

The Cedar Post

May 1992

No. 16

Covering the Spectrum at Sondre Stromfjord, Greenland

The Sondre Stromfjord radar facility (CEDAR Post, Feb. 1992, No. 15) is located on the southwest coast of Greenland (67.0° N, 309.2° E) and has been in operation for nearly ten years. Over this time, active and passive remote sensing techniques have been employed which cover the electromagnetic spectrum. This is illustrated below, on a log scale, where the existing and planned instrumentation is plotted at or within its operating frequency. This plot illustrates the diverse yet complementary array of techniques available at the site to perform investigations of the high-latitude upper atmosphere.

This unique assemblage of optical and RF equipment at the site has contributed significantly to research efforts which span the spectrum of upper atmospheric studies. Continuing efforts with additional instrumentation and techniques are planned to broaden further the research at the site.

ISR New Modes – A new ionospheric mode is now available using SRI's incoherent scatter radar that is optimized for F1-region studies. This mode, dual pulse differencing (DPD), uses two pulses suitable for the F-region but of unequal length. By differencing the second-order spectral statistics between the two backscattered signals, as a function of range, it is possible to determine the spectral

characteristics of the medium with a range resolution corresponding to the difference of the pulse lengths, typically 9 km. We also plan to implement a new mode for the E-region, i.e., alternating codes. This waveform has been used at other radars and provides improved statistics for the E-region with a range resolution of 3 km.

In addition to the modes used for routine ionospheric measurements, new modes for lower altitudes have been introduced. These include Barker coded pulse-to-pulse modes suited for D-region measurements (50-95 km) and complementary coded pulse-to-pulse suited for ST measurements (5-24 km).

LIDAR – SRI is presently developing an Arctic lidar (ARCLITE) facility at the incoherent-scatter radar site in Sondre Stromfjord, Greenland. The project, funded by NSF through the CEDAR initiative, is to perform high-altitude molecular/aerosol backscatter measurements in the Arctic covering the stratosphere/mesosphere region during both nighttime and daytime conditions. The backscatter measurements will be used in investigations concerning:

- Long-term studies of the basic density and temperature structure of the Arctic stratosphere/mesosphere region.
- Effects of stratospheric warming.
- Occurrence and properties of polar stratospheric and mesospheric clouds.
- Dynamic and thermodynamic coupling between the mesosphere and lower thermosphere.



The motivation for a permanent backscatter lidar system at the Sondrestrom site includes (i) the current lack of middleatmosphere molecular backscatter observations in the Arctic, (ii) the unique assemblage of optical and RF instrumentation at or near the radar facility, and (iii) existing logistic support (i.e., shelter, electrical power, personnel). Recently, John Meriwether and the Phillips Laboratory lidar group carried out a campaign at Sondrestrom investigating noctilucent clouds during the summer months in 1990 and continued operations into the spring of 1991. A discussion of this effort was given by John Meriwether in the CEDAR POST, No.12, February 1991. This work demonstrated the high scientific return that could be achieved by a permanent lidar capability at the site.

The CEDAR-funded backscatter lidar employs an injection seeded (resulting in a .0035 cm⁻¹ transmitted laser line width), high-energy (16.8 W) GCR-5 Spectra Physics Nd: YAG laser for primary operation at 532 nm (560 mJ per pulse at 30Hz). The transmitted laser energy passes through a x4 beam expander to achieve a beam divergence of less than 0.1 mrad. The receiver system is designed around a 36-inch Newtonian telescope of astronomical quality with optical filters, photomultipliers, and photon counting electronics completing the package. The resulting field of view of the telescope is less than 0.5 mrad. Two cooled EMI 9863B/100 PMTs are used to cover the large dynamic range introduced by the desired coverage in altitude. A mechanical chopper is incorporated into the receiver package to eliminate signal-induced noise in the PMTs by blocking the strong backscatter returns below 15 km. A 10Å interference filter is used to monitor the backscatter return of the 532 nm transmitted laser energy during polar night conditions. Because of the site's geographic location above the Arctic Circle, considerable observing periods will exist during times of long twilight. To reduce the background during times of low solar elevation angles, a Daystar filter made up of a 10Å interference filter, a polarizer, and a birefrigent solid etalon is used to attain a filter bandwidth of 0.4Å. In addition, the solar background can be reduced further by taking advantage of the polarization properties of the Daystar filter and the different polarization in the scattered sunlight and laser energy. Since the unpolarized light from the twilight sun is scattered 90° to the receiver and the linearly polarized laser light is backscattered at 180° to the receiver, polarization techniques can be used to reduce the scattered sunlight during low solar elevation angles. This approach will be tested this summer by John Meriwether in Alaska during a noctilucent cloud campaign and was employed in our lidar system this winter.

