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The RCC Report

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Weather Data Drive Pest and Disease Model for Fruit Crops

Real-time and past weather data are now being linked to models that guide management of apple orchard diseases and pests in the northeast U.S. New York ranks second nationally in apple production, totaling \$185 million annually. Pesticide use in Northeast orchards represents a significant economic cost to growers. Working with the New York State Agricultural Experiment Station, the Northeast Regional Climate Center collects weather observations from a statewide agricultural network in the Applied Climate Information System database, integrates these data with hourly National Weather Service observations, and then links the combined data to an array of apple crop disease and pest models.

Pest models predict the phenological stage of trees and development stage of insect pests based on observed degree-day

accumulations. Given the correspondence between the stages, a recommendation for pest management is provided. The Web site http://newa.nrcc.cornell.edu/newaModel/apple_pest allows users to evaluate the status of six major apple pests. The model also includes a feature in which users can modify the orchard phenological stage or pest stages based on their own observations and receive updated recommendations. The disease models incorporate temperature, humidity, and rainfall data to predict apple scab and fire blight infection events. The site http://newa.nrcc.cornell.edu/newaModel/apple_disease provides users with real-time disease status in both tabular and graphical formats.

These modeling capabilities will be expanded into Massachusetts and Vermont in the 2009 growing season.



Courtesy New York Apple Association

RESEARCH

Temperature Models Predict Peak West Nile Virus Infection Rates in Mosquitoes

Two mosquito species, *Culex restuans*, the white-spotted mosquito, and *Culex pipiens*, the northern house mosquito, are believed to maintain the natural transmission cycle of West Nile Virus (WNV) between birds and mosquitoes. The population of northern house mosquitoes, the primary suspect for WNV transmission to humans, is low in spring, but becomes predominant later in summer as the white-spotted mosquito decreases in abundance.

Research has found that two simple models are able to explain much of the variance in the crossover date, when the relative proportion of the two species is equal. The peak infection rate in mosquitoes often occurs about two to three weeks after the northern house mosquito becomes the dominant species. This is the period of greatest risk of transmission to humans, horses, and wildlife. One model is based on the number of days in which the maximum temperature exceeds 81°F, and the second is based on the number of degree days with a base of 63°F.

Previously, the models have been based on current year-to-date daily temperatures and on the probable climatological daily temperatures for days beyond the present date. This spring, however, tests have been conducted using the Model Output Statistics (MOS) temperature forecasts from the National Weather Service for the 10 days following the present date, and then using the probable climatological daily

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*The northern house mosquito, *Culex pipiens*, is responsible for the transmission of West Nile Virus to humans. Photo by Michael Jeffords, Illinois Natural History Survey.*

Climate Centers Help Preserve Early Weather Records

Weather observations have been documented in the United States since before the U.S. won its independence from Great Britain. Thomas Jefferson, for example, recorded weather observations for much of his adult life. Systematic weather observations began when U.S. Army forts recorded daily weather observations starting in the early 1800s. In the mid- to late-1800s, volunteer observer networks were managed by the Smithsonian Institution and the U.S. Department of Agriculture. These station networks eventually evolved into the Cooperative Observer Network, which continues to collect data today for the National Weather Service.

The Midwestern Regional Climate Center (MRCC) and Northeast Regional Climate Center (NRCC) both participate in the Climate Data Modernization Program (CDMP), a partnership between the National Climatic Data Center and private industry to image and key paper and microfilm records from the 19th century

and to make them available on the Internet to members of the climate and environmental research community.

A group based at the MRCC is examining the daily data for quality control as part of the Forts Project. In addition to ensuring that the desired data have been accurately keyed, quality-control procedures focus on temperature, precipitation, and snow observations from the 19th century, mainly 1820–1892. The NRCC team is performing quality control on digitized Surface Airways Observations (hourly) National Weather Service data spanning 1893 to the present from major city offices and airports.

These data will extend climate records from stations across the country back scores of years, and are a valuable addition to the data needed to document climate change and variability in the United States.

More information about CDMP can be found at <http://www.ncdc.noaa.gov/oa/climate/cdmp/cdmp.html>

Information about the Forts Project can be found at <http://www.ncdc.noaa.gov/oa/climate/cdmp/forts.html> and <http://mrcc.isws.illinois.edu/research/cdmp/cdmp.html>

Historical Climate Network Modernization Project

The National Oceanic Atmospheric Administration Western Regional Climate Center (WRCC) has been performing site surveys of potential candidate locations for installing automated equipment for stations in the U.S. Historical Climatology Network (USHCN). A pilot project to evaluate the process is under way in the southwest U.S. The USHCN presently consists of some 1,200 sites across the country that meet the criteria for length and completeness of climate observations. These data are heavily used, especially to detect long-term climate variations.

