



Upcoming International Conferences

Dr. Akyüz of the Department of Soil Science will be presenting two papers at the International Meeting on Soil Fertility Land Management and Agroclimatology in Kusadasi, Turkey. The first paper presented under the Agroclimatology theme is entitled "Agricultural Applications of North Dakota Agricultural Weather Network" (A. Akyüz, B. Mullins, D. Morlock). The second paper presented under the Irrigation and Water Quality theme is entitled "Automated Irrigation Scheduling Application of the North Dakota Agricultural Weather Network" (A. Akyüz, T. Scherer, D. Morlock).

Dr. Akyüz is the North Da-

kota State Climatologist and Director of the North Dakota Agricultural Weather Network (NDAWN). The NDAWN network collects weather data that is used primarily in agricultural applications. The applications assist growers in making weather critical decisions concerning their crops, livestock, and livelihood. The potato late blight and sugarbeet cercospora model currently available on the NDAWN web site forecast disease development which allows growers to make timely spray applications thereby saving money.

The most recent NDAWN application and topic of the second paper is the irrigation scheduler. The irriga-

tion scheduler allows producers to track rain and irrigation amounts on a specific field and displays the moisture deficit of the field's three primary soil types. The model assists the grower in making irrigation decisions thereby promoting water use efficiency.

The conference was organized by the Adnan Menderes University in collaboration with the Soil Science Society of Turkey.



Dr. F. Adnan Akyüz

Presentation in India

North Dakota State University Doctoral Graduate student Ambika Badh will be presenting a paper at the World Universities Forum, Indian Institute of Technology, Mumbai, India on the 16th to the 18th of January 2009.

The paper is entitled

"Impact of climate change on the growing seasons in select cities of North Dakota, United States of America" (A Badh, A Akyüz, G Vocke and B Mullins, 2008).

Ms. Badh is currently seeking a Ph.D. degree in Natural Resource Management

with emphasis on Earth and Climate Science with Dr. Akyüz. Her research topic is Climate Change Impact on Growing Seasons and Crop Selection in the Northern Plains.



Ambika Badh

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Special points of interest:

- New Datalogger CR1000
- Weather Station Sites
- Data Quality Control
- Summer Climate Recap
- Precipitation Network in North Dakota

Training Seminar at Campbell Scientific Inc.

In April 2008, Network Engineer Radu Carcoana spent a week at Campbell Scientific Inc. in Logan, Utah for training on the CR1000 datalogger. The main purpose of the training was to get acquainted with the new CR1000 datalogger and software.

In fact, in technical terms, NDAWN is a Data Acquisition System comprised of sensors that provide wide arrays of information in a form of , generally speaking, electrical impulses which are collected in a customary fashion by a datalogger. Dataloggers are smaller, more robust, energy efficient computers who, according to Campbell Scientific, “read electrical signals and convert them into engineering units, perform calculations and reduce data to statistical values”. This data is retrieved, stored and made available to



Campbell Scientific Inc. CR1000 datalogger.

you by a PC with data files.

Talking about dataloggers, presently all NDAWN stations dataloggers computers (CR10 and CR10X) use the Campbell proprietary programs such as PC208W and the most recent one Loggernet, with the sidekick Loggertalk to custom program the existing modem COM300. It is worth mentioning that NDAWN uses a library of specially made vocabulary specific to North Dakota (counties, etc) NDSU and

NDAWN. This special vocabulary was “burned” into a computer chip just for NDAWN.

In a couple of years NDAWN will be updated to the new generation of dataloggers: CR1000. Although it is not compatible with the existing proprietary software – Loggernet, the new CR1000 computer has enhanced capabilities, superior performance and user friendlier programming with CRBASIC language software. The pair system is specially suited for customary measurements, control, acquisition and dissipation of recorded data of any kind.



Radu Carcoana
Network Engineer

Guidelines for Weather Station Sites

Special guidelines are used to find proper NDAWN weather station sites that reasonably represent the general climate for a surrounding 20 mile (32 km) radius area, except rainfall. It is important to consider the radius that a rain gauge amount represents because rainfall is usually from thunderstorms which produce variable rain amounts over short distances. In fact, most of the rainfall in North Dakota falls in the form of thunderstorms.

The two primary guidelines for weather

station location:

- Located at least 20 to 25 times the height of an obstruction away from it so winds are minimally affected. Wind blowing around obstacles and down steep slopes produce pockets of swirling air that affect wind speed and direction.

“Weather stations are installed in locations that represent as large an area as possible.”

- Higher landscape to avoid flooding and cold air drainage. Cold air sinks and collects in low lying areas which affects air temperature.

For complete document on “Guidelines for Weather Station Sites,” refer to the following web site:

<http://ndawn.ndsu.nodak.edu/help.html?topic=equip>

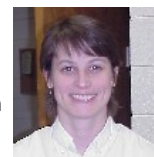
NDAWN Data Quality Control

Data quality control begins when the data are downloaded. The data are retrieved daily via telephone modem by a High Plains Regional Climate Center (HPRCC), in Lincoln, Nebraska. The data are processed by a computer program that identifies missing and obviously erroneous values. The program then provides estimates based on surrounding station data using an inverse distance weighted algorithm or a regression equation based on the most highly correlated station(s). All estimated

data are identified with an “E” flag following the value. After completing this initial data quality control step, data are electronically transferred to the NDAWN data base in Fargo, North Dakota.

Once data have been passed through the HPRCC quality control program, the daily values are visually scanned and compared to surrounding stations. Generally, the visual quality control is completed every Monday thru Friday morning, except holi-

days, in order to identify intermittent malfunctioning sensors that the program cannot detect. In addition, weekly and monthly average data are similarly compared to identify possible calibration or other problems. Guidelines for visual quality control have been established to ensure that nothing is overlooked.



