WINTER/SPRING 1995

VOLUME 18, ISSUES 3
Volume 19, Issue 1

The State Climatologist

PRESIDENT'S MESSAGE

Contents

1 President's Message

2 Obituary

2 NEXRAD

Dr. Kenneth Hadeen
Director, NCDC

Mr. David J. Smith
President, AASC

John P. Hughes
Editor, The State Climatologist

Within a month following the 1994 meeting in Madison, I was fortunate to received completed action items involving the AASC concerns with the tipping bucket gage used with ASOS. In response, a letter on precipitation observations was forwarded from the ASOS subcommittee to Dr. Friday. Prompted by our letter and external user group concerns a ASOS issues briefing was held at the American Meteorological Society annual meeting in Dallas, TX, in January 1995. Results of field evaluations and the data continuity projects were discussed. With this inaugural briefing, the NWS acknowledged that there is a need to move ASOS into the realm of usefulness for climate applications. The NWS is moving ahead with ASOS commissioning while integrating climate needs when appropriate. Recently, specifications for a new all-weather ASOS precipitation gage were developed and expect to be included in future RFP's. A review of NWS progress on ASOS and related climate issues will be a focus of our upcoming annual meeting.

Over the past year, the Executive Committee addressed two issues of concern to the AASC:

1) NWS cooperative observing program - In the early Summer of 1995, a panel organized by the National Research Council met to discuss the issues surrounding the future of the Cooperative Observers Program. To complement these efforts, the AASC invited the American Meteorological Society, Association of American Geographers, and American Geophysical Union to nominate a focal point within each organization to facilitate professional dialogue on NWS Cooperative Weather Program issues.

2) Status of State Climate Programs - with the waxing and waning of budgets, personnel, university structures, etc. we thought that a survey of the status of state programs was appropriate. In May 1995, a survey was mailed to all SC's. Responses from twenty-eight states have been received and we are in the process of evaluating the results and contacting the remaining states. In the past year, we welcomed new SC's in New Hampshire, Pennsylvania, Georgia, and Florida and are also anxious of news from New Mexico and Missouri.

The AASC will have an opportunity, associated with our annual meeting, to visit and scour the new NCDC facilities. This new facility will surely move climate services and data archival into the 21st century. Already potential "treasures" have been found in the basement of the old Federal Building which should keep climate folks busy for several years.

Finally, the months ahead are likely to require the involvement of many, if not all of the SC's, in setting a new course for the AASC. Our role in providing resources and guidance to encourage coordinated services and applied research efforts will continue. Changes, however, resulting from

unprecedented shifts in Federal and state agency missions necessitate action by the AASC. I look forward to a productive and informative meeting in Asheville, North Carolina, in August. Bring your ideas, innovations, and visions! With your help and guidance we can move the AASC forward in an effort to strengthen climate services.

David J. Smith, South Carolina State Climatologist

OBITUARY

Dr. Bernard E. Dethier passed away on February 22, 1995, in Blue Hill, Maine, at the age of 68. Dr. Dethier was born on June 5, 1926, in Boston, Massachusetts. He earned his Bachelor's and Master's degrees from the California Institute of Technology and received his doctorate from the John Hopkins University in 1958. He served as a Lieutenant in the United States Navy (Aerology). He taught meteorology and climatology at Cornell University for thirty years, before retiring in 1988 as Professor Emeritus. During this time, he was successful in building the meteorology program and establishing the university's undergraduate degree program in meteorology. He served as the New York State Climatologist from 1979 to 1988. Upon his retirement, he moved to Blue Hill, Maine, where he served as the Maine State Climatologist until his death. He was the founder of the Northeast Regional Climate Center and served as its first director. He was also chairman of numerous scientific and research programs while at Cornell and was the author of several papers dealing with weather and climate. He served on several committees of the American Association of State Climatologists, the American meteorological Society and the World Meteorological Organization. He was a member of the American Association of State Climatologists and served as its President in 1981. He was also a member of Sigma Xi and a Fellow and Professional member of the American Meteorological Society. Dr. Dethier is survived by his wife Merrily Ann, four children, two stepchildren, ten grandchildren, a sister and a brother. He was predeceased by a brother, Vincent Dethier of Amherst, MA.