This NOAA HCN Modernization (HCNM) pilot program aims to replace manual equipment at 141 sites in the four participating states with automated equipment measuring at 5-minute intervals. The WRCC is surveying 108

sites, and the High Plains Regional Climate Center is surveying the other 33 sites.

The WRCC has been providing documentation of the physical, logistical, and administrative factors that determine overall feasibility of a location. Representative, undisturbed, and unchanging sites are needed. At least one site is desired in every box of a 50-mile nationwide grid. A rigorous procedure has been defined to identify and document sites, evaluate their suitability, obtain host consent, install and maintain the stations, perform quality control, and rapidly disseminate the observations. A NOAA science panel meets to review the information, and recommends proceeding with the most viable site, or requests identification of additional candidates. About 40 sites have been selected, and installation is expected to commence in summer 2009.

HPRCC Assesses the Potential for Wind Energy

The High Plains Regional Climate Center (HPRCC) is working with a local group in Lincoln, NE to assess the potential for wind power in Lincoln. NeighborWorks, a non-profit, community-based housing organization in Lincoln, <http://www.nwlincoln.org/>, is examining the effectiveness of a helix-type wind power plant on a new three-story building. The HPRCC has installed wind-monitoring equipment on the building, and data will be collected for several months.



Weather monitoring specialist Glen Roebke of the HPRCC installs an anemometer and wind vane on the building in Lincoln.

generation at the site, and comparisons will be made to other automated weather stations located in and around Lincoln that are monitored as part of the Automated Weather Data Network, managed by Ken Hubbard in the School of Natural Resources at the University of Nebraska-Lincoln. These data are available for other years and can help establish whether the wind data collected in 2009 represent a period of high, medium, or low wind compared to other years.

The dataset will be used to assess the potential for wind power

Customer Request Identifies Potential Research Need

A routine request for climate information at the Southeast Regional Climate Center (SERCC) has led climatologists there to explore the potential need for research relating to climate and certain diseases. A woman called the SERCC wanting know about the best place for her daughter to live in North Carolina. The daughter suffers from an auto-immune disease that requires an environment that does not have high humidity or rapid and

severe pressure changes. The staff was able to provide the data to help answer the woman's question. As a result of this inquiry and a perceived need for this type of information, the SERCC, as part of its Climate-Health links initiative, is now exploring the potential need for research leading to maps showing desirable places to live depending on climate factors related to various diseases.

A Different Use for Snowfall Data

The Navy Morale, Welfare and Recreation Department (MWR) at the Naval Station Great Lakes, located near Waukegan, IL, needed snowfall and temperature data for a contest they held this winter for their trainees. Contestants had to guess the total amount of snowfall from December 21 to March 19 and the number of days with a temperature of less than 11°F. The MWR Department contacted the Midwestern Regional Climate Center for assistance in obtaining the data. Daily temperature data were available from the nearby Waukegan Airport. Since there are no nearby U.S. Cooperative Network stations, snowfall data were obtained from

three nearby stations in the Community Collaborative Rain, Hail and Snow (CoCoRaHS) Network. The MRCC provided daily updates to the MWR Department during the contest period. The lucky winner received airfare and a four-night stay in Key West, FL.

The Naval Station Great Lakes (NSGL) hosts the Navy's only Recruit Training Command, and each year approximately 37,000 men and women complete the requirements to become Navy Sailors at this facility. More than 25,000 military and civilian personnel work, train, and live at NSGL.

PARTNERSHIPS & COLLABORATIONS

SRCC Partners to Develop Climate Information for Research on Climate Hazards

The Southern Climate Impacts Planning Program (SCIPP) is the newest National Oceanic and Atmospheric Administration Regional Integrated Science and Assessment (RISA) program formed to conduct research on climate hazards in the southern region of the United States. The program aims to bridge the gap between climate science and local-level climate hazard planning processes.

The six-state SCIPP region includes Oklahoma, Texas, Louisiana, Arkansas, Tennessee, and Mississippi, a region that corresponds to boundaries of the NOAA Southern Regional Climate Center (SRCC). This research actively engages community-level decision makers to determine hazard planning and climate information gaps, develop an all-hazards assessment tool, and provide education and outreach to assist planning decisions. The major climate hazards of interest include droughts, floods, hurricanes, and severe storms due to their frequency and impact across this region.

The SCIPP was formed in the summer of 2008 as a collaborative effort between the Oklahoma Climatological Survey at the University of Oklahoma (OSU) and the Department of Geography and Anthropology and SRCC at Louisiana State University (LSU). The principal investigators are Dr. Mark Schafer (OSU) and Dr. Barry Keim (LSU). Program managers at OSU (James Hocker) and LSU (Dr. Lynne Carter) will coordinate efforts of climate and social science researchers at both institutions.