The measurement accuracy and, consequently, the performance, of the lidar system is largely determined by the product of the laser power and the telescope area. This power-aperture product may be used to compare the performance between lidar systems. A factor of 10 improvement in the power-aperture product increases the measurement altitude, for a fixed accuracy, by about two scale heights. Power-aperture products for the ARCLITE Rayleigh lidar system and the mobile Phillips Lab Rayleigh lidar system operating an Nd:YAG laser at 532 nm are given in Table 1.

Table 1

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POWER-APERTURE PRODUCTS OF ARCLITE AND PHILLIPS LAB RAYLEIGH LIDAR SYSTEMS AT 532 nm

Facility	Laser Power (W)	Telescope Area (m ²)	P•A (Wm ²)
ARCLITE	16.8	0.66	11.09
Phillips Lab*	3.0	0.29	0.88

*J. W. Meriwether, private communication - Sondrestrom performance

The significant laser power and large telescope area of the ARCLITE facility provide a performance factor that is high compared with the Phillips Laboratory mobile Rayleigh lidar system placed temporarily at the Sondrestrom radar site during the fall/winter period of 1990-91. Density and temperature profiles were obtained up to 85 km (10% error) with a vertical resolution of 300 m and an integration time of three hours (J. W. Meriwether, private communication). From Table 1, the ARCLITE system is a factor of 12 more sensitive than the Phillips Lab system and, thus, should obtain density profiles up to ~ 95 km with the same temporal and spatial resolution. The lidar system will be shipped this fall and will become operational late 92 or early 93.

MF RADAR - The important role of tides and gravity waves in providing vertical coupling between the various regions of the atmosphere has become increasingly evident in recent years. Since wave motions are an integral part of the global circulation at all altitudes and latitudes, global measurements of the climatology of the wave parameters and the vertical fluxes of energy and momentum produced by the waves are needed if we are to have a complete understanding of the dynamics of the atmosphere. The mesosphere and lower thermosphere region is particularly interesting since it represents a transition height range from dynamics dominated by upward propagating gravity waves and tides to a region characterized by a mixture of the waves generated at lower altitudes and the waves generated in situ by EUV, for example. At high latitudes, the Lorentz forcing and Joule heating in the E-region begin to be important and provide further sources of wave energy. Yet, except for some wind measurements in the Antarctic, there are no measurements of winds at high latitudes.

To this end, CEDAR provided funds to Dr. Susan Avery and Dr. Miguel Larsen to perform mesospheric wind experiments at Sondrestrom. The technique to be used involves a medium frequency (MF) radar that would provide signals that are partially reflected from scatterers in the mesosphere and spaced-antenna reception of those signals. This system will be installed at the old rocket range a few kilometers from the base and operated more or less continuously during a six-month period to obtain the seasonal variations in wind characteristics (summer, winter, equinox).

> Jeff Thayer, SRI International, Geoscience and Engineering Center

Preliminary Workshop Schedule for the 1992 Annual Meeting

We now have rooms available at both NIST and NCAR for the workshops and classes. At NCAR, the main seminar room seats 122, the Damon Room seats 50, and the Fleishmann Building holds 35. Where possible, we tried to schedule the workshops at NCAR. We also tried to keep rooms 103-105 at NIST relatively free so that posters could be put up earlier and stay up longer. Note also that the workshops do not always start at the same time and during the last two days will meet in the new Foothills Laboratory.