NEXRAD INFORMATION

The Next Generation Weather Radar system (NEXRAD) will consist of approximately 160 Weather Surveillance Radar-1988 Doppler (WSR-88D) throughout the United States and selected overseas locations. This system is a joint effort of the United States Departments of Commerce, Defense, and Transportation to meet the needs of the participating agencies. Level III products will be recorded at 114 sites as stations are commissioned and sent to the National Climatic Data Center (NCDC) for archiving, level II recorders will be placed at all WSR-88D sites. Table 1 contains a list of sites from which Level II data and level III products will be available. Contact NCDC for information on the availability of Nexrad products, or data from any site. The first WSR-88D was installed in 1990 near Oklahoma City, Oklahoma, and the last will be completed in 1996.

WSR-88D systems generate three meteorological quantities: reflectivity, mean radial velocity, and

spectrum width. From these quantities, computer processing generates numerous meteorological analysis products.

Three functional components make up the WSR-88D. Radar Data Acquisition (RDA), Radar Product Generator (RPG) and the Principal User Processor (PUP) (See Figure 1). The RDA consists of a tower, pedestal, antenna, fiberglass radome, klystron transmitter, receiver, status and control processor, and signal processor. The RPG calls upon algorithms that convert base data from the RDA into hundreds of meteorological and hydrological products (39 categories) of various resolutions, data level intervals, and elevation angles in both graphic and alphanumeric form. Selected products are stored on a Write Once Read Many (WORM) optical disk that is sent to the National Climatic Data Center for archive and distribution to customers. This retrieval takes place at a PUP that displays products generated at the RPG. The PUP consists of a microcomputer with graphics tablet, system and application terminals, color graphics printer, color graphic monitors and communication system. Color graphics can be used to display products such as reflectivity, mean radial velocity, echo top height, and precipitation accumulation amounts. Hard copies and acetate overlays are made from the color graphics printer to be sent to customers.

A volume scan strategy is selected automatically by the RDA or manually by the operator and determined by operational needs so that the WSR-88D may continually scan the environment in a sequence of pre-programmed 360 degree azimuthal sweeps at various elevation angles. Four separate scan strategies are used now with the possibility of others being implemented in the future.

Volume Coverage Pattern 11 (VCP 11) is a precipitation mode. VCP 11 is short pulse, 14 elevation angles with a 5 minute update rate using separate surveillance and doppler scans at the 2 lowest angles. The lowest seven angles are contiguous (See Figure 2). The resulting data are used in algorithms to determine storm tracks, shear and mesocyclones. Other algorithms determine precipitation amounts and obtain wind profiles.

Volume Coverage Pattern 21 (VCP 21), a second precipitation mode, is used to observe more distant storms; it uses a short pulse, 9 elevation angles and a 6 minute update rate. There are separate surveillance and doppler scans at the two lowest elevation angles with the lowest five angles being contiguous (See Figure 3).

Volume Coverage Pattern 31 (VCP 31) is a clear air mode and is used to detect early formation of convective precipitation, air mass discontinuities and to obtain wind profiles. It is long pulse, 5 elevation angles with a 10 minute update rate. There are separate surveillance and doppler scans on the lowest three elevation angles (See Figure 4).

Volume Coverage Pattern 32 (VCP 32) is the same as VCP 31 but with a short pulse (See Figure 4).

Precipitation mode is automatic upon detection of precipitation at any elevation angle, or it may be manually selected at times. Return to clear air mode must be manually selected at the Unit Control Position. Three precipitation categories are available.

Precipitation category 1 - significant precipitation detected.

Precipitation category 2 - small amounts of precipitation detected.

Precipitation category 0 - no precipitation for 1 hour.

