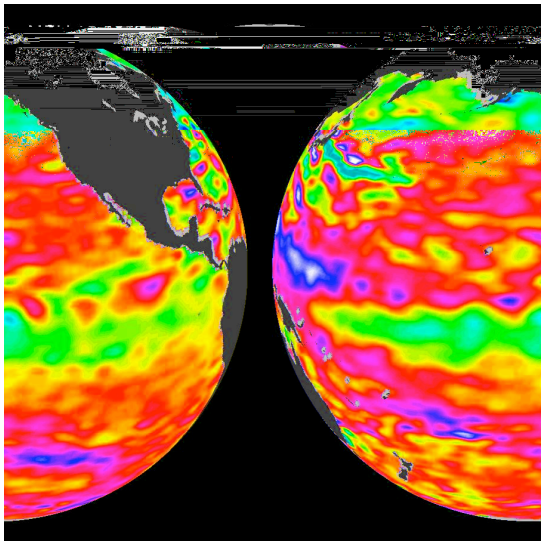
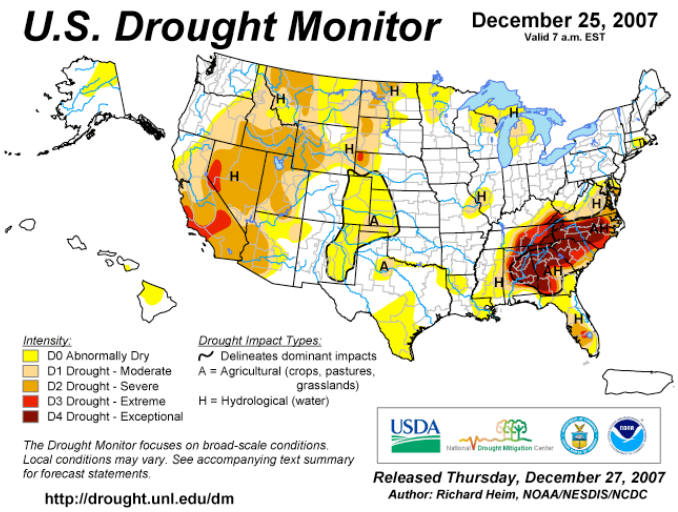
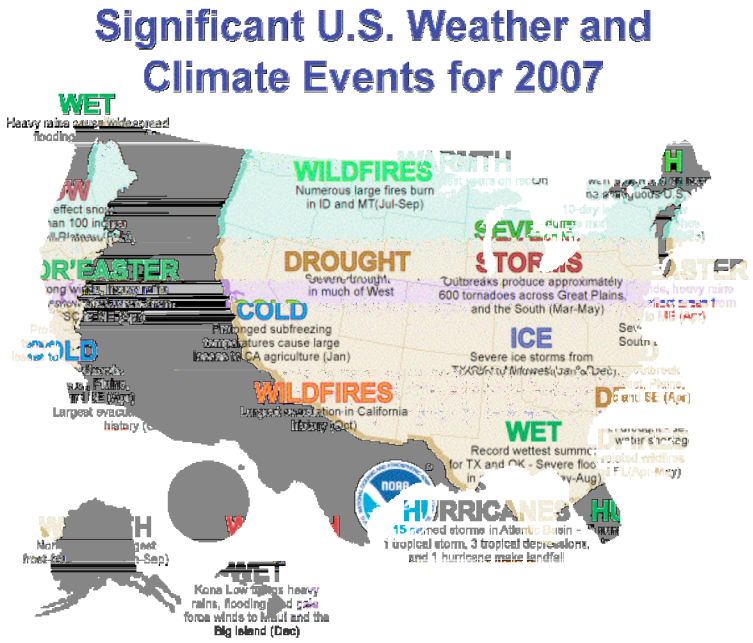
THE STATE CLIMATOLOGIST

2007 Annual Summary

Volume 26, Issue 1







***The State Climatologist* is a publication of the American Association of State Climatologists**

Editor's Note

The State Climatologist is an annual report of the activities of the members of the American Association of State Climatologists. It has been a pleasure to be the editors of this year's edition, spanning the period of January – December 2007.

We would like to express appreciation to all of the state climate offices, regional climate centers, AASC partners and others who contributed to this year's edition.

Deborah Bathke
New Mexico Climate Center
New Mexico State University

Melissa L. Griffin
Florida Climate Center
Florida State University

July 7, 2008

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About the American Association of State Climatologists

The American Association of State Climatologists (AASC) is a professional scientific organization composed of state climatologists (one per state), directors of the six Regional Climate Centers and associate members who are persons interested in the goals and activities of the Association. State Climatologists are individuals who have been identified by a state entity as the state's climatologist and who are also recognized by the Director of the National Climatic Data Center of the National Oceanic and Atmospheric Administration as the state climatologist of a particular state.

State Climatologists currently exist in 44 states and Puerto Rico. They are typically either employees of state agencies or are staff members of state-supported universities. Associate members may be assistant state climatologists or other climatologists under the employ of the state climatologist, representatives of federal climate agencies, retired state climatologists, or others interested in climate services. The total membership of the Association is approximately 150. For more info, see

http://lwf.ncdc.noaa.gov/oa/climate/stateclimatologists.html.

ARSCO

A state climate office may gain status as the AASC-Recognized State Climate Office (ARSCO) by providing:

1. A document detailing current and planned activities meeting ARSCO requirements;
2. A letter of support from the state's Regional Climate Center Director;
3. A letter of support from at least one National Weather Service Forecast Office serving the state.

Candidate offices must demonstrate the following capabilities:

- Communication capabilities – the office must be able to communicate with its clientele via multiple media, including telephone, Internet, mail, E- mail, and fax;
- Information services – the office must be capable of providing a range of data and information;
- Research – the office must conduct research on climate and human activities;
- Outreach – the office should design products and services for education, climate information, awareness, and the media;
- Monitoring and assessments – monitoring climate conditions, evaluating future impacts, and providing historical context to events are activities conducted by ARSCOs.

Upon receipt of the materials and approval of the AASC Executive Board, a Memorandum of Agreement (MOA) with the National Climatic Data Center shall be issued. Currently, 37 states have received ARSCO status.

Letter From The AASC President

Summer, 2008

Dear Fellow Climatologists, Partners and Friends of the AASC,

It is my pleasure to present to you this annual report summarizing the work of both AASC Recognized State Climate Offices (ARSCO), Regional Climate Centers, fledgling State Climate Offices and our valuable federal partners. The summaries within represent quite a diverse group ranging from the nearly volunteer work by climate experts at some universities to the fully staffed and technically experienced agencies at the regional and national scales. The common thread in each report is our mutual interest in serving the climate needs of the nation.

2007 began with a bang as the IPCC chose February 2nd, Ground Hog Day, to release its latest report from Paris. The world consciousness of our shifting climate reached a crescendo in the autumn when the Nobel Peace Prize was awarded to former Vice President Gore and the host of IPCC scientists, more than a few of whom are friends and colleagues. As the year ended, an extraordinarily early campaign for the nation's presidency made it clear that the present administration's policies on climate change would end abruptly with the next president.

The last year marked significant infrastructure building within the AASC. A half dozen action teams, formed in Coeur d'Alene and representing the spectrum of our membership, have been addressing wide-ranging issues from communication within our regions of influence to the quality assurance of climate data and siting recommendations for the modernized climate networks. The AASC is now officially incorporated and awaiting approval from the IRS on its tax-exempt status. The Journal of Service Climatology has come to life and we will welcome at least three new states into the AASC roles in 2008.

Thank you for the opportunity to serve as the Executive Officer of this extraordinary group of climate scientists for the past two years!

Sincerely,

Paul Knight
President – AASC
PA State Climatologist

2007 SUMMARY OF THE UNITED STATES CLIMATE

Compiled from reports by Richard Heim, National Climatic Data Center &
Lane Bourgeois, Georgia Institute of Technology
National Climatic Data Center Intern

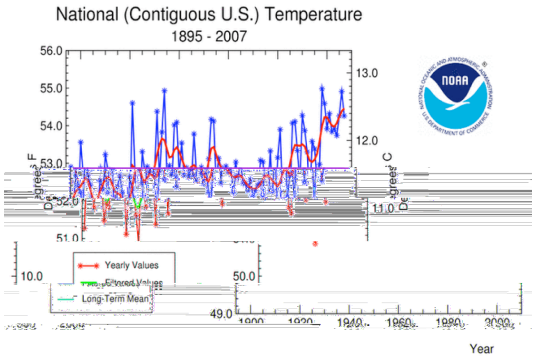
Overview

Reliable monthly, seasonal, and annual weather records for the U.S. exist from 1895 to the present, enabling the climate of 2007 to be placed in a 113-yr context for the contiguous United States. Based on preliminary data available at the end of the year, the nationally averaged temperature in 2007 was 12.4°C (54.3°F), ranking this year as the ninth warmest year on record and tied with 2005. Considerable variability in temperatures and precipitation occurred throughout the year and regionally, with record warmth occurring in March and record cold following in April. Unseasonably warm temperatures dominated in the western U.S. and cold in the east under a strong upper-level ridge/trough pattern during July. A heat wave in August broke numerous record high temperatures, stressing residential energy systems.

The year was characterized by dry conditions in the West and an historic drought in the Southeast, with unusually wet conditions in the Plains, especially during the first nine months of the year. Texas and Oklahoma had the wettest June-August on record, while Georgia and Mississippi experienced the driest March-May and Tennessee had the driest January-August. Drought persisted for much of the year in the western Great Lakes. Nationally, seven months were drier than average, with 2007 ranking as the 47th driest year on record. Moderate to extreme drought, as defined by the U.S. Drought Monitor (Svoboda et al., 2002), expanded from a fourth of the contiguous U.S. at the beginning of the year to nearly half by the end of summer before decreasing to a third of the country by year's end. Above-normal temperatures and below-normal precipitation during the spring contributed to a below-normal snow pack in the West. The persistently dry conditions, coupled with excessive summer heat, contributed to a near-record wildfire year.

National Temperature

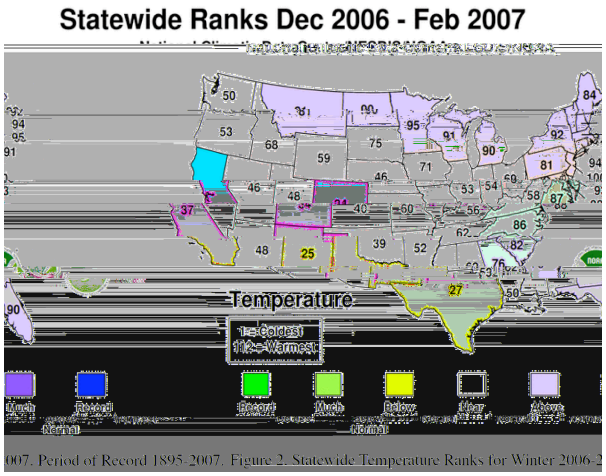
For the contiguous United States, 2007 ranked as the ninth warmest year on record and marked the tenth consecutive year with temperatures much warmer than the long-term average (Fig. 1). The past ten years have all been among the 25 warmest years on record, a streak which is unprecedented in the historical record. The annual average temperature in 2007 was 0.8°C (1.5°F) warmer than the 20th century mean, yet was 0.4°C (0.7°F) cooler than 2006 (third warmest). The long-term warming trend for annual temperatures is approximately 0.56°C (1.0°F) per century. Temperature ranks for the contiguous U.S. were second warmest on



Temperature for the Contiguous U.S.

Figure 1: Annual Averag National T

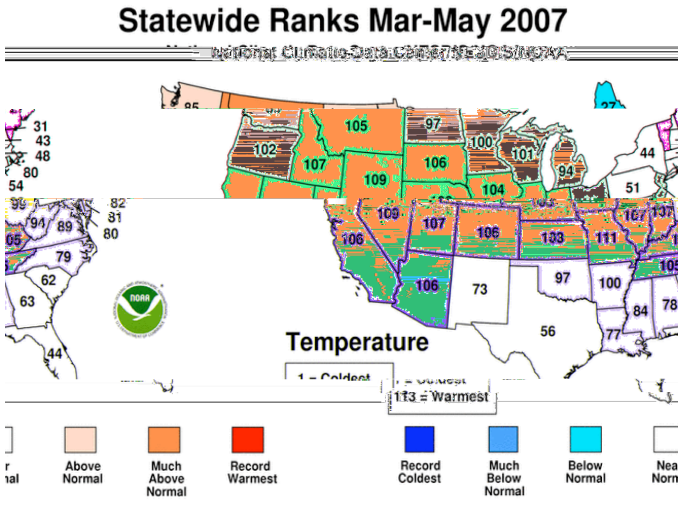
record in March and third warmest in August. Large regions of below-average temperatures were present during January, February, April and July.



007. Period of Record 1895-2007. Figure 2. Statewide Temperature Ranks for Winter 2006-2

Collectively, the 2006-2007 winter (December-February) temperatures were near average across most of the nation (Fig. 2). December 2006 was marked by above-average to record warm temperatures across a large portion of the Northeast. January was cold across most of the western and southern states and above average in the eastern U.S. A persistent trough positioned over the eastern U.S. in February was responsible for cold temperatures from the Great Plains to the Atlantic coast. The Central region ranked ninth coldest on record and was near the center of the coldest anomalies with departures from average more than 3.9°C (7°F) for the month. The Northeast region was more than 3.1°C (5.5°F) below average and ranked 14th coldest.