Barb Mullins
Data Acquisition
Manager

North Dakota Summer Climate Recap

June State Average Precipitation

- 2008 Amount: 4.22 inches
- Monthly Ranking: 28th Wettest
- Maximum: 7.21 inches in 2005
- Minimum: 1.14 inches in 1974
- State Normal: 3.19" (1971-2000)
- Years in Record: 114

July State Average Precipitation

- 2008 Amount: 2.73 inches
- Monthly Ranking: 67th Driest
- Maximum: 7.88 inches in 1993
- Minimum: 0.62 inches in 1936
- State Normal: 2.75" (1971-2000)
- Years in Record: 114

August State Average Precipitation

- 2008 Amount: 2.48 inches
- Monthly Ranking: 36th Wettest
- Maximum: 5.02 inches in 1900
- Minimum: 0.72 inches in 1961
- State Normal: 2.10" (1971-2000)
- Years in Record: 114

June State Average Temperature

- 2008 Average: 60.9°F
- Monthly Ranking: 29th Coolest
- Maximum: 74.2°F in 1988
- Minimum: 56.2°F in 1915
- State Normal: 63.7°F (1971-2000)
- Years in Record: 114

July State Average Temperature

- 2008 Average: 69.3°F
- Monthly Ranking: 61st Coolest
- Maximum: 79.7°F in 1936
- Minimum: 61.8°F in 1992
- State Normal: 68.7°F (1971-2000)
- Years in Record: 114

August State Average Temperature

- 2008 Average: 68.6°F
- Monthly Ranking: 33rd Warmest
- Maximum: 73.6°F in 1983
- Minimum: 60.9°F in 1977
- State Normal: 67.2°F (1971-2000)
- Years in Record: 114

NDAWN Web Site

Throughout the year the NDAWN web site has been going through "behind the scenes" improvements and upgrades. Program modifications helped to enhance efficiency and increase the speed of data requests.

Several minor programming bugs were fixed. Plus, much of the software pack-

**"NDAWN Web site:
ndawn.ndsu.nodak.edu"**

ages were updated. Hardware was improved with the addition of a faster server. On the visual side, the front page of the web site received a new look. Also, improvements were made to the irrigation scheduler.

Web site maintenance is extremely impor-

tant and sometimes underrated. Software upgrades are needed for security. Also, adjustments to programming improve speed and efficiency. Proper maintenance can help to avoid potential problems in the future.

Once upgrades to the system are in place, features will continue to be revised or new features added to the web site.

NDSCO web site (www.ndsu.edu/ndsco)

The North Dakota State Climate Office (NDSCO) web site is www.ndsu.edu/ndsco. The web site is used to provide climate information to the public.

This year pre-generated windrose graphs for several locations were added. The windroses were created using NDAWN hourly data.

Colored maps of freeze/frost occurrence

were added. Maps for the fall and spring dates of occurrence probabilities are given for three temperatures (36, 32, and 28°F) at three probability levels (10, 50, and 90 percent). Data were taken from the Climatology of the U.S. No. 20 Supp no. 1, National Climatic Data Center, January 1988).

A new Climatology section provides Climatology of the U.S. No. 20 1971-

2000, National Climatic Data Center, for individual stations.

Check the News & Events for recent and upcoming NDAWN and NDSCO activities.



Recognized by the American Association of State Climatologists



North Dakota State Climate Office (NDSCO)

Soil Science
NDSU Dept 7680
PO Box 6050
 Fargo, ND 58108-6050
Phone: 701-231-6577
E-mail: adnan.akyuz@ndsu.edu

North Dakota Agricultural Weather Network (NDAWN)

The North Dakota Agricultural Weather Network (NDAWN) was established through a grant from, and in cooperation with, the High Plains Regional Climate Center (HPRCC), Lincoln, Nebraska in 1989. Originally the network consisted of 6 automatic weather stations located at North Dakota State University (NDSU) Branch Research Centers. Our objective was, and still is, to provide current weather data (yesterday's data today) necessary for the development of, and operational use of various crop, insect, and disease development models.

Currently there are 70 weather stations that expand across ND and include 10 stations in MN, 1 in SD, and 2 in MT. Data are retrieved daily via telephone modem by an HPRCC computer and loaded to the NDAWN web site. The hourly data are used in agricultural and general applications. Crop applications for barley, canola, corn, potato, sugarbeet, sunflower and wheat are available on the NDAWN web site. Additional applications include the irrigation scheduler, crop water use, insect development, and heating/cooling degree day calculator.

We're on the Web

www.ndawn.ndsu.nodak.edu

CoCoRaHS in North Dakota

CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow network. The network is composed of volunteers who measure precipitation in their own neighborhoods and record their measurements daily on the CoCoRaHS web site. The web site address is <http://www.cocorahs.org/>.

All volunteers either attend a training seminar or view the on-line training slides. The equipment is standardized and consists of a 4" diameter high capacity gauge.

CoCoRaHS was created as a result of the Fort Collins, Colorado flash flood of July 28, 1997 in which storms produced over 12 inches of rain in a short period of time. The flooding was devastating and claimed several lives.

The network is sponsored by the National Science Foundation Grant and the NOAA's Environmental Literacy Program Grant. The support has allowed other states to join the on-line

network of observers. North Dakota will be the 37th state to join the network.

Dr. Akyüz is the North Dakota CoCoRaHS State coordinator. North Dakota will go live on the CoCoRaHS web site November 1,

2008. Currently we are looking for North Dakota volunteers. If you are interested in joining the network please call the North Dakota State Climate Office (NDSCO).

NDSCO
Phone: 701-231-6577
Email: adnan.akyuz@ndsu.edu



Community Collaborative Rain, Hail and Snow network