Monday PM June 22

- Coordinated Analysis of the Thermosphere (CAT) – Maura Hagan
 - NCAR Main Seminar Room, 1:30 5:30
- Airborne Lidar and Observations of the Hawaii Airglow/Arctic Noctilucent Clouds Campaign (ALOHA/ANLC-93) – Chet Gardner NCAR Damon Room, 1:30 – 5:30
- 3) Reception

NCAR Mesa Lab, 5:30 – 7:00

Tuesday PM June 23

- 1) Arecibo Michael Kelley NCAR Fleishmann Building, 1:30 – 5:30
- Problems Related to Ionospheric Modelling and Observations (PRIMO) – David Anderson NCAR Main Seminar Room, 1:30 – 5:30
- Auroral Arcs James Hecht NCAR Damon Room, 1:30 – 3:30
 MUSETA – July Monthly Archiver Archive
- 4) MISETA John Meriwether NCAR Damon Room, 3:30 – 5:30

Wednesday PM June 24

- Storms (Examine March 1990 and June 1991) – Michael Buonsato
 - NCAR Main Seminar Room, 1:30 4:15
- 2) Radar Scheduling John Holt NCAR Main Seminar Room, 4:15 – 4:45
- Directions for the Data Base Vincent Wickwar NCAR Main Seminar Room, 4:45 – 6:00
- Coupling and Dynamics of Regions Equatorial (CADRE) – David Fritts NCAR Damon Room, 1:30 – 3:30

5) Nightglow Variability – Michael Hickey NCAR Damon Room, 3:30 – 5:30

Thursday PM June 25

- Opportunities I Gerald Romick* NCAR Foothills Lab, Bldg. 2, Auditorium, Room 1022, 1:30 – 5:30
- Jicamarca Donald Farley NCAR Foothills Lab, Bldg. 2, Room 1001, 1:30 – 3:00
- Accessing the CEDAR Data Base Barbara Emery NCAR Foothills Lab, Bldg. 2, Comet Classroom, 1:30 – 3:30
- 4) Vertical Winds in the Upper Mesosphere and Thermosphere – Gina Price NCAR Foothills Lab, Bldg. 2, Room 1003, 3:00 – 5:00

Friday PM June 26

- Global Ionospheric Simultaneous Measurements of Substorms (GISMOS) – Odile de la Beaujardiere NCAR Foothills Lab, Bldg. 2, Room 1001, 1:00 – 5:30
- Accessing the CEDAR Data Base Barbara Emery NCAR Foothills Lab, Bldg. 2, Comet Classroom, 1:00 – 3:30
- Opportunities II Gerald Romick* NCAR Foothills Lab, Bldg. 2, Auditorium, Room 1022, 1:00 – 3:30

*Opportunities Workshops include opportunities associated with satellites, rockets, ship-borne, and ground-based instruments.

Registration News

As of May 15, 152 persons registered for the 1992 CEDAR Workshop, 123 of whom are students, of which 117 are expected to receive travel funds. This year, for the first time, we are considering charging students a \$5 late fee if they register after June 15 in order to encourage students who do not get travel funds to register in time to be included in the student biography list. Late registration for nonstudents is May 31. Fees for foreign registrants can be paid on arrival.

This year, we will be in three separate buildings. We will continue to use the auditorium at NIST for the morning plenary sessions and the Sunday radar class. NCAR now inhabits two major sites — the Mesa Lab in southwest Boulder and Foothills Lab in northeast Boulder. Foothills Lab is the new home of the High Altitude Observatory which hosts the CEDAR Workshops, and is a complex of three buildings connected by aerial walkways. The middle building contains a 140 seat auditorium and several smaller conference rooms. We plan to use the Mesa Lab Monday through Wednesday, and Foothills Lab Thursday and Friday for the afternoon workshops.

At the moment, there are about 60 registrants who plan to bring a poster to the CEDAR Workshop. These will be shown in two poster sessions Tuesday and Wednesday mornings. Unlike previous years, we will show the posters in the halls outside the main seminar room of the Mesa Lab instead of at NIST. The posters for Tuesday morning should be put up sometime Monday afternoon, and taken down before the afternoon break on Tuesday. The Wednesday morning posters will be put up after the afternoon break on Tuesday, and should be taken down before the barbecue Wednesday evening. About 55 posters will be presented by students, who will be eligible for best student poster prizes. Prize winners will be announced during the Friday morning plenary session. We will continue to accept additional posters, but space is limited. Please send your poster title and author list by May 29 to: Dr. James Hecht, Aerospace Corporation, M2-256, P. O. Box 92957, Los Angeles, CA 90009. Phone: (310) 336-7017, FAX: (310) 336-1636. e-mail: dirac2::hecht (SPAN).