The capability exists to design additional VCPs to optimize performance of the WSR-88D for particular locations or weather scenarios.

There are a total of 24 level III products routinely available from NCDC which include 7 graphic products in clear air mode, 11 in precipitation mode, 5 graphic overlays and 1 alphanumeric product. Digital precipitation and radar coded message are products that are unavailable from NCDC at this time. Each product will include state, county & city background maps. Level III graphic products are available only as color hard copy, gray scale hard copy or acetate overlay copies. A list of these products appears in Federal Meteorological Handbook (FMH) No. 11, part A, pages 5-3 and 5-4, and a

SPECIAL NOTE: The WSR-88D is a very complex system. Program modifications and engineering changes are common. Early models experienced difficulties in the recording of level II data and even today tapes are received that contain spurious, erroneous, or illegal configurations. The user is cautioned that these anomalies may be encountered while reading the archived tapes, and in some cases, data gaps are evident.

NCDC will be glad to assist in solving problems encountered in reading

communication console messages. The meteorological elements included are base reflectivity, base velocity, and base spectrum width. Initially level II recorders were placed at selected sites for use when significant weather events were taking place. As the system developed it became apparent that level II data would be important in properly calibrating the radars, in research applications, and to test revised algorithms. Current plans call for level II recorders to be placed at all WSR-88D sites.

EXABYTE tape drives and 8mm tapes are used as recording devices and media. Each tape can hold approximately 4.7 gigabytes of data and, depending on operational mode of the radar and recorder model used, one tape may be filled about every 1.8 days for each site. These tapes are received at the NCDC from individual sites and are processed on a series of 8505 EXABYTE drives, reblocked, cataloged, inventoried, and archived. The normal charge for level II orders is $100 per tape, plus an $11 service and handling charge per order.

ription of each product
1, part C, pages 2-1
. A brief description
uses of these products
in Table 2. Also, a
e of base reflectivity
gure 5 along with an
f the legend that will
ch product, Figure 6.

are digital base data
e RDA's signal proces-
ormat containing status
rformance/maintenance
scan strategy, clutter
ilter bypass map, radio

complete descr
is in FMH-1
through 2-101
and possible
are included
color example
appears in Fi
explanation o
accompany ea

Level II data
output from th
sor in polar f
messages, pe
data, volume

the tapes but technical questions about the data themselves must be addressed to the:

NWS/Operational Support Facility
Applications Branch
1200 Westheimer Dr.
Norman, OK 73069

Telephone: (405) 366-6530
FAX: (405) 366-6550

The NCDC also distributes the software, including source codes, to display the WSR-88D level II data. Reflectivity, velocity, and spectrum width are displayed while the level II tape is being read and written to disk, or images can be displayed after the data have been written to disk. The WSR-88D Visualization Software (WVS) runs on SUN, IBM, HP, and SGI unix-based workstations. A copy of WVS may be obtained either by mail on 8mm tape or through ftp. For mail-order, a charge of $25 will be assessed to cover the cost of the tape and $11 to process the order.

To receive a complete copy of the RADAR WEATHER OBSERVATIONS Environmental Information Summaries C-10, or WSR-88D LEVEL II BASE DATA VISUALIZATION SOFTWARE, or TAPE DOCUMENTATION FH 65-68 for level II data. Please contact:

National Climatic Data Center
151 Patton Avenue, Room 120
Asheville, NC 28801-5001
Phone: (704) 271-4800
FAX: (704) 271-4876
Internet: orders@ncdc.noaa.gov

NCDC also has numerous products, including NEXRAD inventories, available via World Wide Web (WWW): http://www.ncdc.noaa.gov.

For a further understanding of WSR-88D Doppler radar, please refer to FMH-11 (Parts A through D):

FMH-11 Part A System Concepts, Responsibilities, and Procedures
FMH-11 Part B Doppler Radar Theory and Meteorology
FMH-11 Part C Products and Algorithms
FMH-11 Part D Unit Description and Operational Analysis

REFERENCES

1. Federal Meteorological Handbook-11

Part A System Concepts, Responsibilities, and Procedures

Part B Doppler Radar Theory and Meteorology.