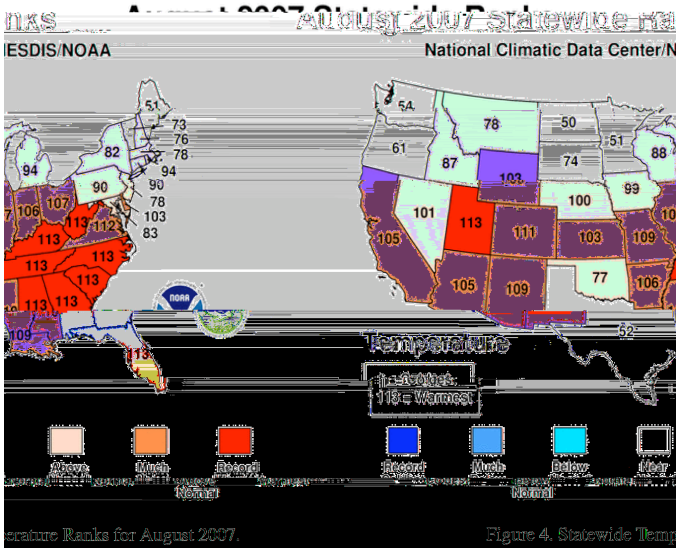
After a relatively cool beginning to the year, March rebounded and ranked second warmest for the contiguous U.S. Temperatures were much above average across 22 states from the West Coast to the Ohio Valley. Oklahoma had its warmest March on record during 2007. In fact, March statewide-averaged temperatures in Oklahoma had not been within 1.1°C (2°F) of the 2007 average since the late-1930s. The prolonged warm spell during March led to a premature leaf and bloom for many plants and trees across the central, southern and southeastern U.S. In early April, temperatures plummeted as Arctic air brought record-breaking cold temperatures and a cold freeze event to much of the central Plains, the South and parts of the East. Over 1200 daily minimum temperature records were broken across the contiguous U.S. during this event. Nonetheless, the spring season (March-May), temperatures ranked eighth warmest nationally, reflecting the dominance of the March warmth during the season (Fig. 3).



Spring 2007. Period of Record 1895-2007. Figure 3. Statewide Temperature Rankings for

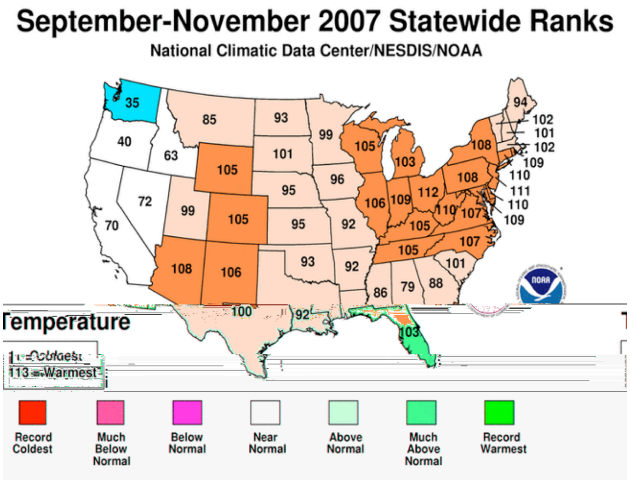
The summer (June-August) months were characterized by a near record to record warm July across portions of the West, and below to much below average temperatures across much of the remainder of the contiguous U.S. In addition, widespread warmth blanketing a majority of the contiguous U.S. resulted in a rank of third warmest August on record for the Nation. A severe and persistent heat wave moved across the country

from the Intermountain West to the Southeast and Ohio Valley during August 2007. More than 50 deaths were attributed to the excessive heat. Over 70 all-time record highs were set in August, along with scores of new daily high temperatures. Average temperatures during the warmest periods from the 7th-11th, and again from the 15th-17th, were more than 5.6°C (10°F) warmer than average in many parts of the country. Seven states (Utah, Kentucky, Tennessee, Alabama, Georgia, South Carolina and Florida) had a record warm August and an additional 17 states had temperatures which ranked much above average for the month (Fig. 4). For the season, the summer of 2007 was sixth warmest across the nation despite the colder than average anomalies present over Texas and Oklahoma, which resulted from persistent cloud cover and rainfall during much of June and July. Both July and August were exceedingly warm across Utah and ranked second warmest and warmest, respectively, giving the state a record warmest ranking for the summer season.



srature Ranks for August 2007. Figure 4. Statewide Temp

Autumn (September-November) was marked by persistent near-to-above average temperatures (Fig. 5). October ranked fifth warmest for the contiguous U.S., with much above average temperatures observed across most of the eastern third of the nation. Record warmth during October occurred in New Jersey, Maryland and Delaware. For the season as a whole, national temperatures ranked sixth warmest.



5. Statewide Temperature Ranks for Autumn 2007. Period of Record 1895-2007. Figure

For the year, the only state where temperatures ranked below average was Maine. Thirteen states had temperatures which ranked much above average and the remaining states were near or above.

The annual temperature for Alaska in 2007 ranked as the 15th warmest in the 1918-2007 record, representing a return to warm anomalies after near-normal conditions in 2006. Only ten of the last 31 years had annual temperatures near to or below the long-term mean for the state. Winter temperatures in 2007 were above average for the eighth consecutive year, although a severe Arctic outbreak affected southeast Alaska in late February to early March. For the

greater Fairbanks area, February 15 - March 15 was the coldest ever on record during that time of year. The average high was -19.9°C and the average low was -33.5°C. Spring was slightly below average, summer was warmer than average, and fall was significantly warmer than the 1918-2000 average.

National Precipitation and Drought

Precipitation in the United States during 2007, although variable, was characterized by periods of excessive rainfall across the central third of the U.S., and persistent and developing drought in the southeastern quarter of the country and the far western states. The average annual precipitation was 28.9 inches (733 mm), which is 0.3 inches (7 mm) below the 20th century (1901-2000) average (Fig. 6).

This pattern dominated during the winter and spring months, with the Southeast and West regions having the driest and sixth driest spring, respectively, while the West North Central region of the northern Plains ranked third wettest. A series of severe storms caused flooding, extensive damage, and loss of life from Texas to Kansas and Missouri in June and July. This was followed by the remnants of Tropical Storm Erin, which produced heavy rainfall in the same area in August, giving the South region its wettest summer on record. Precipitation during fall was below normal for much of the nation, although widespread extreme anomalies were absent.

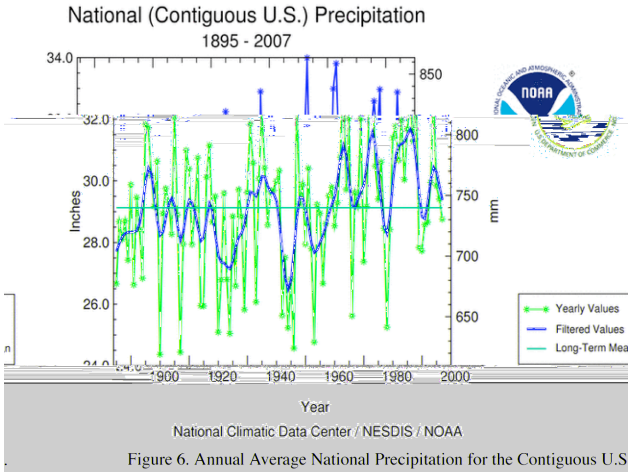


Figure 6. Annual Average National Precipitation for the Contiguous U.S

Severe to exceptional drought affected the Southeast and western U.S. throughout much of the year. After a slight contraction during 2005-2006, the drought area in the West expanded this year, covering half or more of the region beginning in late spring. The persistent dryness in the Southeast started in December 2006 and resulted in an expanding drought area with time, with more than two-thirds of the region in drought from mid-summer 2007 through the end of the year. Unusually warm temperatures and scarce rainfall exacerbated conditions. Drought also affected large parts of the

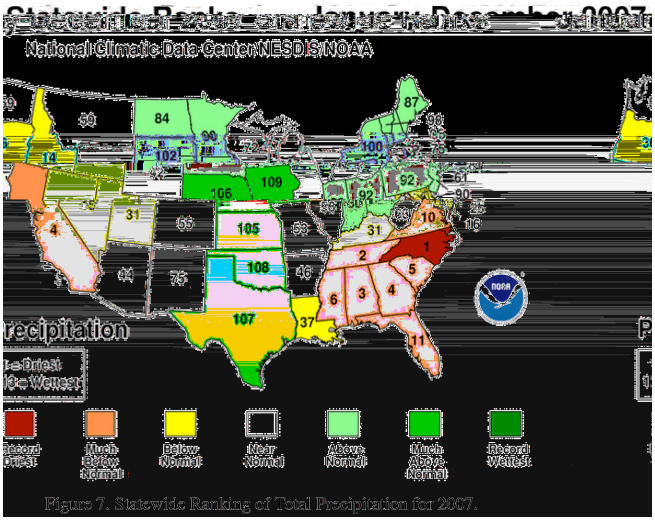


Figure 7. Statewide Ranking of Total Precipitation for 2007.

Upper Midwest for much of the year. Several short-lived dry episodes occurred in other regions throughout the year, notably in the Ohio Valley and Northeast in May and the northern Plains in July.

The cumulative effects of the drought resulted in the driest year in the 113-year record for North Carolina, second driest for Tennessee, third driest for Alabama, and fourth driest for Georgia and California (Fig. 7). Note the sharp gradient between the severe drought in the Southeast, above normal to much above normal conditions in the country's mid-section and Northeast, and the intervening regions from Louisiana north to Missouri and east to the Potomac where conditions were near normal. Conditions in the southern Plains went from extremely wet to extremely dry during September, with Texas having the wettest January-September on record, followed by the 11th driest October-December. Water conservation measures and drought disasters, or states of emergency, were declared by governors in five southeastern states, along with California, Oregon, Maryland, Connecticut, and Delaware at some point during the year. Unusually dry conditions during May-October of this year and for the last several years resulted in a record low level for Lake Superior, impacting shipping and recreational activities. Also noteworthy is that, in contrast to the severe drought in the Southeast, heavy precipitation was noted from the Ohio Valley and Great Lakes into the Northeast for the year.

Snow Storms and Snowpack

The 2006/2007 snow season was variable in many areas across the U.S. Parts of the Northern Cascades, Big Horn Mountains in Wyoming, and the Colorado Front Range had generally near to above average snowfall, while the Sierra Nevada, Wasatch, and the mountains of Arizona experienced below average snow accumulations. The snow cover extent was slightly above average for the North American continent as a whole over the winter season, but well below average during the spring, consistent with a trend over the last 40 years towards reduced spring snow cover for North America (Fig. 8). The below average snow pack during the spring can be associated with the anomalous warmth that engulfed most of the contiguous U.S. during March (when monthly mean temperatures were more than 3°C above average in many places) and May.

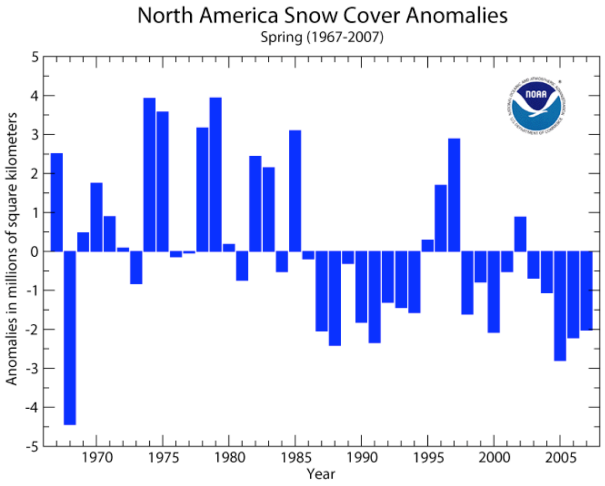


Figure 8. North American Snow Cover Extent Anomalies for Spring (March-May), 1967-2007, as Derived from Visible Satellite Observations.

Notable snowstorms that affected the contiguous U.S. in 2007 include the deadly ice storm that occurred January 11-16, affecting areas from the Rio Grande Valley to New England and southeastern Canada. Two subsequent storms affected the southern U.S. and later the southern Plains and Mid-Atlantic States. During mid-February, a major snowstorm deposited 10-50 cm of snow across much of the central U.S., while parts of eastern New

York and northern Vermont received up to 76 cm. The Northeast Snowfall Impact Scale (Kocin and Uccellini, 2004; Squires and Lawrimore, 2006) classified this as a Category 3 (Major) storm and ranked it as the 14th most intense on record for the Northeast. This event was preceded by a 10-day lake effect storm that produced over 254 cm of snow on New York's Tug Hill Plateau, with a total of 358 cm reported at Redfield in Oswego County. In southeast Alaska, all stations saw well above normal snowfall in March with many locations breaking March snowfall records. Near the end of spring, few areas in the contiguous U.S. had above average snow pack, while snow pack water content less than 50% of average was widespread from Oregon to the Southwest.

The beginning of the 2007/2008 snow season was above average across parts of the Southwest, with well-below-normal amounts in the Sierra Nevada, Cascades, the Bear River, and Salt River Ranges. A severe winter storm in the second week of December covered Missouri and Oklahoma in a thick layer of ice. Several back-to-back mid-latitude cyclones brought significant snowfall from the Great Plains through New England in mid- and late December.

Wildfires

The 2007 fire season continued a string of record or near-record wildfire seasons across the United States. Long-term precipitation deficits played a critical role in the severity of the 2007 wildfire season, especially in the Southeast and West, where drought conditions persisted or worsened during the year.

According to preliminary data from the National Interagency Fire Center (NIFC), the 2007 fire season had the second most acres burned in the historical record, with more than 9.3 million acres (~3.8 million hectares) for the U.S. as a whole, about 500,000 acres (~200,000 hectares) less than was reported in 2006 (the record year). Based on annual statistics that extend back to 1960[1], the number of fires reported each year has shown a steady decline since the early 1980s for the entire U.S., and since the early 1990s for Alaska. However, the total number of acres burned each year has increased steadily since about 1995 (Fig. 9). As a result, there has been an increasing trend in the size of wildfires (Westerling et al. 2006), with six of the ten worst seasons in terms of acres burned having occurred since 2000.

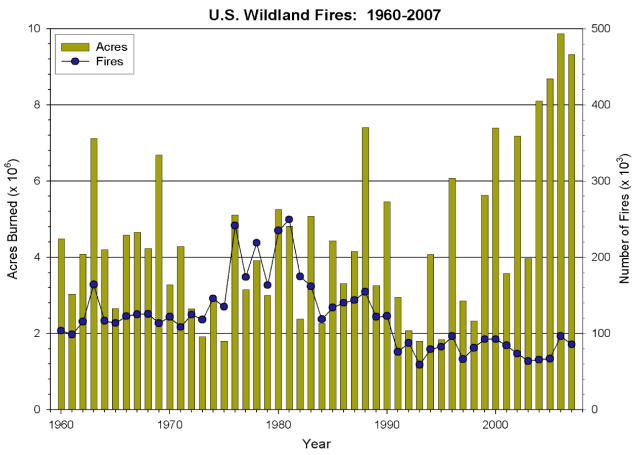


Figure 9. The Annual Number of Wildland Fires (curve, right axis) and the Acres Burned (bars, left axis) for the Contiguous U.S. for 1960-2007.