Barbara Emery, NCAR

1992 Annual CEDAR Meeting Agenda Sponsored by NSF, HAO/NCAR, and U of CO

Sunday, June	21, 1992 – Radar School	10.00 10.15			
10:00-4:30	Incoherent Scatter Measurements Technique	10:00-10:15	Depart NIST for NCAR for Break and Posters		
	and Applications Bela Feier, Utab State: Jim Vickrey, SPI	10:15-12:15	Posters – Session B at NCAR Mesa Lab		
	Ben rejer, our state, sin vickiey, ski	12:15-1:30	LUNCH		
Monday, June	22, 1992 – NIST Auditorium	1:30-5:30	Workshops at NCAR Mesa Lab		
8:30–8:45 Introductions and Welcome Bob Serafin, NCAR; Tom Holzer, HAO; Mike Kelley, Cornell Univ.		6:00–8:30 BBQ at NCAR Mesa Lab Thursday, June 25, 1992 – The Polar Cap Observatory:			
8:45-9:15	(Talk by CEDAR Postdocs)	8.30_0.00	PCO Engineering Studies		
0.15 10.00	Dave Knudsen and John Sahr	9:00-9:45	Tutorial Lecture – Global Change and Polar		
9.15-10.00	Mesosphere John Plane, Univ. East Anglia, UK		Mesospheric Clouds Eric Jensen, NASA Ames		
10:00-10:30	BREAK	9:45-10:00	Polar Summer Mesospheric Radar Echoes Mike Kelley, Cornell Univ		
10:30-11:15	Large Atmospheric Observatory Initiative Chet Gardner, Univ. Illinois	10:00-10:15	Polar Stratospheric Clouds John Meriwether, Clemson Univ.		
	The Advanced Electro-Optic System at	10:15-10:45	BREAK		
11.15 11.25	Dick Frosch, Phillips Lab	10:45-11:15	Status of NSF Long-Range Strategic Planning Rich Behnke, NSF		
11:15-11:55	Gordon Shepherd, York Univ., Canada	11:15 - 12:00	Tutorial Lecture – Time-Varying Convection Michael Lockwood, RAL-UK		
11:35-12:00	John Gille, NCAR	12:00-12:15	Concluding Remarks Mike Kelley, Correll Univ		
12:00-1:30	LUNCH	12:15 1:20	LUNCH		
1:30-5:30	Workshops at NCAR Mesa Lab	12.15-1.50	Workshops at NCAP Footbills Lab		
5:30-7:00	Reception at NCAR Mesa Lab	1:30-5:30	workshops at NCAR Footnin's Lab		
Tuesday, June 23, 1992 – NIST Auditorium		Friday, June 26, 1992 – NIST/NCAR			
8:30-9:00	NSF-CEDAR Issues Rich Behnke and Fred Roesler, NSF	8:30-8:40	Status of GEM Bill Lotko, Dartmouth College		
	Report on HELPS Workshop Suzanda Basu, Boston College	8:40-9:00	Convection Patterns for Northward IMF Dolores Knipp, U.S. Air Force Academy		
9:00–9:15	The Oxygen Collision Frequency in the Thermosphere Joe Saleh, MIT Haystack Observatory	9:00–9:30	Convection Patterns for Steady Homogeneous Auroral Arcs: Observations and Modeling Yuri Galperin, SRI–Academy of Sciences, Russia		
9:15-10:00	Tutorial Lecture – Overview of Upper Atmosphere TIGCM Ray Roble, NCAR	9:30-10:00	Air Force Efforts in Global Models Dave Anderson, Phillips Laboratory		
10:00-10:15	Depart NIST for NCAR for Break and Posters	10:00-10:30	BREAK		
10:15-12:15	Posters – Session A at NCAR Mesa Lab	10:30-10:45	Radar Aeronomy in Japan - Present and Future		
12:15-1:30	LUNCH		Sho Fukao, Kyoto Univ.		
1:30-5:30	Workshops at NCAR Mesa Lab	10:45-11:00	EISCAT Results Sheila Kirkwood, Swedish Institute of Space Physics		
Wednesday, Ju	une 24, 1992 – NIST Auditorium	11:00-11:15	Radio Aeronomy in Ukraine		
8:30-9:00	CEDAR Prize Lecture		John Foster, MIT		
9:00-9:15	TIMED Tim Killeen, Univ. Michigan	11:15–11:45	Poster Prize Awards, Future Plans for CEDAR, Concluding Remarks		
9:15-10:00	Tutorial Lecture – The Effect of Solar	11:45-1:00	LUNCH		
	Judith Lean, NRL	1:00-5:30	Workshops at NCAR Foothills Lab		