Part C WSR-88D Products and Algorithms.

Part D WSR-88D Unit Description and Operational Applications.

2. "Recording, Archiving, and Using WSR-88D Data" American Meteorological Society Bulletin April 1993, Timothy D. Crum, Ron L. Alberty, and Donald W. Burgess.

3. "A Description of the Initial Set of Analysis Products Available from the NEXRAD WSR-88D System" American Meteorological Society Bulletin July 1993, Gerard E. Klazura and David A. Imy.

Table 1

WSR-88D SITES

STATION	CALL	LVL II	LVL III
ABERDEEN, SD	KABR	**	***
ALBANY, NY	KENX	**	***
ALBUQUERQUE, NM	KABX	**	***
ALPENA, MI	KAPX	**	***
ALTUS AFB (FREDERICK), OK	KFDR	**	
AMARILLO, TX	KAMA	**	***
ANCHORAGE, AK	PAHG	**	
ANDERSEN AFB, GUAM	PGUA	**	
ATLANTA, GA	KFFC	**	***
AUSTIN/SAN ANTONIO, TX	KEWX	**	***
BEALE AFB, CA	KBBX	**	
BETHEL, AK	PABC	**	
BILLINGS, MT	KBLX	**	***
BINGHAMTON, NY	KBGM	**	***
BIRMINGHAM, AL	KBMX	**	***
BISMARCK, ND	KBIS	**	***
BOISE, ID	KCBX	**	***
BOSTON/TAUNTON, MA	KBOX	**	***
BROOKHAVEN (NEW YORK CITY), NY	KOKX	**	***
BROWNSVILLE, TX	KBRO	**	***
BUFFALO, NY	KBUF	**	***
BURLINGTON, VT	KBTV	**	***
CAMP HUMPHREYS, KOREA	RKSG	**	
CANNON AFB, NM	KFDX	**	
CEDAR CITY, UT	KICX	**	***
CHARLESTON, SC	KCLX	**	***
CHARLESTON, WV	KRLX	**	***
CHEYENNE, WY	KCYS	**	***
CHICAGO, IL	KLOT	**	***
CINCINNATI/DAYTON, OH	KILN	**	***
CLEVELAND, OH	KCLE	**	***
COLUMBIA, SC	KCAE	**	***
COLUMBUS AFB, MS	KGWX	**	
CORPUS CHRISTI, TX	KCRP	**	***
DAVENPORT (QUAD CITIES), IA	KDVN	**	***
DENVER/FRONT RANGE, CO	KFTG	**	***
DES MOINES, IA	KDMX	**	***
DETROIT, MI	KDTX	**	***
DODGE CITY, KS	KDDC	**	***
DOVER AFB, DE	KDOX	**	
DULUTH, MN	KDLH	**	***
DYESS AFB, TX	KDYX	**	
EDWARDS AFB, CA	KEYX	**	
EGLIN AFB, FL	KEVX	**	
EL PASO, TX	KEPZ	**	***
ELKO, NV	KLRX	**	***
EUREKA, CA	KBHX	**	***
FAIRBANKS, AK	PAPD	**	

Table 1 (Continued)