Wildfire activity started earlier than usual in 2007, as wildfires affected portions of the Tennessee Valley and the Southeast in March, eventually spreading to northern Minnesota in April and southern Florida in May. In the West, the fire season started slowly in June, except in central California where numerous

Source: National Interagency Fire Center (NIFC) in Boise, Idaho http://www.nifc.gov/fire_info/fire_stats.htm.

blazes affected the Lake Tahoe area. Fire activity increased dramatically in July, as large portions of the Intermountain West were affected by wildfires. The most severe fire activity during the summer occurred in the Northern Rockies, where numerous large fires burned in July and August. Fire activity persisted into September across Idaho and Montana, but eventually shifted southward into California later in the month. The most destructive fires of the year occurred in Southern California during the fall, as severe to exceptional drought and strong Santa Ana winds exacerbated brush and forest fires, destroying homes across the region in October and November.

The 2007 fire season was not an especially severe one in Alaska, which had just over half a million acres (~202,000 hectares) burned during the year. However, in September the Anaktuvuk River wildfire, which was caused by lightning, burned over 250,000 acres (~100,000 hectares) and set a record for the largest fire on Alaska's North Slope.

Severe Extra-tropical Storms

Several severe extra-tropical cyclones affected the United States in 2007. The first major system moved across parts of the Midwest and the Northeast on February 13-15. The intense storm produced significant accumulations of ice and snow in these areas, with some locales in Illinois receiving more than 30 cm of snow, and in upstate New York where more than 100 cm of snow was reported. During April 15-17, a Nor'easter moved up the Eastern Seaboard, bringing strong winds, high seas, and heavy rains from South Carolina to Maine. Some locations across the Northeast received over 190 mm of rain in a single day, producing widespread flooding, while on the cold side of the storm, more than 40 cm of snow fell across Vermont and New Hampshire.

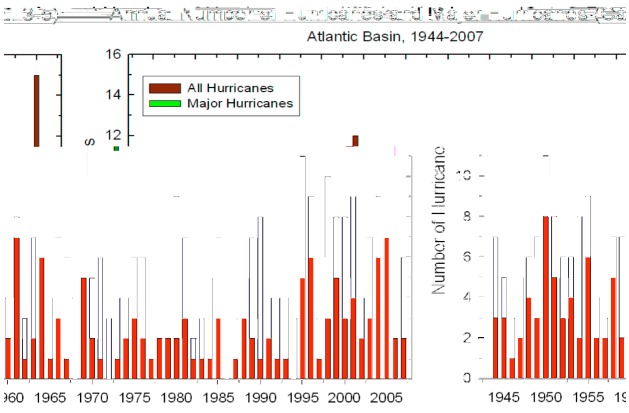
During the normal spring peak in severe weather, several tornado outbreaks occurred across the Plains, producing over 400 tornadoes during April and May combined. The worst of these outbreaks occurred on May 4-5, when an EF5[2] tornado devastated the town of Greensburg, KS, killing 10 people and destroying nearly 95% of the town. The tornado was on the ground for 22 miles (35.4 km) and had a maximum path width of 1.7 miles (2.7 km), moving north-northeast until it turned northward upon reaching Greensburg and later curved back to the west. This was the first category 5 tornado since the Oklahoma City, OK tornado in May 1999. According to statistics compiled by NOAA's Storm Prediction Center, there were 1092 tornadoes reported in 2007, with May having the most of any month (250). The most severe day was April 3, when 594 reports of severe weather (tornadoes, wind and hail combined) were documented.

Although the summer and much of fall were relatively quiet for much of the U.S., there were two major extra-tropical storms of note to end the year. The first was a strong Kona Low which brought heavy rains greater than 25 cm and flooding to Maui and the Big Island of Hawaii during the first week of December. The second was a storm system that battered the coasts of Washington and Oregon from December 1-3. Several locations along the northern Oregon coast received more than 250 mm of rain for the period, along with peak wind gusts exceeding 165 km hr-1.

[2] The National Weather Service switched to the Enhanced Fujita Scale from the Fujita Scale on February 1, 2007. For more information on the EF Scale, please see: http://www.spc.noaa.gov/efscale/

Atlantic Hurricanes

The 2007 Atlantic hurricane season brought fewer hurricanes than was originally expected and the total number of named storms was below the recent average, yet above the 1950-2000 average. The recent average (1997-2006) seasonal hurricane activity in the North Atlantic basin is 14.4 named storms, 7.8 hurricanes and 3.6 major hurricanes. These values represent an increase over the average of the preceding 25 years (1972-1996) of 9.6 named storms, 5.4 hurricanes and 1.8 major hurricanes. There were 15 named storms in 2007 (Fig. 10); 6 of these became hurricanes and 2 became major hurricanes. Three tropical storms (Barry, Erin and Gabrielle) and one hurricane (Humberto) made landfall with the mainland U.S. this year, making it a relatively quiet season for this country. Unfortunately, Central America was hit very hard by two back-to-back Category 5 storms (Dean and Felix) in August and September, respectively.



er of Hurricanes and Major Hurricanes in the Atlantic Basin for 1944-2007.

Figure 10. Annual Numb

A widely used measure of seasonal activity is NOAA's Accumulated Cyclone Energy (ACE) Index (Fig.11). The ACE is calculated by summing the squares of the estimated maximum sustained velocity of every active tropical storm (wind speed 35 knots or higher), at six-hour intervals. The ACE Index accounts for the combined strength and duration of tropical cyclones during the season. The 2007 ACE Index was 72, indicating a near normal season.

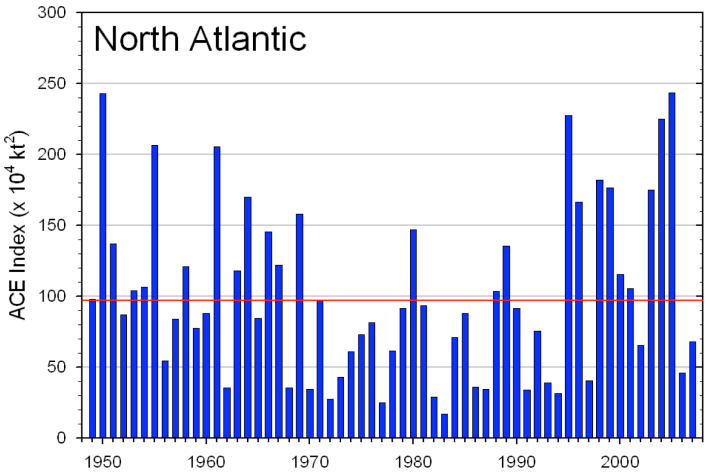


Figure 11. ACE Index Expressed as Precent for 1949-2007.

The season began early in 2007 with the development of Subtropical Storm Andrea off the southeastern coast of the United States on May 9, becoming the first named storm in May since 1981. Andrea quickly weakened to a depression the next day without making landfall. June brought Tropical Storm Barry in the Southeastern Gulf of Mexico; Barry made landfall in Pinellas County, Florida with maximum sustained winds of 51 mph (45 knots or 83 km/hr). Only one tropical storm, Chantal, formed in the Atlantic basin in July and did not make landfall. Three tropical storms formed in August: Dean, Erin, and Felix. Dean later developed into a powerful hurricane with maximum sustained winds of 165 mph (144 knots or 265 km/hr) that made landfall near Costa Maya, Mexico and is blamed for over forty deaths in that region.

Seven tropical storms formed in the Atlantic basin in September, the busiest month of 2007. Hurricane Felix, which formed on August 30, grew into a Category 5 storm and made landfall near the Nicaragua-Honduras border. News reports indicate that Felix was responsible for over 130 deaths and many more injuries in these countries. The maximum sustained winds of Hurricane Felix at the time of landfall were estimated to be 160 mph (140 knots or 260 km/hr). Tropical storm Gabrielle made landfall near Cape Lookout, North Carolina on September 9 and weakened to a depression the next day. Hurricane Humberto was the only hurricane to strike the mainland U.S. in 2007, rapidly intensifying to hurricane status in the early morning hours of September 13. One death is blamed on this storm. At the end of September, Hurricane Lorenzo made landfall near Veracruz, Mexico as a Category 1 storm, resulting in six fatalities.

In October, Category 1 Hurricane Noel brought heavy rains and major flooding to parts of Puerto Rico, Hispaniola, and Cuba, causing numerous fatalities. News reports estimate that at least 147 people died as a result of this storm, making it the deadliest storm of the season in the Atlantic basin. Noel later transitioned to an extra-tropical low and hit the area between eastern Long Island to New England in the U.S., causing considerable tree and power line damage before passing into the Maritimes.

No tropical cyclones formed in the Atlantic basin in November, although one tropical cyclone developed in December after the official end of the Atlantic hurricane season. In mid-December, Sub-Tropical Storm Olga developed in the Caribbean, and eventually gained tropical characteristics. According to press reports, excessive rains from Tropical Storm Olga over the interior mountains of the islands of Puerto Rico and Hispaniola generated flash floods killing at least two dozen people.

NOAA/National Weather Service Climate Services Division

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Silver Spring, MD 20910
www.weather.gov/os/csd/
www.weather.gov/climate

In 2007, NWS Climate Services Division (CSD) continued the implementation of its regional and local climate services program. In addition to continuing development of new local climate forecast products, data related activities have increased. The following activities are highlighted.

Observations and Data Issues

The CSD continued to play a leading role to ensure the integrity of the nation's climate record. CSD cooperated with climate service data partners, including the National Climatic Data Center (NCDC), Regional Climate Centers (RCC), and State Climatologists (SC), on the following ongoing projects:

- 21st Century Cooperative Observation Program (COOP): A plan of action has been developed to ensure a quality COOP network. Poorly cited stations will be identified and corrected. Those with poor data quality will also either be brought into compliance with data and exposure standards or changed to unpublished status.

- Historical Climatology Network Modernization (HCN-M): CSD is participating in two working groups (O&M/Infrastructure and Site Development & Design) of the HCN-M Integrated Work Team coordinating the planning and implementation of the HCN-M.

- Fischer & Porter (F&P) Electronic Data Logger Update: Deployment of the electronic data loggers began in 2007 and continues. All F&Ps are scheduled for upgrades in several years. This effort will rescue the nation's hourly precipitation network from possible catastrophic mechanical failure of the gauges and the data readers at NCDC.

- Paperless Initiative: Both (Wxcoder [PC/web] and IVROCS [touch tone telephone]) are now supported nationally. Electronic data transmission can be used as the official COOP climate data submission instead of hard copy. Enhanced QA/QC should greatly reduce errors inherent in the manual recording environment and more data are available daily for all applications.

- Data Quality Control: CSD continues to coordinate with NCDC and partners on developing a set of common quality control procedures for all NOAA climate data. CSD is also working with NWS regions to set policy for common QA/QC in each field office.

- Threadex: Consistent data extremes for 255 Local Climatological Data stations were released to all data users on December 31, 2007 and are available via the web.

- Snowfall/Snowdepth: Automated snow sensor studies were terminated due to other HCN-M project funding priorities in the spring of 2008. CSD began preparation of a "*Service Requirements for Automated Snowfall Measurements*" document which will allow the NWS to request future funds to continue the assessment and development process. The manuscript serves as the required administrative foundation for the Operations and Services Improvements Process (OSIP) funding requests.

Training

CSD continued to improve and conduct training of NWS regional and field personnel through redesigning and updating much of the existing Climate Professional Development Series Professional Competency Units, including residence training, teletraining, distance learning, and website links (online at: http://www.nwstc.noaa.gov/nwstrn/d.ntp/meteor/clipds.html)
AASC members are encouraged to use these materials. Training includes guidance to NWS field personnel on appropriate referral to various partners (NCDC, RCCs, SCs, etc.) for climate data and information. 2007 training events included:

- November 6-8 - Residence training on Climate Variability at COMET (Cooperative Program of Operational Meteorology, Education, and Training), Boulder CO.

- December 5-7 - Residence training on NWS Weather Forecast Office (WFO) Climate Operations, at the NWS Training Center, Kansas City MO.

Outreach Activities

The 2007 Climate Prediction Assessments Science Workshop (CPASW) was held in Seattle, WA, March 20-23. The 2008 CPASW was held in Chapel Hill, North Carolina, March 4- 7. The 2009 CPASW will be held in Norman OK, March 24-27. CPAS workshops identify new climate prediction applications research, promote interactions between climate-sensitive integrated research and service communities, and assess impacts of climate forecasts on environmental-societal interactions. More information is at http://climate.ok.gov/cpasw/ .

CSD attended 2007 NWS sub regional data stewardship meetings in Lexington KY (May 22-23), Fargo ND (June 12-13), and Laramie WY (June 26-27). CSD attended a 2008 data stewardship meeting in Madison WI (May 21-22) and will attend another such 2008 meeting in Kansas City MO (July 29-30).

New Products

CSD was part of an integrated work team in 2007 that developed policy for WFO issuance of Drought Information Statements (DGT) for their area of responsibility. The policy became effective June 10, 2008. DGTs will provide a unified summary of current drought severity, indices, data, impacts, forecasts and products and other pertinent information to enhance the ability of users to focus drought mitigation efforts on areas of greatest need. The DGT establishes a separate product identifier to be used for WFO drought information. Policy details are at http://www.weather.gov/directives/sym/pd01012001curr.pdf

State climate record extremes:

CSD is finalizing policy on investigating potentially new state climate record extremes. The policy is expected to be implemented this summer. The formation of a State Climate Extremes Committee (SCEC) addresses the consideration of potentially record-setting extreme meteorological elements observed at the statewide level. The purpose of the SCEC is to mirror the activities of the National Climatic Extremes Committee (NCEC), but for observations challenging state records, rather than national ones. It is proposed that SCECs serve as advisory panels that will make recommendations regarding state records to the director of the NCDC. With the agreement of the NCDC Director, such records will become officially sanctioned, and recognized by the meteorological and climatological community.