The SRCC will provide climate information obtained from the Applied Climate Information System (ACIS), developed by the NOAA Regional Climate Centers. New geospatial capabilities will be added to ACIS along with a severe storms database and other climate information to enhance coastal hazard assessments.

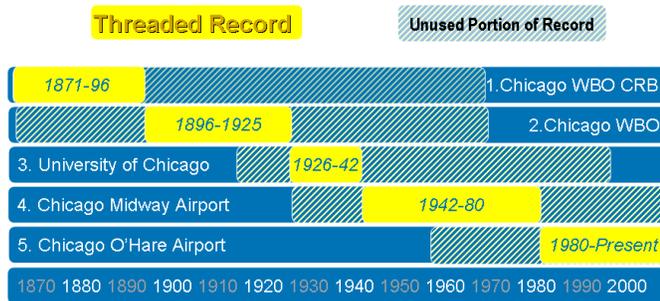


ThreadEx Database Links Area Long-Term Climate Records of Extreme Events

One of the great challenges facing users of the U.S. climate record is the fragmentation of station information over time due to station relocations. A typical first-order station has three to six site changes over the course of its full period of record. As a result, obtaining a long series (100 years or more) for presenting temperature and precipitation extremes is difficult, particularly for the media.

A solution to this problem was the development of the ThreadEx database, the electronic linking of station records within a metropolitan area regardless of climatic compatibility.

ThreadEx has been used extensively over the past two years by the media (particularly The Weather Channel) and the National Weather Service (NWS). It provides a means of presenting comparable climate records via the NWS, Regional Climate Centers, private partners, and the National Climatic Data Center. The Northwest Regional Climate Center



This figure shows how weather records taken at different locations and different periods in Chicago were "threaded" to produce a continuous period of record for extreme values.

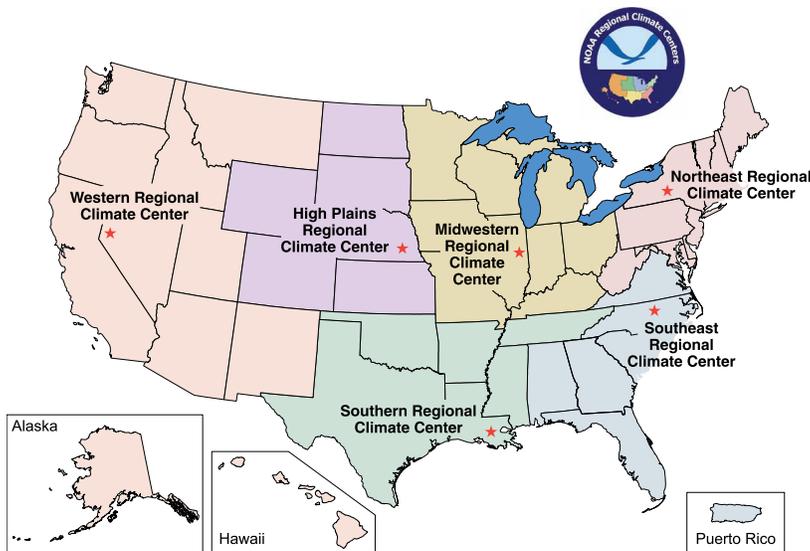
has recently updated the ThreadEx database to reflect data records that became available through the Climate Database Modernization Program and the receipt of previously unavailable daily observations from NWS offices across the country. ThreadEx data are available on the Internet at <http://threadex.rcc-acis.org/>.

Temperature Models continued from page 2

temperatures for subsequent days. This change decreases the spread of the expected earliest and latest predicted crossover dates, and the expected first day of the crossover period is predicted earlier by an average of seven days.

Crossover data have been collected for Champaign-Urbana, Illinois, and are probably representative of the central Illinois area, but likely vary for other regions. For the 2009 forecasts and further information, go the West Nile Virus link on the MRCC Web page: http://mrcc.isws.illinois.edu/research/westnile/index_anim.htm

For more than twenty years NOAA's Regional Climate Center Program has been recognized by Congress as vital to the efficient, coordinated delivery of NOAA climate services from national to local levels. The mission of the six centers is to provide quality data stewardship, improve the use and dissemination of climate data and information for the economic and societal good of the U.S., and conduct applied climate research in support of improved use of climate information.



BY THE NUMBERS

April 1-June 30, 2009

Total web hits: 13,592,192
 Data Requests/contacts: 2,752
 Media requests: 72

High Plains RCC University of Nebraska, Lincoln, NE	(402) 472-6706
Midwestern RCC University of Illinois, Champaign, IL	(217) 244-8226
Northeast RCC Cornell University, Ithaca, NY	(607) 255-1751
Southeast RCC University of North Carolina, Chapel Hill, NC	(919) 843-9721
Southern RCC Louisiana State University, Baton Rouge, LA	(225) 578-5021
Western RCC Desert Research Institute, Reno, NV	(775) 674-7010