STATION	CALL	LVL II	LVL III
FLAGSTAFF, AZ	KFSX	**	***
FORT CAMPBELL, KY	KHPX	**	
FORT HOOD, TX	KGRK	**	
FORT POLK, LA	KPOE	**	
FORT RUCKER, AL	KEOX	**	
FORT WORTH/DALLAS, TX	KFWS	**	***
GEORGETOWN, BAH	MGGT	**	
GLASGOW, MT	KGGW	**	***
GOODLAND, KS	KGLD	**	***
GRAND FORKS, ND	KMVX	**	***
GRAND ISLAND (HASTINGS), NE	KUEX	**	***
GRAND JUNCTION, CO	KGJX	**	***
GRAND RAPIDS, MI	KGRR	**	***
GRAND TURK, BWI	MGDT	**	
GREAT FALLS, MT	KTFX	**	***
GREEN BAY, WI	KGRB	**	***
GREER, SC	KGSP	**	***
GRIFFISS AFB, NY	KRMX	**	
HOLLOMAN AFB, NM	KHSX	**	
HOUSTON, TX	KHGX	**	***
INDIANAPOLIS, IN	KIND	**	***
JACKSON, MS	KJAN	**	***
JACKSONVILLE, FL	KJAX	**	***
KADENA AB, OKINAWA	RODN	**	
KAMUELA, HI	PDON	**	
KEESLER AFB, MS	KBIX	**	
KEY WEST, FL	KEYW	**	***
KING SALMON, AK	PAKC	**	
KNOXVILLE/MORRISTOWN, TN	KMRX	**	***
KUSAN AB, KOREA	PBCS	**	
LA CROSSE, WI	KARX	**	***
LAJES AB, AZORES		**	
LAKE CHARLES, LA	KLCH	**	***
LANDER/RIVERTON, WY	KRIW	**	***
LAS VEGAS, NV	KESX	**	***
LAUGHLIN AFB, TX	KDFX	**	
LINCOLN (CENTRAL ILLINOIS), IL	KILX	**	***
LITTLE ROCK, AR	KLZK	**	***
LORING AFB, ME	KCBW	**	
LOS ANGELES, CA	KVTX	**	***
LOUISVILLE, KY	KLVX	**	***
LUBBOCK, TX	KLBB	**	***
MARCH AFB, CA	KRIX	**	
MARQUETTE, MI	KMQT	**	***
MAXWELL AFB, AL	KMXX	**	
MEDFORD, OR	KMAX	**	***
MELBOURNE, FL	KMLB	**	***
MEMPHIS, TN	KNQA	**	***
MIAMI, FL	KAMX	**	***
MIDDLETON ISLAND, AK	PAIH	**	

Table 1 (Continued)

STATION	CALL	LVL II	LVL III
MIDLAND/ODESSA, TX	KMAF	**	***
MILWAUKEE (SULLIVAN TOWNSHIP), WI	KMKX	**	***
MINNEAPOLIS, MN	KMPX	**	***
MINOT AFB, ND	KMBX	**	
MISSOULA, MT	KMSX	**	***
MOBILE, AL	KMOB	**	***
MOLOKAI, HI	PTEJ	**	
MONTEREY (SAN FRANCISCO BAY), CA	KMUX	**	***
MOODY AFB, GA	KVAX	**	
MOREHEAD CITY, NC	KMHX	**	***
NASHVILLE, TN	KOHX	**	***
NEW ORLEANS/SLIDELL, LA	KLIX	**	***
NOME, AK	PAEC	**	
NORFOLK/RICHMOND, VA	KAKQ	**	***
NORTH PLATTE, NE	KLNX	**	***
OMAHA, NE	KOAX	**	***
PADUCAH, KY	KPAH	**	***
PENDLETON, OR	KPDT	**	***
PHILADELPHIA, PA	KDIX	**	***
PHOENIX, AZ	KIWA	**	***
PITTSBURGH, PA	KPBZ	**	***
PLEASANT HILL (KANSAS CITY), MO	KEAX	**	***
POCATELLO, ID	KSFX	**	***
PORTLAND, ME	KGYX	**	***
PORTLAND, OR	KRTX	**	***
PUEBLO, CO	KPUX	**	***
RALEIGH/DURHAM, NC	KRAX	**	***
RAPID CITY, SD	KUDX	**	***
RENO, NV	KRGX	**	***
ROANOKE, VA	KFCX	**	***
ROBINS AFB, GA	KJGX	**	
SACRAMENTO, CA	KDAX	**	***
SAINT LOUIS, MO	KLSX	**	***
SALT LAKE CITY, UT	KMTX	**	***
SAN ANGELO, TX	KSJT	**	***
SAN DIEGO, CA	KNKX	**	***
SAN JOAQUIN VALLEY, CA	KHNX	**	***
SAN JUAN, PR	MCBR	**	
SEATTLE, WA	KATX	**	***
SHREVEPORT, LA	KSHV	**	***
SIOUX FALLS, SD	KFSD	**	***
SITKA, AK	PAEI	**	
SOUTH KAUAI, HI	PRCW	**	
SOUTH SHORE, HI	PDHB	**	
SPOKANE, WA	KOTX	**	***
SPRINGFIELD, MO	KSGF	**	***
STATE COLLEGE, PA	KCCX	**	***
STERLING (WASHINGTON DULLES), VA	KLWX	**	***
TALLAHASSEE, FL	KTLH	**	***
TAMPA, FL	KTBW	**	***