NOAA's National Climatic Data Center (NCDC)

Veach-Baley Federal Building
151 Patton Avenue
Asheville, NC 28801-5001
www.ncdc.noaa.gov
Data Services Contact: ncdc.info@noaa.gov

Active State Climatologist continued to receive free access to the NCDC data holdings in 2007 and NCDC was pleased to host many visitors from State Climatologist offices. Several states entered into new Memorandum of Agreements with NCDC. Plus, the AASC was incorporated as a non-profit corporation registered in Buncombe County, North Carolina, helping to secure Asheville as a center for climate services at national, regional, and state levels.

Along with the State Climatologists, NCDC's six RCCs continued to deliver excellent climate service, serving millions of customers a year with on-line data. Through the distributed data service called the Applied Climate Information System (ACIS) some 40 thousand customers downloaded data each month. Bridging the gap between NCDC and the National Weather Service (NWS) climate services, the RCCs built the Web Xmitted Cooperative Observer Data Encoded Report (WxCoder III), a method to improve data observation collection, which NWS put into service for approximately 2500 Coop stations.

In an outstanding collaboration, NCDC was pleased to participate in writing and in publishing a retrospective of the April 2007 Easter Freeze event, with enormous participation by State Climatologists. As a further evidence of climate-service-partnership, www.drought.gov went "live", raising the bar of weather and climate science collaboration.

In 2007, two administrative changes occurred with the Southeast RCC changing locations, moving from Columbia, South Carolina to Chapel Hill, North Carolina, and with NCDC's partnership liaison lead changing from Tim Owen to Marjorie McGuirk.

NCDC's partners in climate services brought regional and local expertise and assistance to a wide range of customers in all fields including building design, irrigation, pest management, energy, risk management, and natural hazards. Working together with NWS, RCC, and the State Climatologists, NCDC is proud to continue its role in user-centric tiered national climate services.

Natural Resources Conservation Service
National Water and Climate Center
1201 NE Lloyd Blvd, Suite 802
Portland, OR 97232
http://www.wcc.nrcs.usda.gov

National Water and Climate Center Overview

The National Water and Climate Center (NWCC) is part of the Natural Resources Conservation Service within the United States Department of Agriculture. The Center's mission is to "*lead the development and transfer of water and climate information and technology that support natural resource conservation.*" The primary goal of the NWCC is to be "*a globally recognized source for a quality snow, water, and climate information and technology.*"

Staffing

The NWCC consists of three branches under the Center's new Director, Mike Strobel; Water and Climate Services (WCS), Water and Climate Monitoring (WCM) and Information Systems Branch (ISB). Water and Climate Services has two main functions: produce water supply forecasts for the western U.S. and provide climate services for the NRCS and other cooperating USDA agencies nationwide. The key staff members of this Center are:

- Garry Schaefer, Acting Supervisory Physical Scientist, Water and Climate Services Branch Leader, garry.schaefer@por.usda.gov, 503-414-3068
- Tony Tolsdorf, Acting Water & Climate Monitoring, 503-414-3006
- Laurel Grimsted, ISB, 414-3053
- Jim Marron, Resource Conservationist, jim.marron@por.usda.gov, 503-414-3047
- Jan Curtis, Applied Climatologist, jan.curtis@por.usda.gov, 503-414-3017

Hydro-Meteorological Networks

- SNOTEL: About - http://www.wcc.nrcs.usda.gov/snow/about.html, Sensors, Data, and Products - http://www.wcc.nrcs.usda.gov/snow/
- Snow Course: http://www.wcc.nrcs.usda.gov/snowcourse/
- SCAN: http://www.wcc.nrcs.usda.gov/scan/

Climate Products

- Soil Narratives and Tables: http://www.wcc.nrcs.usda.gov/cgibin/soil-nar.pl, http://www.wcc.nrcs.usda.gov/climate/climate-map.html
- Wind Rose Graphs: ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose
- Adjusted Daily Wind Database: ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/windrose
- GEM (Generation of Weather Elements for Multiple applications) model: ftp://ftp.wcc.nrcs.usda.gov/downloads/climate/gem
- PRISM: http://www.wcc.nrcs.usda.gov/climate/prism.html

Western Water Supply Forecasts

Monthly, between January and May, this Center produces reports, maps, and graphs, with explanations on how to interpret these products at: http://www.wcc.nrcs.usda.gov/wsf/wsf.html. Recently, experimental daily water supply products have been developed for water resources managers: http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html.

Other Projects

QC of SNOTEL Data Continues

After assessing maximum and minimum temperatures this past year (ftp://ftp.wcc.nrcs.usda.gov/support/climate/SNOTEL-QC/QC_zip), the quality control effort is now focused on daily precipitation data.

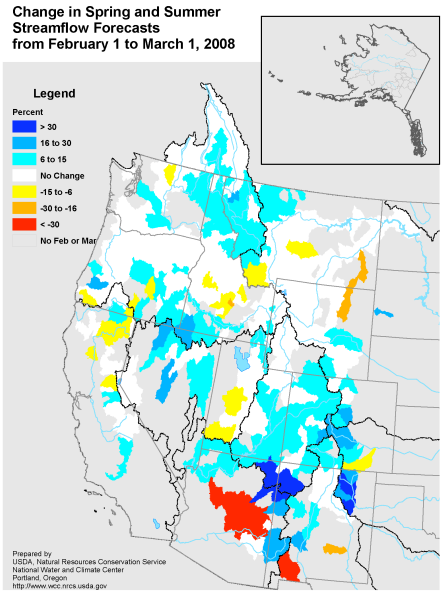
Seamless Daily PRISM Maps

The final set of daily US climate maps at a 4 km x 4km resolution for Tmax, Tmin, and Precip from 1960-2001 have been completed and are being supplied to the NRCS Data Gateway (http://datagateway.nrcs.usda.gov/) for retrieval. These data will be available in GIS format.

New Maps of SNOTEL Data

NWCC continues to add to its GIS-based products. The maps are available from - http://www.wcc.nrcs.usda.gov/gis/index.html.

Here are some examples:
ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf
ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpctnormal_update.pdf
ftp://ftp.wcc.nrcs.usda.gov/support/water/westwide/snowpack/wy2008/difsnow0803.gif
ftp://ftp.wcc.nrcs.usda.gov/support/water/westwide/streamflow/wy2008/difstrm0803.gif



Midwestern Regional Climate Center

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http://mrcc.sws.uiuc.edu

Steve Hilberg, Director

Data, Data Systems, and Data Management

The MRCC supports an active Applied Climate Information System (ACIS) server and will have a second ACIS server online by mid July. The new MRCC web site is designed to take full advantage of the ACIS system as well as, for a limited time, provide access to legacy data systems. The MRCC Applied Climate System (MACS) works within the MRCC website to provide nation-wide user data products that take full advantage of the ACIS data sets as well as datasets and products that are specific to the Midwestern States. As part of our MACS Beta test web site the MRCC already has 11 products based on daily data from ACIS as well as products using hourly data and real-time METAR data from databases unique to the MRCC. The MRCC has moved forward with its online accounting system and web based delivery of customer requested products created by our Climate Service office. Behind-the-scenes the MRCC has added or is in the process of replacing computing hardware including 2 ACIS servers, a MACS database server, a MRCC web server, a Climate Database Modernization Program (CDMP) web server, and a Climate Service Office database server.

CDMP support continues for MRCC work on the quality control of the Forts Database Build. Major progress has led to the completion of the initial three test levels that are designed to check for completeness and accuracy in the keying requested. These tests are now being run in near-real time as new Forts stations are digitized and submitted to the MRCC, and an effort is being made as time allows to apply these tests retroactively to the previously digitized stations. Considerably more work remains to be done regarding the climatological testing of these observations. A total of more than 260 stations with long time series of 19th Century daily data are available now.

Climate Services and Collaborations

The MRCC Web site remains one of the most important climate services provided to the public. The most popular page on the MRCC web site is the Midwest Climate Watch, which provides access to a variety of climate maps updated daily, and a Weekly Climate Highlights narrative about ongoing climate events. A recent new addition is a Midwest Drought Information Page accessible from the Midwest Climate Watch, bringing together all our drought related products. There is also a new page on temperature and precipitation trends in the Midwest. The MRCC Web site provides direct links to the State Climate Offices in the region, and generates state level maps of climate variables for states requesting this service. A variety of other free services are also provided to the public, including easy to access information on climate normals, climate record events,

and climate calendars for more than one thousand cooperative observer stations. All the state climate offices in the region have free access to MRCC data services.

The MRCC continues to cooperate with the NWS on a variety of issues, especially with regards to the quality of observations, both current and historical. Regional Climatologist Mike Palecki continues to represent the MRCC on the National Data Stewardship Team and NWS state climate record committees, and Director Steve Hilberg represented the MRCC at a recent NWS Climate Services Sub-Regional Workshop in Madison, WI. Steve has visited a number of NWS offices in the region, and continues to actively collaborate with nearby offices in Lincoln and Chicago on the Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) which he coordinates for the state of Illinois. The MRCC contributed to the NWS Service Evaluation on the extent and impacts of the April 2007 freeze event in the eastern United States. This report was coordinated by the NWS Central Region. In addition to the NWS and MRCC, this effort included participation from State Climatologists and the USDA.

Collaborations with the National Climatic Data Center (NCDC) and the National Oceanic and Atmospheric Administration (NOAA) are increasingly numerous and vigorous. A new activity this year has been MRCC participation in the NOAA Great Lakes Regional Collaboration Team (GLRCT). The GLRCT consists of representatives of the five NOAA line offices with employees and interests in the Great Lakes region, and other collaborative groups connected to NOAA, like the RCCs. Mike Palecki is also a member of the climate change action item sub-team, and is participating in the planning for a stakeholder workshop on climate change and the Great Lakes ecosystem to be held in Ann Arbor, MI, during August 2008. Steve and Mike have also representing the MRCC in the development of the National Integrated Drought Information System (NIDIS) by NOAA, and reviewed the initial version of the U.S. Drought Portal at NCDC. As Regional Climatologist, Mike interacts regularly with the authors of the U.S. Drought Monitor and U.S. Drought Outlook, with regards to status and evolution of drought in the Midwest. Extensive connections to private sector stakeholders impacted by climate variations are maintained through our service office and Senior Scientist Stan Changnon.

Applied Research

The RCCs are no longer funded to pursue a broad agenda of applied and theoretical climate research. Fortunately, the P.I. level scientists at the MRCC have all been successful in attracting additional support to maintain independent research projects that are well aligned with the interests and mission of the Center. In addition, the home institution of the MRCC, the Illinois State Water Survey, provides significant support directly as salary line items and through funds to conduct climate oriented projects. Major research initiatives explored in the last year include:

- Ken Kunkel – trends in snowfall and snowfall extremes using homogeneous time series, mechanisms causing trends in heavy precipitation events
- Stan Changnon – severe storm climatologies (winter storms most recently), weather and climate event impacts and policies, case studies of severe events and their impacts

- Nancy Westcott – high resolution precipitation gauge networks, evaluation of radar/rain gauge blend products and their use in river forecasting, dense fog development
- Mike Palecki – 19th Century short-duration climate extremes, multi-decadal variations in global land and ocean climates, development of a "drought ready communities" program

Southeast Regional Climate Center

University of North Carolina at Chapel Hill
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Chapel Hill, NC 27599-3220
Phone: (803) 843-9721

Peter J. Robinson, Director

The SERCC was officially re-established at the University of North Carolina at Chapel Hill on April 1, 2007. The subsequent two-month transition was accomplished smoothly thanks to the cooperation of the South Carolina Department of Natural Resources and personnel from the old SERCC location. The electronic database and ACIS node was established as part of the SERCC co-located with the North Carolina State Climate Office at North Carolina State University. This establishment took several months, and involved considerable assistance from ACIS personnel in other Regional Climate Centers. Their invaluable help is acknowledged. The support of the other Centers during the transition is greatly appreciated, especially since it ensured that client service continued virtually uninterrupted during the transition. Now the SERCC is fully operational.

The Center organized and supported a meeting with all the State Climatologists in the region. This was held in Atlanta, GA, April 14-15, 2008. The major topic of the meeting was the development of strategies for advancement of coordinated climate services throughout the region. Specific actions are to be developed over time, with regular meetings or conference calls between all participants to be scheduled.

The Climate Prediction Applications Science Workshop 2008 was sponsored by the Regional Center and held in Chapel Hill March 4 – 7, 2008. Approximately 90 people attended. In addition to the opportunity to raise the visibility of climate services, Regional and State, throughout the climate prediction community, there was a lively interchange of information and ideas. The SERCC also co-sponsored a meeting of the International Geographical Union Commission on Water Sustainability in Asheville, August 13 – 17, 2007.

The Center has been charged by NOAA to serve as a focal point for activities related to the links between climate, climate change and public health. The Center is in the process of developing a clearinghouse for information about such links, concentrating on the southeast United States, but amenable to pertinent information from anywhere on the globe.

Western Regional Climate Center

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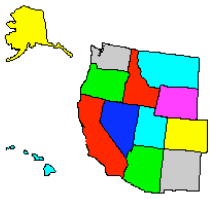
http://www.wrcc.dri.edu



Western Regional Climate Center

Dr. Timothy Brown, Director

The Western Regional Climate Center (WRCC) is housed at Desert Research Institute (DRI) in Reno, NV. DRI is a member of the Nevada System of Higher Education, which includes University of Nevada-Reno, University of Nevada-Las Vegas, and several community colleges. Established in 1986, WRCC's geographical region is large in area and diverse climatologically, including 11 western states, Hawaii, Alaska, and the Pacific Islands. The region served by WRCC in the continental US includes Washington, Oregon, California, Idaho, Montana, Utah, Arizona, New Mexico and Colorado/Wyoming (the latter shared with the High Plains Regional Climate Center). This year Dr. Dick Reinhardt retired in July, and Dr. Kelly Redmond assumed the interim director role through the end of the year. Dick was a member of the WRCC since it began in 1986. A new permanent director will be named in 2008.