Registration Form 1992 Seventh Summer NSF CEDAR Workshop June 21–26, 1992

National Institute of Standards and Technology – NIST National Center for Atmospheric Research –NCAR

1.	PLE	EASE PRINT			
	Nan	ne:			
	Inst	itution:			
	Add	lress:			
	Tele	ephone: () FAX: ()			
	E-m	ail:Citizenship:			
	Are	you a student: () Tutorial Speaker: ()			
	NO	TE: Students will be charged a \$5.00 late fee if they register after June 15.			
2.	I pla	an to attend the radar school on Sunday, June 21			
3.	 I plan to present a poster at the meeting NOTE: Students will be given preference if there are space limitations. 				
4.	(a)	Enclosed is my registration fee of \$55.00 (Fee includes reception and barbecue. Due May 31 for \$15.00 discount.) NOTE: FEE WAIVED FOR STUDENTS AND TUTORIAL SPEAKERS. (\$5.00 late fee charged for students who register after June 15.)			
	(b)	Enclosed is my late registration fee of \$70.00 (Due after May 31)			
5.	(a)	I plan to attend the barbecue at NCAR on Wednesday, June 24			
	(b)	I am bringing guest(s) to the barbecue at NCAR Wednesday, June 24, and enclose \$15.00/guest (indicate amount enclosed)			
6.	I w	ould like to be (removed/included) in the mailing list for the CEDAR Data Base Catalogue.			
NC	TE.	If registration payment is not enclosed with this form please be certain that checks sent separately identify you an			

NOTE: If registration payment is not enclosed with this form, please be certain that checks sent separately identify you and the workshop. Checks for workshop (and guests for the barbecue) should be made payable to NCAR. Foreign registrants can 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 (303) 497-1596 FAX Number: (303) 497-1589 Internet: emery@ncar.ucar.edu SPAN: 9580::"emery@ncar.ucar.edu"

STUDENTS Please complete BOTH sides of this registration form.

University of Colorado Summer Conference Housing Application Main Campus

COMPLETE THE INFORMATION REQUESTED BELOW AND SEND TO THE ADDRESS INDICATED AT THE BOTTOM OF THE FORM.

Name of Conference: NSF CEDAR Meeting, Summer 1992							
Participant's Name:	(1				(5	Sex	
	(last)				(first)		
First Night's Lodging	(date)	Last l	Night's Lod	ging	(data)		
	(date)				(date)		
Address:		Ci	ity:		State:	_Zip:	
Telephone: (Home)		(Business)				
Please request one of the follo	Please request one of the following:						
*Single Room Double Room (Roommate Preference if Any)							
Special Requests (Smoker/Nonsmoker, etc.)							
*There are a limited number of single rooms. If a single room is unavailable, you will share a double room with another conference participant.							
Complete if Accompanied by Spouse and/or Family:							
Spouse's Name		I	First Night's	Lodging	Last Nigl	nt's Lodging	
Child's Name	Age	Sex	_ Dbl	_ Sngl	1st Night_	Last Night	
" Name	Age	Sex	_ Dbl	_ Sngl	1st Night_	Last Night	
" Name	Age	Sex	_ Dbl	_ Sngl	1st Night	Last Night	
Will a rollaway bed be needed? Crib? Total Number in Party							

PAYMENT IS DUE AT CHECK-IN. Cash, traveler's checks, personal checks, VISA and MasterCard will be accepted. DO NOT SEND MONEY IN ADVANCE. PHONE-IN REGISTRATIONS ARE <u>NOT</u> BEING ACCEPTED BUT, IN CASE OF ANY QUESTIONS OR EMERGENCIES, THE AREA MANAGER'S TELEPHONE NUMBER IS (303) 492-6885.