Table 1 (Continued)

STATION	CALL	LVL II	LVL III
TINKER AFB, OK	KTIK		***
TOPEKA, KS	KTWX	**	***
TUCSON, AZ	KSRX	**	***
TULSA, OK	KINX	**	***
TWIN LAKES/NORMAN, OK	KTLX	**	***
VANCE AFB, OK	KVNX	**	
VANDENBERG AFB, CA	KVBX	**	
WICHITA, KS	KICT	**	***
WILMINGTON, NC	KLTX	**	***
YUMA, AZ	KYUM	**	***

** - WSR-88D Site that will send Nexrad Level II data to NCDC
*** - WSR-88D Site that will send Nexrad Level III data to NCDC

Table 2

NEXRAD LEVEL III PRODUCTS

*Base Reflectivity (R)
Base Spectrum Width (SW)
*Base Velocity (V)
Composite Reflectivity (CR)
Echo Tops (ET)
**Hail Index Overlay (HI)
**Mesocyclone Overlay (M)
One-hour Precipitation (OHP)
Severe Weather Probability Overlay (SWP)
Storm Structure (SS) (Alphanumeric product)
*Storm Total Precipitation (STP)
**Storm Tracking Information Overlay (STI)
**Tornadic Vortex Signature Overlay (TVS)
VAD Wind Profile (VWP)
Vertically Integrated Liquid (VIL)

*Nexrad Level III products making up the standard package
**Overlay Products that will be accompanied by alphanumeric read-out

Base Reflectivity (R) - A display of echo intensity measured in dBZ. This product is used to detect precipitation, evaluate storm structure, locate boundaries and determine hail potential.

Base Spectrum Width (SW) - A measure of velocity dispersion within the radar sample volume. The primary use of this product is to estimate turbulence associated with mesocyclones and boundaries.

***Base Velocity (V)** - A measure of the radial component of the wind either toward the radar (negative values) or away from the radar (positive values). Negative values are represented by cool colors (green) while positive values are represented by warm colors (red). This product is used to estimate wind speed and direction, locate boundaries, locate severe weather signatures and identify suspected areas of turbulence.

Composite Reflectivity (CR) - A display of maximum reflectivity for the total volume within the range of the radar. This product is used to reveal the highest reflectivities in all echoes, examine storm structure features and determine intensity of storms.

Echo Tops (ET) - An image of the echo top heights color coded in user-defined increments. This product is used for a quick estimation of the most intense convection and higher echo tops, as an aid in identification of storm structure features and for pilot briefing purposes.

Table 2 (Continued)

**Hail Index Overlay (HI) - A product designed to locate storms which have the potential to produce hail. Hail potential is labelled as either probable (hollow green triangle) or positive (filled green triangle). Probable means the storm is probably producing hail and positive means the storm is producing hail.

**Mesocyclone Overlay (M) - This product is designed to display information regarding the existence and nature of rotations associated with thunderstorms. Numerical output includes azimuth, range, and height of the mesocyclone.