Data

The WRCC continues to contribute to the development of Applied Climate Information System (ACIS), as a collaborative effort among the Regional Climate Centers. Grant Kelly and Greg McCurdy are WRCC's programmers who are working on ACIS.

Our regular data acquisition continued in 2007, with archiving of many US and western US-specific weather and climate data sets. Currently we acquire and make accessible data sets such as the NWS Cooperative Observer Network, airport hourly (SAO/METAR), Remote Automated Weather Station (RAWS), California Irrigation Management Information System (CIMIS), Snowpack Telemetry (SNOTEL), California snow survey, Community Environment Monitoring Program (CEMP), and many other smaller networks such as NOAA buoys, coastal sites, and individual sites of interest. The WRCC has now installed and maintains over 40 climate stations, primarily in the California/Nevada region, with a recent focus on high altitude and coastal climate monitoring.

Jim Ashby continues to work with the Reno National Weather Service office and the Nevada State Climatologist to digitally enter local non-official cooperative observations. A new webpage was created for users to view these data by month.

The WRCC also launched WxCoder III, in collaboration with NCDC and NWS, in fall 2007. It has proven to be a challenging, yet successful, operation. Grant continues to make improvements to WxCoder III with feedback from observers and NWS users.

Climate Services
WRCC web visitors now log approximately 1.7 million page views per month. Our new web tracking software was installed in May 2007, and between May and December, the WRCC web site had 12.6 million page views.

Jim Ashby, Michelle Breckner and Dorothy Miller continue to answer phone calls, emails and various data requests. Kelly Redmond remains the key staff person responsible for media interviews, but these tasks are also spread among others in his absence.

Applied Research
In 2007, Dr. Christopher Davey, a post-doctoral researcher, moved out of state but retained a working relationship with WRCC. He completed the National Climate Inventory for the National Park Service (NPS), including some final reports at the end of the project.

Dr. John Abatzoglou, our second post-doctoral researcher, continued to work on California climate monitoring activities, and published some work on spring and fall asymmetry in temperature. In the middle of the year he began to also work with the Climate, Ecosystem and Fire Applications (CEFA) group at DRI. He continues to pursue Santa Ana wind events, and fire and climate relationships.

Dave Simeral was a key participant in the national inventory project with the NPS. As our field meteorologist, he installed a new climate station on Mount Lincoln in the Sierra Nevada, and continues to do maintenance with Greg on the nearly four dozen stations that WRCC operates. Dave has also provided GIS expertise when needed.

Laura Edwards continued to be involved in California climate monitoring activities, and has been progressively more active in drought monitoring for the western US, and California and Nevada in particular. She, too, began to split her time with CEFA, starting summer 2007. She also worked on a climate inventory and assessment for the Sierra Nevada network of NPS.

Dr. Kelly Redmond served as interim director for the last 6 months of 2007, in addition to his other duties. He was involved in several California projects and a couple of NPS inventory-related activities. He has also been heavily involved in NIDIS efforts, as a co-lead on the Implementation Team.

Other Activities of Interest
Kelly continues to travel on average two weeks per month for the many climate data and services related meetings, in addition to drought monitoring efforts. Laura was nominated to the AMS Applied Climatology committee, and will be co-chair for the next meeting to be held in Whistler, BC, Canada, in 2008. Laura also taught her first course at the nearby Truckee Meadows Community College, and worked with faculty at University of Nevada-Reno to develop an introductory global climate change course. The WRCC continues to be involved in wind energy initiatives, following Dick Reinhardt's initial work.

Alabama Office of the State Climatologist (AOSC)

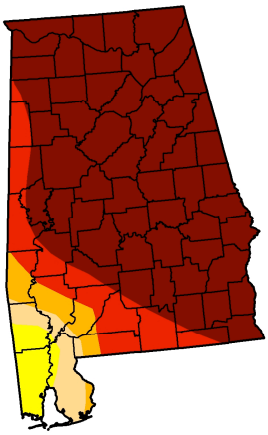
University of Alabama in Huntsville
Cramer Hall, Room 4040
320 Sparkman Drive
Huntsville, AL 35805
Tel: 256.961.7763
http://vortex.nsstc.uah.edu/aosc

John Christy, Alabama State Climatologist
Bob Clymer, Assistant State Climatologist

It is the role of the Office of State Climatology to provide weather and climate information to public and private interests to improve decision-making activities that affect environmental quality and the economic efficiency of the State. Activities include providing specific weather data for the state and for the world, developing plans to mitigate the economic impacts of weather and climate variability and providing consultation on the use, interpretation and availability of weather and climate information. The Alabama Office of the State Climatologist also directly engages in important societal debates such as global warming through workshops, congressional testimony and educational activities.

Drought of 2007

By a number of indices, including station precipitation totals, stream gauge measurements (at one time, 40% at record lows), lake levels, etc., the spring/summer of 2007 was characterized by the most severe drought since records began in the late 19th century period of record, with the peak severity occurring in late August when most of the state was categorized as D4, the most severe category (reddish-brown, see below for 21 August 2007 Drought Monitor).



There were no tropical systems which found there way to Alabama in 2007, so the Fall was again especially dry. Preparing information for the media, the Drought Monitor and the Alabama Monitoring and Assessment Group (city, state and federal agencies concerned with water) took the largest amount of time in the AOSC in 2007 in

comparison with other functions. Some of the statistical analyses provided by the AOSC based on 1200 years of newly published drought indices indicated that a drought of the magnitude of 2006-2007 occurs about once every 250 years. Even so, the climate of 2006-2007 was a departure from the long-term trend toward cooler and wetter summers.

Easter Freeze

An Arctic cold front invaded Alabama over the Easter weekend 5-8 April 2007 with an unusually deep and cold air mass and record setting temperatures. High winds with temperatures below freezing for several hours in No. Alabama killed most of the crops which had been planted in March as well as severely damaging deep rooted vegetation which had already leafed. Replanting of corn in April (since farmers had already sold their crop for fall delivery) is a gamble in any year, but this year it was a disaster as the normal late-spring and summer rain did not materialize. The AOSC spoke to growers about the probabilities of such events and helped interpret long-range forecasts.

Historical Climate Network upgrades

The AOSC continued to work with the NWS and NCDC to establish a robust climate monitoring network in Alabama. Nearly all of the 15 original HCN stations have been re-sited and upgraded with the highest quality equipment. Adding the three Climate Reference Stations, Alabama now has 17 NCDC-commissioned HCN stations at present with at least 3 more ready for installation. The time-consuming site surveys performed by personnel of the WFOs in Mobile, Birmingham and Huntsville, in close cooperation with the modernization team, made this possible. In addition, the expertise of NCDC and NWS SR and HQ scientists in several conference calls kept the communication lines open.

CoCoRaHS

On 1 November 2007, Alabama became an official member of the CoCoRaHS network. As of 1 May 2008 there were 567 stations registered. The AOSC is the state coordinator with each NWS WFO serving as Regional Coordinators for their appropriate counties. Again, the cooperation with the NWS WFO's and Southern Region HQ has been superb in promoting this very public service activity. Numerous media stories appeared on this topic.

Economic Development

The AOSC was again contacted by several industries wanting climate information necessary to make decisions about locating in Alabama and what their facilities might expect from various weather events. The AOSC continues heavily involved in the agricultural community by assessing water resources and the potential for irrigation expansion. The AOSC is involved at the state and federal level on water policy formulation.

Alaska Climate Research Center

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University of Alaska Fairbanks
903 Koyukuk Drive
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907-474-7885
http://akclimate.org

Dr. Gerd Wendler, Director and Professor Emeritus
Dr. Martha Shulski, Research and Service Climatologist
Mr. Blake Moore, Systems Analyst

The Alaska Climate Research Center is a service and research organization at the Geophysical Institute of the University of Alaska Fairbanks. Its primary mission is to respond to inquiries regarding the meteorology and climatology of Alaska at the request of public, private, and government organizations as well as researchers within Alaska and across the globe. Recently, the number of requests from the media has increased with greater coverage on recent temperature trends in Alaska. We are ideally located, with access to resources from the Geophysical Institute, the International Arctic Research Center, and the National Weather Service. In April of 2008, ACRC was awarded ARSCO status for Alaska by the AASC executive board.

The Center maintains and operates a web site, which receives an average hit rate greater than 19,000 per day. The site features climate summary statistics, information regarding the observing network in Alaska, regional climate summaries updated monthly, links to weather and climate resources, information regarding past and present research, and a section for the many tourists that visit our state. Also online, users can see a display of current weather conditions updated every 5 minutes from a station maintained and operated by the center. In addition to a basic weather station, center maintains and operates a suite of radiation instrumentation and observations include incoming shortwave, longwave, and ultraviolet radiation, which is one of the few locations in Alaska, as well as high latitudes, taking these types of observations.

A new book has been published, authored by Shulski and Wendler of the center, titled The Climate of Alaska. The book provides a valuable resource as a general climatological reference guide and a much-needed update to the latest Atlas published in 1968 by Searby. The book came out in late 2007 and was published by the University of Alaska Press.

The center maintains an active climate summary page featured on the website that gives summary statistics updated monthly for the different climate regions of Alaska. Summary graphics and narratives are also printed in newspapers around the state. In cooperation with the National Weather Service Fairbanks Forecast Office, the center writes a statewide summary that appears in Weatherwise magazine. In addition to regular summaries, the center also develops features on specialized topics relating to recent significant weather events around the state as needed.

Along with service responsibilities, the center also conducts research on a number of high latitude meteorological and climatological topics. A Masters degree student with ACRC and the UAF Atmospheric Sciences Department successfully defended his thesis in 2007. His research focused on the predictability and climate dynamics associated with fire season severity in Alaska and found that using the magnitude of only three climate variables in March and April, the upcoming fire season could be predicted. Ongoing projects include climate long-term trends and variability in Alaska, the integration of traditional knowledge and meteorological station observations for parts of Interior Alaska, climate change affecting reindeer populations on a Bering Sea island, and sea ice concentration in the Beaufort Sea as related to the climate of the North Slope. The center has also conducted research on such topics as the urban heat island effect in Fairbanks, the effect of the Pacific Decadal Oscillation on Alaska climatology, and trends in snow melt in Alaska. Though the center is in part funded by the state of Alaska, additional grant funds have been obtained through various sources and include: the Joint Fire Sciences Program, British Petroleum Corporation, the Minerals and Management Service, and the UAF Center for Global Change.

Office of the Arizona State Climatologist

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Nancy J. Selover, State Climatologist

The Arizona State Climate Office (ASC) is located within the Office of Climatology of the School of Geographical Sciences at Arizona State University (ASU) in Tempe, AZ. Currently, the office includes only the State Climatologist, Dr. Nancy J. Selover, although funding has been allocated for a part-time assistant. The purpose of the program is to: (1) manage and disseminate climatological information about the State of Arizona, (2) monitor the climate of Arizona and the region, (3) collaborate with state agencies in need of climate data and advisement, and (4) conduct research aimed at an improved understanding of the spatial and temporal variability of the climate of Arizona.

In addition to serving as a link to established climate data resources, the office receives and archives data from the Phoenix Real-time Instrumentation for Meteorological Studies (PRISMS) station network. The network is comprised of 17 stations across the Phoenix metropolitan area and is maintained by a local utility company. Also archived by the office are data from the Automated Surface Observing System (ASOS) of the National Weather Service Office in Phoenix; the Arizona Meteorological Network (AZMet) operated by the University of Arizona Agricultural Extension; and NWS Coop data, including our own site, Tempe ASU (028499), where we operate a Class A evaporation pan, and train students in climate observation and data issues. Daily weather data are also archived from three Weather Watchers who have been continuously observing the weather for over 20 years around the state. The office is currently setting up a database to archive as many of the local automated networks in Arizona as possible.

The Arizona State Climatologist performs several service roles within the state. The State Climatologist was appointed to the Governor's Arizona Drought Monitoring Committee in 2004 and continues to generate monthly drought status reports (www.water.az.gov/dwr/drought/DroughtStatus.html) based on SPI and streamflow, using the Georgia model of Steinemann and Cavalcanti (2006). The State Climatologist serves on the Arizona Flood Warning System task force, a multi-agency group of flood control district and emergency managers established in 1994 (http://data.afws.org/sui/). Currently in our second decade of drought, we are occasionally subject to extreme flooding events and abnormally wet La Niña years. In 2007, the State Climatologist was part of the Arizona Hazard Mitigation Task Force, updating the statewide hazard mitigation plan for FEMA. We also worked on the original Arizona Hazard Mitigation Plan in 2003-04, providing data on statewide climate records and probabilities of extreme

events. Since the State Climatologist position is now involved full-time with outreach and applied, stakeholder research, the number of presentations to community and educational groups has increased. The State Climate Office also maintains the field equipment for meteorology/climatology in the School of Geographical Sciences.

Research activities generally focus on hydroclimatology (North American monsoon, winter precipitation variability, drought monitoring) and study of surface-atmosphere interactions (urban heat island, influence of urban lakes). The office is working with Decision Center for a Desert City (an NSF research center studying water issues in arid urban locations) on impacts of urban and global warming on water resources, and with the Power System Engineering Research Center, on impacts of climate change on power demand, generation, and transmission.

With regard to the ARSCO for Arizona, the Arizona State Climate Office is committed to supporting the objectives of the AASC. Below is a brief description of the activities of the Office over the past year that addresses each of the ARSCO qualifications:

Communication Capabilities

- Updated our ASC web page (http://geography.asu.edu/azclimate) to make navigation easier, and more format changes are ongoing. The website includes general climate and real-time weather information, statewide monthly temperature and precipitation maps used in the drought status report, a new monthly climate summary for Arizona, educational information, daily North American Monsoon updates (in summer), and links to other resources.
- Archived more than 200 GB of national and Arizona data annually, through an LDM server. Plans for a local database should be implemented this year as funding finally becomes available for an assistant and for computer back-up services. The database will increase the amount of archived data.
- Maintain a voicemail system to take data and information requests when the office is not physically staffed. All calls are answered or returned within 24 hours. Most data requests come through the phone or e-mail, and data are served back through the phone, fax, e-mail, postal service, or the Internet.

