buffet \$15.00/ea or \$7.50/child | _____ |
| (f) | Voluntary contribution for alcohol at reception/buffet | _____ |
| (g) | Late fee if registering after May 31 \$15.00 | _____ |
| (h) | Late fee FOR STUDENTS registering after May 31 \$5.00 | _____ |

TOTAL FEES _____

NOTE: If registration payment is not enclosed with this form, please be certain that checks sent separately identify you and the workshop. Checks for the workshop should be made payable to NCAR. NCAR does not accept VISA or MasterCharge. Foreign registrants may pay on arrival provided they mail their registration forms in early. Please send correspondence to: Barbara Emery, HAO/NCAR, P.O. Box 3000, Boulder, CO 80307-3000; Phone: (303)497-1596; Fax: (303)497-1589; Internet: emery@ncar.ucar.edu; SPAN: 9580:."emery@ncar.ucar.edu".



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Prof. Jeffrey M. Forbes
Aerospace Engineering Sciences
CB 429
University of Colorado
Boulder, CO 80309-0429

Address correction requested.

The Cedar Post is published quarterly and mailed to more than 1400 scientists worldwide.
J. M. Forbes, Editor
P. Gassaway, Production Manager

Barbara Emery
NCAR
High Altitude Observatory
P. O. Box 3000
Boulder, CO 80307-3000