One-hour Precipitation (OHP) - A map of estimated one hour precipitation accumulation on a 1.1 X 1.1 nmi grid. This product is used to assess rainfall intensities for flash flood warnings, urban flood statements and special weather statements.

Severe Weather Probability Overlay (SWP) - A measure of a storms relative severity as compared with those storms around it. The values are directly related to the horizontal extent of vertically integrated liquid (VIL) values greater than a specified threshold. This product is used as a quick identification of the strongest storms.

Storm Structure (SS) (Alphanumeric product) - A table displaying information on storm attributes which include maximum reflectivity, maximum velocity at lowest elevation angle, storm overhang, mass weighted storm volume, storm area base and top, storm position and storm tilt.

*Storm Total Precipitation (STP) - A map of estimated storm total precipitation accumulation continuously updated since the last one-hour break over the entire scope. This product is used to locate flood potential over urban or rural areas, runoff and provide rainfall data 24 hours a day.

nformation Overlay (STI) - A product which shows a plot of the past hours movement, current location, ent for the next hour or less for each identified thunderstorm cell. This product is used to determine ment.

Signature Overlay (TVS) - A product which shows an intense gate to gate azimuthal shear associated rotation. It is depicted by a red triangle with numerical output of location and height.

(VWP) - A graphic display of wind barbs plotted on a height staff in 500 ft or 1000 ft increments. The nd up to 10 previous plots may be displayed simultaneously. This product is an excellent tool for eather forecasting, severe weather and aviation.

l Liquid (VIL) - The water content of a 2.2 X 2.2 nmi column of air which is color coded and plotted This product is used as an effective hail indicator, to locate most significant storms and to identify areas

estimate total basin

**Storm Tracking I
and forecast movem
reliable storm move

**Tornadic Vortex
with tornadic-scale

VAD Wind Profile
current (far right) a
meteorologists in w

Vertically Integrated
on a 124 nmi map.
of heavy rainfall.

PRICE LIST: NEXRAD LEVEL III PRODUCTS

ST BE PAID IN ADVANCE.
SA/AMEX ACCEPTED.
TO: "COMMERCE/NOAA/NCDC" IN U.S. FUNDS.
ON A U.S. BANK OR U.S. AFFILIATE OF FOREIGN BANK.
TO CHANGE WITHOUT NOTICE.
M CURRENT PRICES.
IES ARE REQUIRED TO SUBMIT U.S. GOVERNMENT PURCHASE ORDERS.
FOR EACH PRODUCT
FOR STANDARD PACKAGE (AVAILABLE IN PRECIPITATION MODE ONLY)
WING PRICES IF CERTIFICATION IS NEEDED:
OUT SEAL) $26.00 - LIMIT 70 PAGES EACH.
ERCE SEAL $33.00 - LIMIT 40 PAGES EACH.
AND HANDLING PER ORDER
GE: 50 PERCENT OF THE ORDER'S COST (NOT INCLUDING THE $5.00 SERVICE AND
RGE) OR $45.00, WHICHEVER IS GREATER.

ALL ORDERS MU
MASTERCARD/VI
MAKE PAYMENT
MUST BE DRAWN
PRICES SUBJECT
CALL TO CONFIR
FEDERAL AGENC
$22.00 - CHARGE
$65.00 - CHARGE
ADD THE FOLLO
GENERAL (WITH
DEPT OF COMM
$5.00 - SERVICE
RUSH SURCHAR
HANDLING CHA