Information Services

- In 2007(relative to 2006), we filled 290 (-3%) e-mail requests for data or information, 183 (+45%) voicemail requests for data, and had over 5000 (+150%) hits on our website. Users (other than the web hits) include university researchers (9%), government agencies (15%), the public (49%), and the commercial and legal communities (27%). We did 19 media interviews, including 7 television, 4 radio, and 8 newspaper, and were involved in 4 legal cases as consultants or expert witnesses.
- Our website was updated to add the "Arizona Climate Summary", a monthly newsletter with maps, graphs, and statewide climate statistics for the previous month. Also added in 2007 were downloadable monthly climate calendars for Phoenix, Flagstaff, Tucson, Winslow, Yuma, and Prescott. (http://geography.asu.edu/azclimate/)

Research

- In 2007, we evaluated the Navajo Nation Water Management Bureau's network of weather, precipitation, stream flow stations for data utility and the potential for integration with other nearby networks. The project was funded by the Arizona Water Institute (www.azwaterinstitute.org/). The previously collected data, which were monthly, collected at varying time intervals, are of little climatological or research value. Of the 100+ monthly precipitation cans, we recommended that most of those within 15 km of other stations (35+ cans) be removed as redundant. Where possible, manual gauges should be replaced with recording gauges, operating at ALERT standards, and the Navajo Nation should enlist as many NWS Cooperative Observers as possible – potentially at the Chapter houses with phone and/or Internet communication, to provide daily data directly to NWS. The Navajo weather station network (10 stations) should be automated with telecommunications to integrate the data with NWS and other interested parties in the region.
- Analyzed surface meteorological and ozone data for an EPA-Ozone project called Advanced Monitoring Initiative (AMI), to determine whether remote-sensing methods can be used to identify surface ozone transport across the U.S.-Mexican border regions, in collaboration with the Southwest Consortium for Environmental Research and Policy (SCERP). The combined analysis of surface monitors, satellite sensors [Tropospheric Emission Spectrometer (TES) and Ozone Monitoring Instrument (OMI)], and ozonesonde data can improve the modeling of pollution transport in the border regions and elsewhere, although higher resolution imagery are required.
- Are working with the Power System Engineering Research Center at Arizona State University (ASU) to evaluate the impacts of climate change on power generation and transmission.
- Continuing to work with the National Weather Service, ASU National Center for Excellence - Sustainable Materials And Renewable Technologies (SMART) group, and the Phoenix Urban Heat Island Task Force to identify and mitigate the effects of urban development on heat stress.

Outreach

- Presentations to Arizona Agricultural Extension; elementary schools; charter schools; community colleges; graduate seminars; community groups such as Kiwanis; local governments; and state agencies on climate variability and change, drought, severe weather, and the urban heat island. Interviews for feature stories in local newspaper, radio, and television on drought, extreme heat events, climate change, water supply issues, and daylight savings time. Conducted a K-12 teacher's workshop on weather, and prepared another workshop on climate change science.
- Monthly calculation of the SPI for Arizona's 15 watersheds, which is used to determine drought status, and presentations to the local county drought impacts groups on the drought assessment methods. We are also involved in improving our drought assessment methods by incorporating groundwater well data from the Arizona DWR, and we have just begun a sensitivity analysis of our current drought monitoring method.

- Service on the Arizona Flood Warning System and State Hazard Mitigation Task Forces.

Monitoring and Impact Assessments

- Monthly statewide temperature and precipitation updates and calculation of watershed SPI for drought monitoring for the Governor's Drought Task Force.
- Web-publish monthly newsletter summary of Arizona climate, and contribute temperature and precipitation summaries to the Arizona-New Mexico – CLIMAS publication "Southwest Climate Outlook".
- Archive data from the PRISMS network for Phoenix and the Phoenix first-order weather station, and the AZMet network for Arizona.
- Analyzing temperature and wind patterns in the Phoenix area for heat island monitoring.

Office of the California State Climatologist and CalClim (California Climate Data Archive)

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Michael Anderson, State Climatologist
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The California Office of the State Climatologist (OSC) is housed in the California Department of Water Resources (DWR) Division of Flood Management. Interacting with other divisions within DWR which makes up the state climate office (SCO) and the California Climate Data Archive (CalClim) group at the Western Regional Climate Center, the OSC is continuing the process of reviving and expanding climate programs in California.

The biggest news of the year for the California OSC occurred in July of 2007 when the California State Climate Office was officially recognized by the American Association of State Climatologists (AASC). A new MOA was signed between the California Department of Water Resources and the National Climatic Data Center acknowledging this recognition for the program. The California OSC looks forward to build upon the existing program and continue to improve its services and products.

The past year was a busy one. Two projects were initiated in the Academic and Agency Research Collaborative. The first project brought the National Weather Service Weather Forecast Office (WFO) Sacramento and Professor Rick Snyder from the University of California Davis together to create an evapotranspiration forecast based upon existing forecast data generated by the WFO. The project is aiming for a March 2008 launch of an operational product. In the second project the University of California Merced provided monthly snow covered area reports to the California Department of Water Resources during the February through May period. The reports were provided to water supply forecasters in the Department and were also placed on the state climatologist web site (http://www.climate.water.ca.gov). Plans are in place to continue this project in 2008.

Climate change has been a hot topic in California since the Governor's executive order in June of 2006. To help the Department deal with mitigation and adaptation issues, a matrix management team was formed and held monthly meetings in 2007. The State Climatologist (SC) is part of this team and provides input on the planning and management of team activities. The SC also participates in presentations and workshops with external groups.

There were many opportunities for presentations, interviews, and workshops in 2007. Interviews on a variety of topics were given to outlets such as the Los Angeles Times, the Associated Press, and National Public Radio. Presentations were given at the Floodplain Management Association, the California Water Law and Policy Group, the California Cooperative Snow Survey, the Drought Monitor Workshop, the Yosemite Hydroclimate Workshop, the WERA-102 committee, and the AASC annual meeting. The SC also participated in three workshops in 2007. Two of the workshops dealt with investigating opportunities for reservoir re-operation in response to climate change. These workshops brought local water agencies, the US Army Corps of Engineers, the Bureau of Reclamation, and the California Department of Water Resources. The third workshop was sponsored by the United States Geological Survey and brought researchers together to discuss mountain recharge of aquifer systems monitoring techniques and the potential for a monitoring network to detect changes associated with climate change.

Data distribution was accomplished through email, phone calls, letters, and the web this past year. Email and phone requests for data averaged 3 per week. The California Data Exchange Center averages more than 1 million page visits per week with peaks over 5 million per week during storm events. The California Irrigation Management Information System (CIMIS) network reported over 300,000 reports generated for 2007. Reports are the primary data distribution method for the CIMIS network. Visits to the California State Climatologist web site continue to grow. Page views increased from slightly less than 4,000 in January of 2007 to almost 7,000 page views by December 2007. In January 2008, the number of page views exceeded 9,000. The SC web page will be undergoing some upgrades during the coming year to expand material available on the website and change the presentation of material.

The California OSC continues its partnership with the CalClim program at Western Regional Climate Center (WRCC). CalClim is funded through a grant from the California Energy Commission. With this grant, WRCC has the opportunity to conduct climate analyses and develop products for California. 2007 saw the launch of the California Climate Tracker (http://www.wrcc.dri.edu/monitor/cal-mon/index.html), a monthly updated suite of products tracking temperature and precipitation. It uses both COOP station and gridded (PRISM) data as inputs. A report of the July 2006 heat wave was completed with the National Weather Service, including partners in forecast offices, the California-Nevada River Forecast Center and Western Region Headquarters. Manuscripts are being prepared for peer review publication. As drought has become an increasingly important issue for the western states and California, WRCC has made it a point to contribute to drought monitoring efforts, by providing input in the weekly US Drought Monitor discussion and by collaborating with NDMC and others in writing proposals to fund future monitoring endeavors, among other ongoing activities. Presentations in 2007 were made at the AMS Annual Meeting, California Climate Change Conference and at numerous other smaller meetings and workshops. The WRCC staff members contributing to this effort in 2007 included Laura Edwards, Kelly Redmond and John Abatzoglou.

Colorado Climate Center

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Nolan J. Doesken, State Climatologist
Odie Bliss, Research Coordinator

The Colorado Climate Center (CCC) was established by the state in 1974, through the Colorado State University Agricultural Experiment Station, to provide information and expertise on Colorado's complex climate. Through its threefold program of Climate Monitoring (data acquisition, analysis, and archiving), Climate Research and Climate Services, the Center is responding to many climate related questions and problems affecting the state today. The Center monitors climatic conditions on both broad, regional scales and very local scales. By documenting climate variations in time and space, the relationships between climate, water supplies, other natural resources, agriculture and societal responses can be better understood and applied. Priorities of the Colorado Climate Center in 2007 were: 1) Conduct and coordinate climate monitoring and research specific to practical local needs and applications. Included in this effort is collaborative research with the National Weather Service to test and evaluate ultrasonic depth sensor for automated measurement of snowfall and depth, 2) Assess the observed trends and variations in key climatic elements such as temperature, precipitation, snow accumulation and evapotranspiration and provide this information to the citizens of Colorado to help address concerns over climate change and public response, 3) Support and coordinate the Colorado Agricultural Meteorological Network (COAGMET) and extend this network to dryland farming and grazing areas of the State, 4) Develop and test new uses and applications of COAGMET weather data in cooperation with agricultural practitioners and researchers, 5) Maintain the historic Fort Collins weather station as a benchmark long-term climate monitor, 6) Engage the citizens of Colorado in backyard climate monitoring through the Community Collaborative Rain, Hail and Snow network (CoCoRaHS) and related activities. 7) Disseminate climatic information, expertise and applications and assist others in applied climate research.

Recent publications are available from the CCC's web site at (http://ccc.atmos.colostate.edu)

Bauder, T., N. Doesken, H. Schwartz, M. Bartolo, 2007: Demonstration of the Colorado Agricultural Meteorological Network CoAgMet for improved irrigation and pest management. Colorado Water, Newsletter of the Water Center of Colorado State University, Vol. 25, 1(Feb/Mar), pp. 16-17.

DeMouche, L., D. Bathke, and N. Doesken, 2007: Master Gardeners Role in encouraging water conservation using a rain gauge network. *Journal of Extension*, 45, 4(August), article number 4IAW5.

Doesken, N., 2007: Let it Rain. Weatherwise, Vol. 60, 4, July/August, pp. 50-55.

Doesken, N.J., 2007: The Colorado Climate Center. Colorado Water, Newsletter of the Water Center of Colorado State University, vol. 25, 1(Feb/Mar), pp. 1-13.

R.A. Pielke, K. Wolter, O. Bliss, N. Doesken, and B. McNoldy, 2006: July 2005 Denver heat wave: How unusual was it? *National Weather Digest*, 31, 1, pp. 24-35.

W.A. Brazenec, N.J. Doesken, and S.R. Fassnacht, 2006: Evaluation of ultrasonic snow depth sensors for automated surface observing systems (ASOS). Accepted for publication in *J. of Climatology*.

Pielke Sr., R.A. J. Nielsen-Gammon, C. Davey, J. Angel, O. Bliss, M. Cai, N. Doesken, S. Fall, D. Niyogi, K. Gallo, R. Hale, K.G. Hubbard, X. Lin, H. Li, and S. Raman, 2007: Documentation of uncertainties and biases associated with surface temperature measurement sites for climate change assessment. *Bull. Amer. Meteor. Soc.*, 88:6, pp 913-928.

ARSCO Qualifications: CCC is designated by the AASC as the official state climate office for Colorado. The following describes ways in which CCC addresses each of the ARSCO qualifications:

Communication Capabilities:

The Colorado Climate Center is committed to delivering climate information to the citizens of Colorado. Through a partnership with the Colorado State University Public Relations Department, CCC enjoys direct and frequent access to both print and broadcast media in Colorado. Many interviews were given and featured in newspapers, radio and television. The CCC benefits from good relations and strong communications with NOAA's National Weather Service, National Climatic Data Center, and also other state and federal agencies that are providers and/or users of climate information. Interagency partnerships, many of which are informal in nature, all for cost effective enhancements for integrated climate monitoring and research. CCC participates in the Governor's Water Availability Task Force and State Flood Task Force and give updates on the availability of water conditions. The monthly climate maps and drought presentations are at the following urls:

http://ccc.atmos.colostate.edu/coloradoprecipitation.php
http://ccc.atmos.colostate.edu/droughtpresentations.php

Information Services:

The Colorado Climate Center staff routinely responds to request for climatic data and expertise. The number of requests is lower now than in the past, almost certainly due to the availability of climate information from many sources on the Internet. However, the climate information requests now tend to be more complex and interdisciplinary and require considerable time to address fully. The CCC maintains a website http://ccc.atmos.colostate.edu with many climate information resources. Products based on standard climatic elements such as, temperature and precipitation from NWS cooperative weather stations across Colorado are still a mainstay. Water year precipitation summaries and drought index information are two examples. CCC also features access to the CoAgMet automated weather network near real time and historic data. Several enhancements to this system were made in 2007 to encourage broader use

of CoAgMet by decision makers. Special emphasis has been made on deriving evapotranspiration estimates from meteorological observations. An extensive list of web resources is available for the user.

Research:

The Colorado Climate Center participates in research as time and resources allow. During 2007, research continued on improving the measurements of rain, hail and snow and examining the characteristics of local patterns, variations and extremes in precipitation. For the second year, we helped lead a collaborative effort funded by the National Weather Service to test and evaluate ultrasonic depth sensors for potential future use in automating the measurement of snow fall and snow depth. Early results are very encouraging. In collaboration with the Western Water Assessment (RISA) at the University of Colorado we investigated long-term trends in temperature using only the "best" historic NWS cooperative stations in Colorado based on the fewest changes in instrumentation, station location, observers and time of observation. Warming trends were observed over many parts of Colorado, especially when only the past 30-50 years of data are considered. Trends are less dramatic when data back to at least the 1930s are included. We also began a new project using data from automated weather stations in agricultural environments to examine spatial patterns and interannual variations in evapotranspiration. High resolution (spatial) rain and hail data from the CoCoRaHS network were used in an assessment of the possible impact from the use of hail canons in the San Luis Valley of Colorado.