MAIL TO: Main Campus Conference Housing Area 142 Cheyenne-Arapaho Hall Boulder, CO 80310

Boulder Lodging and Local Transportation Information

1992 Seventh Summer CEDAR Workshop June 21–26, 1992

The facilities listed below have blocked rooms for workshop participants for the nights of June 21-June 25 (with arrival on June 20-21 and checkout on June 26-28), 1992. 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 a Travel Agent, have them identify you in the same manner). Participating hotels and rates for June 21-June 25, 1992, are:

Hotel Days Inn 5397 S. Boulder Road Boulder, CO 80303 (303) 499-4422; FAX: (303) 494-0269	Single* \$41 (U	Double* \$41 p to 4 People)	Deadline June 7	No. of Rooms 50
Holiday Inn of Boulder 800 - 28th Street Boulder, CO 80303 (303) 443-3322 or 1-800-542-0304	\$62	\$62	May 20	25
Homewood Suites Hotel 4950 Baseline Road Boulder, CO 80303 (303) 499-9922 or 1-800-225-5466; FAX	 \$56 for a Suite w/ Kitchen (will accommodate 3-4 people 1 bed is a sofa sleeper) : (303) 499-6702 	2	May 14	25
Courtyard By Marriott 4710 Pearl East Circle	\$66	\$66	June 5	20

4710 Pearl East Circle Boulder, CO 80301 (303) 440-4700 or 1-800-321-2211; FAX: (303) 440-8975

RESERVE ROOMS BEFORE DEADLINES TO ASSURE LOWER RATES

All hotels have comfortable accommodations and all of them, except the Courtyard, can provide shuttle service to local meetings if requested by individuals *in advance* (based on availability). The Days Inn and Homewood Suites provide free continental breakfasts with lodging. Homewood Suites also has a free social hour Monday through Thursday. Checkout times are 12:00 noon. All hotels have swimming pools. We were unable to book blocks of rooms at the Broker Inn or the Clarion due to a medical convention, but some individual rooms may be available.

*Hotel rates do not include 9.5% sales tax.

University of Colorado Dormitory Rooms & Meals:

	Single	Double	No. of Rooms
Main Campus Conf. Housing Area	\$124.07	\$99.43 (per person)	30(S), 45(D)
142 Cheyenne-Arapaho Hall			
Boulder, CO 80310			
NOTE: FOR EMERGENCIES ONLY: (303)	492-6885 (Suzy Carr	pbell or her secretary)	

Rates include a Dorm Room from 6/21 to 6/25 and breakfast every day from 6/22 to 6/26. Lunches at \$6 and dinners for \$7.75 are available to anyone on an a-la-carte basis. Early arrivals (6/20) and late departures (6/27-28) will pay extra for those nights. NO PHONE-IN RESERVATIONS ARE ACCEPTED. PLEASE SEND REGISTRATION FORM PROVIDED HEREIN. Also, have only ONE individual in charge of each group from each university. CU accepts VISA and MasterCard. The above prices include the 9.5% sales tax. Please check in at Hallett Hall. Parking permits for a week will be sold for \$12.50 Sunday morning.

GROUND TRANSPORTATION (Airport)

The Boulder Airporter Limousine Service (303/321-3222) and the Stapleton Supercoach (303/499-1951) will take reservations for direct transportation between the hotels, University and Denver's Stapleton Airport. 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 availability). Children's World also offers summer field-trip programs. If you're interested, please call Shaun Barnes at (303) 494-3694. Many other day-care facilities are listed in the Boulder telephone directory under "Child Care."

FIRST CLASS

JUN-2'92



Dr. Chester S. Gardner University of Illinois Dept. of Electrical & Computer Engg. 1406 West Green St. - EL Urbana, Illinois 61801

Address correction requested.

Dr. Barbara Emery National Center for Atmos. Res. P.O. Box 3000 Boulder, CO 80307

The Cedar Post is published quarterly and mailed to more than 800 scientists worldwide. C. S. Gardner, Editor.

Sodium Layer Centroid Height São José dos Campos, Brazil (23°S)



In the March 3 issue of *Geophysical Research Letters*, Barclay Clemesha, Dale Simonich and Paulo Batista report a longterm decrease in the height of the mesospheric sodium layer at São José dos Campos, Brazil [Clemesha et al., *GRL*, *19*, 457, 1992]. Lidar measurements of atomic sodium obtained by this group during 710 days over a period of 15 years from 1972 to 1987 were adjusted for seasonal and diurnal variations in the layer height. The adjusted heights exhibited a long-term decrease averaging 49 ± 12 m/yr, significant at the 99.99% level. The authors report that the observed change in sodium layer height is consistent with long-term cooling trends in mesospheric temperatures detected by other techniques and predicted by models incorporating the expected increases in middle atmosphere CO₂ and CH₄ concentrations.