ARCHIVE III PRODUCTS PRECIPITATION MODE

PRODUCT NAME (ID/NO.)	RANGE (NAUTICAL MILES)	RESOLUTION (NAUTICAL MILES)
*Base Reflectivity (R/19)	124 nmi	0.54 nmi
Base Spectrum Width (SW/28)	32 nmi	0.13 nmi
Base Spectrum Width (SW/30)	124 nmi	0.54 nmi
Base Velocity (V/25)	32 nmi	0.13 nmi
*Base Velocity (V/27)	124 nmi	0.54 nmi
Composite Reflectivity (CR/38)	248 nmi	2.2 nmi
Echo Tops (ET/41)	124 nmi	0.54 nmi
**Hail Index Overlay (HI/59)	124 nmi	
**Mesocyclone Overlay (M/60)	124 nmi	
Precipitation (OHP/78)	124 nmi	1.1 nmi
Weather Probability		
(SWP/47)	124 nmi	2.2 nmi
ructure (SS/62)		
umeric Product)		
otal Precipitation		
0)	124 nmi	1.1 nmi
racking Information		
(STI/58)	186 nmi	
Vortex Signature		
(TVS/61)	124 nmi	
nd Profile (VWP/48)		
Integrated Liquid		
)	124 nmi	2.2 nmi

III products making up the standard package
cts that will be accompanied by alphanumeric read-out

*Nexrad Level
**Overlay Produ

ARCHIVE III PRODUCTS CLEAR AIR MODE

PRODUCT NAME (ID/NO.)	RANGE (NAUTICAL MILES)	RESOLUTION (NAUTICAL MILES)
ectivity (R/19)	124 nmi	0.54 nmi
ctrum Width (SW/28)	32 nmi	0.13 nmi
ctrum Width (SW/30)	124 nmi	0.54 nmi
ocity (V/25)	32 nmi	0.13 nmi
ocity (V/27)	124 nmi	0.54 nmi
e Reflectivity (CR/36)	248 nmi	2.2 nmi
nd Profile (VWP/48)		

Base Refl
Base Spe
Base Spe
Base Velo
Base Velo
Composit
VAD Wi

TD 3200 CD-ROM

Vol	State(s)
1	Washington/Oregon
2	California
3	Idaho/Montana
4	Arizona/Nevada
5	Colorado/Wyoming
6	New Mexico/Utah
7	North Dakota/South Dakota
8	Kansas/Nebraska
9	Texas
10	Texas/Oklahoma
11	Iowa/Minnesota
12	Michigan/Wisconsin
13	Illinois/Missouri
14	Arkansas/Louisiana/Mississippi
15	Indiana/Kentucky/Ohio
16	Connecticut/Maine/Massachusetts/ New Hampshire/Rhode Island/Vermont
17	New York/Pennsylvania
18	Delaware/Maryland/New Jersey/ Virginia/West Virginia
19	North Carolina/South Carolina/Tennessee
20	Alabama/Florida/Georgia
21	Alaska/Hawaii/Pacific Islands/, Puerto Rico/Virgin Islands

The NCDC Cooperative Station Data CD-ROM's are now available. This 21 volume set contains TD-3200 cooperative station data which will be updated annually. The CD-ROM provides daily air temperature, precipitation, snowfall, snowdepth, evaporation and soil temperature data files by state for over 8,000 currently operating stations (and a total of 23,000 historical stations) in the United States for the general period late-1940s to 1993. This version contains the daily station data, and station inventories. No access software is provided. The NCDC fixed tape format for TD-3200 is used, which means users cannot import data into spreadsheets without additional programming. The cost for the CD-ROM's are $120.00 per volume, or the entire set of 21 volumes is available at a reduced cost of $1500.00 (add a $5.00 handling charge per order). All orders must be prepaid.

The CD-ROM's may be ordered through NCDC Climate Services Branch:

National Climatic Data Center
Federal Plaza
151 Patton Avenue., Room 120
Asheville, NC 28801 - 5001

(704) 271-4800

orders@ncdc.noaa.gov

FIRST CLASS
POSTAGE & FEES PAID
United States Department of Commerce
NOAA Permit No. G - 19

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION
NATIONAL CLIMATIC DATA CENTER
FEDERAL BUILDING
151 PATTON AVENUE, ROOM 120
ASHEVILLE, NORTH CAROLINA 28801 - 5001

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300
FORWARD AND ADDRESS CORRECTION