Outreach:

During the past year, climate information was presented to the public via news media, traditional publications, field trips and the CCC web site. Also, Climate Center staff gave dozens of invited talks and seminars to diverse audiences. A new outreach program was initiated in 2007 in collaboration with a local school district entitled "Walking Through the Water Year." This educational program is designed to show the public and K-12 students that the weather is our water supply and that by paying closer to attention to our changeable weather that we can better understand our complex system of water collection, storage and delivery in Colorado.

The largest outreach effort during 2007 was the Community Collaborative Rain, Hail and Snow network (CoCoRaHS) to develop a weather-centered water education and outreach program for Colorado, http://www.cocorahs.org. CoCoRaHS expanded rapidly to other parts of the U.S. in 2007. Thirty states and approximately 13,000 volunteers are now involved and this number continues to grow. CoCoRaHS has been very effective at not only reaching the general public but also building partnerships with other State Climate Offices, National Weather Service forecast offices and regional headquarters, and other organizations who need and benefit from detailed and timely precipitation information.

Connecticut State Climate Center

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Xiusheng (Harrison) Yang, State Climatologist

Communication Capabilities

The main communication tools of the Connecticut State Climate Center include the following:

CSCC web page http://www.canr.uconn.edu/nrme/cscc,
Joint web page with Connecticut IWR http://www.ctiwr.uconn.edu,
Feature articles in various local media,
Traditional ways through our cooperative extension system,
Peer-reviewed publications.

Information Services

Our homepage includes, but not limited by, the statewide 30-year monthly climatic data (including means, variation ranges, and extremes, and derived parameters); national, regional, and local climate data sources; and links to current weather information. The establishment of the website has provided residents, government agencies, schools, and businesses in the State a needed service that previously not available. During the fiscal year 2008, The Connecticut State Climate Center has delivered 2 radio talks regarding the Connecticut climate conditions, provided 4 impact analyses to various media and local governments, and answered several hundreds requests for particular meteorological data from various users in the State. The CSCC director has also been invited by in and out-of-state users to provide specific microclimate assessment.

Research

The CSCC director has been continuously doing climate related research, focusing on climate change, air pollution, impact of water resources on farming productivity, multimedia cycling of hazardous materials, and atmospheric transport of biological agents. In fiscal year 2008, CSCC has initiated a full study on "climate and climate change in Connecticut". The Center also provides needed climatic data for other research projects on and off campus.

Outreach

Our outreach activities are largely characterized by providing climatic information and impact assessment to various users within and outside the State of Connecticut, as described in "Information Services".

Office of the Delaware State Climatologist

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David R. Legates, State Climatologist
Daniel J. Leathers, Associate State Climatologist
Kevin R. Brinson, Assistant State Climatologist

The Office of the Delaware State Climatologist is located in Newark, Delaware at the University of Delaware and is co-operated with the Delaware Environmental Observing System (DEOS). It is closely allied with the Department of Geography, which operates a Ph.D. program in Climatology. Both the Office and the State Climatologist continue unfunded to provide climate support services to the State of Delaware. The Office of the Delaware State Climatologist shares space with DEOS as well. In addition, Kevin R. Brinson, a Ph.D. student in the Climatology Program and technician for DEOS now serves as the Assistant State Climatologist.

The Office of the Delaware State Climatologist is an AASC Recognized State Climate Office (ARSCO) and partners with the National Climatic Data Center, the Northeast Regional Climate Center, and the National Weather Service in Mt. Holly NJ to provide data and climate services to the citizens of the State of Delaware. As with most State Climate Offices, we provide climate data and expertise to both the public and private sector as well as conduct newspaper, radio, and television interviews and, occasionally, court testimony. The Delaware State Climatologists also man the Technical Assistance Center of the Delaware Emergency Management Agency during critical weather events. In addition, the Office currently has undertaken two main projects:

The Delaware Environmental Observing System (DEOS)
Our main funding effort has been the establishment of a real-time system dedicated to monitoring environmental conditions across the Delmarva Peninsula. The Delaware Environmental Observing System (DEOS) is designed as a tool for decision makers involved with emergency management, natural resource monitoring, transportation, and other activities throughout the State of Delaware. DEOS also provides both State agencies and the citizens of Delaware with immediate information as to environmental conditions in and around the State. Being that it is supported by the Office of the Delaware State Climatologist, DEOS also provides a climate archive of the data to support the developing needs of high-resolution (in time and space) requests for environmental data. (http://www.deos.udel.edu)

Being a peninsula, isolated by the Delaware Bay, the Delaware River, and the Chesapeake Bay, the Delmarva Peninsula is very much affected by coastal storms and processes. To make appropriate decisions that depend upon these environmental conditions, decision makers must have environmental data with the highest spatial and

temporal resolution possible. Data needs include weather information, observations of streamflow, bay and ocean conditions, and water and air quality. But more importantly, these data must be of the highest quality, readily available, and easily applied. DEOS integrates existing observations from federal, state, and local sources and augments these existing observations with approximately twenty additional observing sites (primarily weather stations, but installed sensors also have included water temperature, wave period, and water quality for the Delaware Bay) around Delaware, Maryland, and Pennsylvania. These observations are connected to a central data collection facility through existing telecommunications capabilities. DEOS currently provides timely data dissemination to State agencies, the National Weather Service, and the public and also is in the process of developing reliable data quality control and quality assurance procedures.

DEOS consists of three main components: (1) the DEOS Environmental Monitoring and Observing Network (DEMON), a network of thirty-one new meteorological observation sites coupled with existing weather and other environmental observation sites in and around Delmarva, (2) the DEOS Integrated Visualization and Analysis System (DIVAS), a GIS-based integration of surface weather observations with National Weather Service WSR-88D radar estimates of precipitation, thereby providing estimates of meteorological and environmental variables over a high spatial resolution grid, and (3) a number of DEOS Analysis Systems (DAS), designed to provide decision support in a variety of environmentally-sensitive areas. One such system will provide transportation and emergency management officials with real-time assessments of coastal and stream flood risk potentials. DEOS also is working closely with the Kentucky Climate Center and the Virginia Office of State Climatology to provide joint expertise to enhance our developing system.

This year, six additional stations were added in Sussex County and one in Kent County, Delaware. Over the summer, we will install eight new stations in Chester County, Maryland, in cooperation with Chester County Emergency Management. We also plan to install two additional weather stations in New Castle County that are funded by private corporations. DEOS also has now taken over the operation of the four weather station network of the University of Delaware Agriculture Extension Office.

The DEOS Environmental Monitors Program (DEMs)

We also continue to operate the DEOS Environmental Monitors Program (DEMs). DEMs is a statewide spotter network of more than thirty volunteers that make daily measurements of rainfall, snowfall, and (for some) air temperature. DEM volunteers also serve as local spotters to inform State Weather Officials of breaking severe weather as well as provide local conditions during emergency weather events.

DEMs volunteers enter their data directly into the DEOS database through webpage access (a few, however, still prefer to use mail-in cards). This program is a way to identify those people that are truly interested in taking long-term climate measurements and make them official cooperative observers by providing them with more accurate (and more expensive) equipment.

In summary, the Office of the Delaware State Climatologist is growing. In the past three years, we have obtained support for three undergraduate and two graduate students working on specific projects with DEOS and State Climate personnel. We also have obtained permanent support for a technician and a programmer to continue our development of DEOS.

Florida Climate Center

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David Zierden, State Climatologist
James J. O'Brien, Emeritus State Climatologist
Melissa Griffin, Assistant State Climatologist
Preston Leftwich, Climate Research Assistant

About the Florida Climate Center

The Florida Climate Center is housed at the Center for Ocean-Atmospheric Prediction Studies (COAPS) in the Fuqua Research Complex at Innovation Park. Though physically located off-campus, COAPS and the Florida Climate Center are part of the Department of Meteorology at the Florida State University. The Florida Climate Center is public service center sponsored by the Institute of Science and Public Affairs. The office space, facilities, and equipment are provided by COAPS, but the Climate Center receives ongoing state financial support that covers the salaries of 1.5 full-time employees. The Florida Climate Center full-time staff currently consists of David F. Zierden, current State Climatologist, Melissa Griffin, assistant state climatologist, Preston Leftwich, a part-time research associate and instructor of an introductory meteorology course to undergraduates in the main department on campus. and Marcus Williams. Also contributing is Dr. Mort Winsberg, author of *Florida's Weather* and professor emeritus of geography at FSU. Dr. James. J. O'Brien, former State Climatologist and Professor Emeritus, remains actively involved and provides welcome leadership to the Florida Climate Center.

The Florida Climate Center is an American Association of State Climatologists (AASC) Recognized State Climate Office (ARSCO) and works in partnership with the National Climatic Data Center, Southeast Regional Climate Center, and National Weather Service to provide data and climate services to the citizens of the State of Florida. We have a standing memorandum of understanding with NCDC and letters of support from the National Weather Service Forecast Offices.

Florida Climate Center's Approach to Climate Services

One of the primary missions of the office is to provide routine climate data and services. In addition to the inquiries that come straight to the office, they are also referred to us from NCDC, the regional climate centers, and the National Weather Service Forecast Offices. The Florida Climate Center receives dozens of phone calls, emails and faxes each day requesting everything from answers to simple climate and weather questions to detailed data requests and analyses. We have developed a unique philosophy on climate services that allows us to best serve the needs of our "customers". The keys to our philosophy are as follows:

- Archive and access to historical data

- Climate "service" begins with personal contact, listening to needs
- Look beyond traditions weather variables; use derived quantities and other products
- Education and outreach
- Community involvement

Communication of Information

- Provide routine climate and data services to the general public, engineering/legal firms, research communities, university and state agencies.
- Maintains archive of original weather observations from the National Weather Service Cooperative Observer Program, along with datasets unique to Florida. (i.e: Florida Division of Forestry tower observations)
- Climate information distributed through the climate center's website: www.coaps.fsu.edu/climate_center
- Interviewed by a variety of media sources (newspaper/television) about issues such as global climate change, drought, El Nino/La Nina, hurricanes and damaging freezes.

Research

- Involvement with the Southeast Climate Consortium (SECC), one of the Regional Integrated Science and Assessment (RISA) teams funded by NOAA's Office of Global Programs, with focus on downscaled and localized climate forecasts and their applications.
- Reconstruction of historical Keetch-Bryam Drought Index (KBDI) for Alabama, Florida and Georgia., which is used by Florida Division of Forestry and Florida Medical Entemology Lab.
- Creation of derived climatology products based on repeat inquiries and data made available free of charge on website. (i.e: Heat Index, Wind Climatology, etc).
- Continued production of KBDI forecasts for the Southeast.
- Assisted undergraduate/graduate students at COAPS in research of climatic patterns, temperature trends, and dataset ambiguities.

Education and Outreach

- Joined the Community Collaborative Rain, Hail and Snow (CoCoRaHS Network) in October 2007. The Florida CoCoRaHS program has received funding to promote weather and climate information within Florida 4-H.
- Involved in the Young Scholars Program at FSU. In this program, exceptional high school students from around the state come to Florida State University for six weeks of study and research directed by faculty scientists.
- Participated in many extension-sponsored workshops in recent months and will continue to provide training and to promote *AgClimate* in the coming year with the agriculture extension services in Florida, Georgia, and Alabama.
- Presented various climate topics to such groups such as the Rotary Club, Alumni Association, The North Florida Gulf Fishing Club, Lion's Club, etc.
- Briefed state agencies such as the Agriculture Commissioner's office, Public Service Association, Public Health Center on current climate issues.

Georgia State Climatology Office

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Dr. David Stooksbury, State Climatologist
Pam Knox, Assistant State Climatologist

The Georgia State Climatology Office is located in Athens, GA, on the campus of The University of Georgia in the Biological and Agricultural Engineering Department. The office houses two full-time climatologists: Dr. David Stooksbury, the State Climatologist and Associate Professor, and Pam Knox, the Assistant State Climatologist. We also have a postdoctoral scientist, Dr. Pierre Gerard-Marchant, working on hydrologic projects.

The Georgia State Climatology Office continues to be involved in a variety of research and public outreach activities. We maintain a web site and actively interact with users from around the state. These contacts include university scientists, educators, lawyers, construction and insurance companies, government agencies, reporters, and private citizens. Many of these data requests come by way of email, but we also receive phone calls, walk-ins and the occasional letter.

The State Climatology Office has been heavily involved this year with the Southeast Climate Consortium on a variety of research projects. We have participated with other states in training activities for Extension agents on the use of the AgClimate.org website, a web site which relates climate statistics for the Southeastern US to El Niño phase and crop management issues. We are now in the process of developing a similar site for water managers (to be called HydroClimate.org or something similar). This site will provide assistance in planning for drought and wet conditions using ENSO phase information and Climate Prediction Center projections of current and upcoming precipitation amounts. Interviews with a variety of water managers and stakeholders have helped us hone the content of the site and our understanding of how water managers use climate information. We also contribute to the CoastalClimate.org web site content and the state Weekly Weather and Crop Bulletin and the National Drought Monitor.

In addition to research activities, we provide guidance to a number of state agencies on weather and climate conditions and severe weather, including the State Drought Monitoring Committee (which Dr. Stooksbury co-chairs with the Director of the Georgia Environmental Protection Division) and the Georgia Emergency Management Agency (GEMA). The State Climatologist regularly monitors water conditions across the state and issues drought statements and other special climate statements when conditions warrant it.

Hawaii State Climate Office (HSCO)

Department of Meteorology
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PH: (808)-956-2324

Dr. Pao-Shin Chu, State Climatologist
Alice Ruan, Graduate Research Assistant
Sara Thomas, Student Assistant

The Hawaii State Climate Office (HSCO) is located on the campus of the University of Hawaii, in Honolulu. The HSCO is a part of the School of Ocean and Earth Science and Technology at UH Manoa, in the department of Meteorology. The office was established in 2000. Dr. Pao-Shin Chu is the State Climatologist. The Hawaii State Climate Office is the AASC Recognized State Climate Office and is also partnered with NCDC and also maintains a website in order to provide accurate climate data for Hawaii residents and researchers.

One of the biggest projects this year for the HSCO was the continuation of updating the annual average rainfall maps for parts of the state. The period of record for the maps is from 1975 through 2004. The index for Kauai County and Hawaii County was completed and the final reports submitted. Work is still on going to finish the indices for Maui County and Honolulu County. The last comprehensive rainfall report was published in 1973 by the Department of Land and Natural Resources. The new maps will be a valuable current climate reference for all in the state, given that the low rainfall was observed since the 1970s.

With funding from the National Park Service, the HSCO is currently providing data and analysis on climate and climate change in the Pacific Island Network to support other vital signs monitoring and park management.

In collaboration with the NWS/Central Pacific Hurricane Center in Honolulu, another project accomplished in 2007 was to produce a climatic atlas of tropical cyclone tracks over the central North Pacific. This project was supported by NOAA and the Hawaii Coastal Zone Management Program of the Department of Business, Economic Development and Tourism. Publication of this atlas is expected in 2008.

The Hawaii State Climate Office also provides climate data for a variety of projects. Many of the common requests are for: researchers, students, private sectors, government agencies, visitors, and residents. Last year there were approximately 120 requests for climate data and information. The HSCO also maintains records from the early 1900's. Many of the records are journals kept by the sugar cane and pineapple plantations which were plentiful throughout the state in the early part of the twentieth century. The HSCO has also been helping the NWS/Office for Hydrologic Development to update precipitation frequency atlas for Hawaii.

Idaho State Climate Services

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Dr. Russell J. Qualls, Idaho State Climatologist
Dr. Wenguang Zhao, Research Scientist
Ayodeji Arogundade, Yohannes G/Eyesus Getahun, Graduate Student

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Climatic information is essential to every citizen of Idaho. To help people obtain the climatic and water data and information necessary to planning and every day work, the State Climatologist Program strives to acquire, archive, process and disseminate, in the most cost effect manner possible, all climate and weather information which is or could be of value to policy and decision makers in the state and to provide climatic services which are important to the people of Idaho.

The functions of the State Climatologist and State Climate Services are to:

- act as liaison between Idaho weather information users and the National Climatic Data Center
- maintain a data bank of climatological and hydrological data and information
- supply data in a form useful to users
- perform requested climate analyses or refer requests to other appropriate persons, agencies or consulting firms
- maintain contact with users of climatic and hydrological data in order to ascertain their needs for data and analyses
- maintain a bibliography of publication pertinent to Idaho and Pacific Northwest climate

In May, 1978, an agreement was concluded among the National Climatic Data Center, the National Weather Service and the University of Idaho to provide climate services which had been provided by a former National Weather Service program. ISCS became the AASC Recognized State Climate Office (ARSCO) for the State of Idaho in 2001.

Idaho State Climate Services is housed in the Department of Biological and Agricultural Engineering and is directed by the Idaho State Climatologist. It is supported by the Idaho Agricultural Experiment Station and the Idaho Cooperative Extension System in cooperation with the Idaho Water Resources Research Institute.

ARSCO Qualifications: ISCS is designated by the AASC as the official state climate office for Idaho. The following describes the ways in which ISCS addresses each of the ARSCO qualifications:

Communication Capabilities:

- ISCS maintains internet, email, telephone, and fax communication links.

Information Services:

- Maintain an online archive of the complete period of record for all Idaho Cooperative Observer data sets in cooperation with the University of Idaho Library, which may be downloaded by user-selected station. http://inside.uidaho.edu/asp/liststations.asp
- Responded to more than 400 e-mail requests for climate data/information/services.
- Answered more than 200 telephone requests
- Interviewed by more than six Idaho newspapers.
- Maintain an automated weather station, a Cooperative Observer Station with over 110 years of data, and a recording precipitation gage, and partially fund a Sno-Tel site.
- Established three Idaho Transportation Department Road Weather Information System Weather Stations.

Research:

- Use remote sensing to simulate snowmelt runoff from the Upper Snake River.
- Examine the effect of climate change scenarios on snowpack and runoff volumes and timing for the eastern Snake River Plain, the principal water supply for southern Idaho.
- Evaluate the impact of current water rights on distribution of irrigation water under changing supplies associated with various climate change scenarios.
- Evaluate the impact of climate-induced changes to evapotranspiration on irrigation water demand.
- Analyzing historical temperature trends at climate stations across Idaho
- Analyze socio-economic impacts of various climate change scenarios
- Developing algorithms and models to assimilate remotely sensed data for use in spatially distributed land surface-atmosphere exchange models
- Developing a meteorological downscaling model to apply global weather forecasts to small watersheds. Results will be used in snowmelt runoff modeling for reservoir operation
- Conducting studies for the Idaho Transportation Department on the interaction of inclement weather and road slope and curvature on the frequency of accident occurrences.

Outreach: Participation and collaboration of the following outreach activities:

- Climate Presentations to local elementary schools
- Provide news interviews
- Serve as a climate expert on Idaho Public Television talk shows.
- Work with Boy Scouts of America as a merit badge counselor for environmental science
- Work with Lego Robotics teams focused on Alternative Energy, and Nanotechnology.

Illinois State Water Survey
IL Dept. of Natural Resources

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Jim Angel, State Climatologist

The Illinois State Climatologist Office (SCO) is located at the Illinois State Water Survey (ISWS) in Champaign, Illinois on the campus of the University of Illinois. Since 1973, ISWS has supplied the salary for the state climatologist, as well as computer and communication support and office space. The office also operates the NWS coop site for Champaign-Urbana.

ARSCO Qualifications: The AASC has designated the Illinois SCO as the state climate office for Illinois. The following describes the ways in which the office addresses each of the ARSCO qualifications:

Communication Capabilities
The Illinois SCO has phone, fax, and email services with high-speed Internet service for the rapid transfer of data. The state climatologist maintains a web site devoted to climate data and information on a wide variety of climate topics.

Information Services
The Illinois SCO receives numerous requests for climate data and information. In a last year, the SC handled 510 phone calls and email requests. The web site contains maps, plots, and tables of current climate conditions, historical data, and climate summaries as well as information on important climate topics in Illinois such as El Niño, drought, winter storms, and heat waves. In the last year, the web site received 1.2 million hits with 84,000 unique visitors and 14,000 repeat visitors.

Research

- Climate change in Illinois with special emphasis on reconstructing the 19th century climate of the state and examining model output for Illinois from GCM simulations used in the 2007 IPCC reports for use in water supply planning.

- Co-PI on two NOAA grants using the Forts Daily Climate Observation Data Set to Extend Analyses of U.S. Climate Events in the mid-19th Century.

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- Markus, M., J. R. Angel, L. Yang, M. Hejazi, 2007: Changing estimates of design precipitation in northeastern Illinois: comparison between different sources and sensitivity analysis. Journal of Hydrology, vol. 344, no. 3-4, pp. 210-222.

Outreach

- Wrote contributions to the monthly ISWS Water and Climate Summary;
- Provided data and guidance to agencies in Illinois, including the Illinois Drought Response Task Force, the Illinois Department of Transportation, the Illinois Attorney General's office, and the Illinois Emergency Management Agency;
- Gave 151 media interview and produced monthly press releases;
- Gave 10 public talks and two scientific talks;
- Worked with local NWS offices and the Midwestern Regional Climate Center on issues related to climate, including visits to NWS offices, the sharing of data and climate information, and coordinating efforts on CoCoRaHS.

Monitoring and Impact Assessment

- Continued provision and development of a series of web-based products for monitoring conditions in Illinois;
- Provided input into the U.S. Drought Monitor;
- Monitored climate/meteorological events as they unfolded including conditions during the 2007 growing season, the hard freeze of early April 2007 that caused significant damage to Illinois fruit crops, the heavy rains of August 2007, and heavy snows and rains in the winter of 2007-08.

Iowa State Climatologist Office

Iowa Dept. of Agriculture & Land Stewardship

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Harry J. Hillaker, State Climatologist

The State Climatologist Office (Iowa SC) is a bureau of the Iowa Dept. of Agriculture & Land Stewardship. The State Climatologist is appointed by the Iowa Secretary of Agriculture (an elected state official). The Iowa SC office was founded in Iowa City at the University of Iowa on October 1, 1875 and was initially known as the Iowa Weather Service. In 1890 the Iowa Weather Service operations were moved to Des Moines and came under the supervision of the Iowa Weather & Crop Service. The Iowa SC was co-located with the National Weather Service from 1890 until 2003 and has worked very closely with that agency since its inception. Finally, the Iowa SC was made a division of the newly created Iowa Department of Agriculture in 1923.

Information Services:
The Iowa SC office maintains archives of NWS co-op and first order station data back to the beginning of records. This would include the regular NCDC reports such as *Storm Data, Iowa Climatological Data* and *Local Climatological Data*, as well as the original observations. Access to a multitude of federal and state weather and climate data archives are also maintained. With 132 years of continuous operation the Iowa SC Office has an unusually large archive of original federal and state books, reports and manuscripts from the 19th and early 20th Century. The office's climate archives were moved in November 2006 to a more accessible climate-controlled location.

Research:
The Iowa SC office primarily is involved with the acquisition, processing, dissemination and archiving of weather and climate data. However, research activities are performed as funding permits and have been conducted in cooperation with agencies such as the National Climatic Data Center (NWS co-op network metadata), the Midwestern Regional Climate Center (pre-1948 data keying project), the National Science Foundation (crop-hail climatology), U. S. Army Corps of Engineers (evaporation, snow, short-duration precipitation studies) and the Iowa Dept. of Natural Resources (development of more timely temperature data resources).

In the past fiscal year the Iowa SC office has been working with the Midwestern Regional Climate Center (MRCC) to document the quality control methods utilized in creating a serially complete set of daily Iowa temperature, precipitation, snowfall and snow depth data dating to January 1991. These records have been converted by MRCC into the common TD-3200 format for use by other interested researchers. It is hoped that this data set will be useful in evaluating the effectiveness of data QC techniques used

by other agencies, as well as in documenting any trends in data completeness and accuracy over the 17 year period of record. Further, the data set should be of great utility in applications requiring complete time-series of data (i.e., no missing or cumulative data). Work also has continued in developing a monthly data base of historical Iowa precipitation records with about 19,000 station-years compiled.

Outreach:
The office maintains very open communication with the news media with a total of 432 news media contacts this past fiscal year (July 2006-June 2007). This, combined with preparation of Public Information Statements issued in cooperation with the National Weather Service, and weekly and monthly crop-weather summaries prepared for the USDA provides very wide dissemination of climate products and information. A total of 2,031 inquiries were answered during the past fiscal year. Most inquiries were received from government agencies (39%), the news media (21%), attorneys (12%) and insurance (6%). Virtually every major branch of State government utilizes the Iowa SC Office data on a regular basis.

The office also prepares regular monthly climate reports, the *Preliminary Iowa Monthly Weather Summary* and the *Iowa Climate Review*. The Preliminary Monthly Weather Summary is issued within the first few work days of each month and provides a brief summary of Iowa's weather conditions for the previous month. This report is available on-line and is also sent free of charge via regular mail. The Iowa Climate Review is a monthly report containing daily data for all official Iowa weather stations and is available by subscription. The Climate Review report is not currently on-line; however, the raw data are provided to Iowa State University's Iowa Environmental Mesonet web page and made available at that site.

The Iowa State Climate Office works closely with the National Weather Service in monitoring the co-op and ASOS data networks so as to improve the quantity, quality and timeliness of Iowa climate observations. The State Climatologist has served on several NWS regional and national committees involved with climate and data issues. Finally, the Iowa SC attended the AASC annual meeting in Couer d'Alene, ID in July 2007.

Monitoring and Impact Assessments:
The Iowa State Climate Office is a member of the Governor's Drought Task Force and Flood Task Force. The office provides regular updates of monthly temperature and precipitation data to the USDA Farm Service Agency for their use in evaluating county-by-county eligibility for disaster relief programs. The office also assists the Iowa Homeland Security and Emergency Management Division in their operations and occasionally provides guidance for county and regional emergency response offices. The office also provides near real-time rain event maps for the Iowa DOT for their use in evaluating where roadways may be in need of detailed examination for possible flood damage. During the past fiscal year the office was active in supporting applications for disaster relief from FEMA related to a blizzard in March 2007 in northwestern Iowa and to the USDA for counties in southern and western Iowa in the summer of 2006 for drought.

Kentucky Climate Center

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Dr. Stuart A. Foster, State Climatologist and Director
Dr. Rezaul Mahmood, Associate Director

The Kentucky Climate Center (KCC) observed its 30th year of operation in 2008. As a member of Western Kentucky University's Applied Research and Technology Program (ARTP), the KCC received funding to support both undergraduate and graduate students and provide opportunities for them to participate in a variety of research and service activities, including presentations at statewide, regional, and national meetings. Beginning in the fall semester of 2007, the Department of Geography and Geology began enrolling students in the university's new Bachelor of Science Program in Meteorology, and the KCC will play an important supporting role by providing student engagement opportunities for many of those students. The KCC is recognized by the AASC as the State Climate Office for Kentucky.

Information Services

The KCC provides climate data and information through a variety of channels. These include communication via telephone, fax, and e-mail. Our primary source of service delivery is via our website, which includes a variety of narratives, tables, maps, and graphs summarizing Kentucky's historical climate. The website emphasizes interactive graphics to help users find the data and information they need.

Research

Faculty and students associated with the Kentucky Climate Center are involved in a variety of applied research projects. They published results of a USDA-funded research on pollution transport associated with livestock operations in the *Journal of Environmental Quality*, and published results of studies addressing land use-land cover change and land-atmosphere interactions in the *Journal of Geophysical Research*, *Monthly Weather Review*, and *Global and Planetary Change*. The KCC contributed to published research on climate station exposure in the *Journal of Geophysical Research*. The Center completed multiple station histories in conjunction with the NCDC's Climate Database Modernization Program.

The KCC, in conjunction with University of Colorado and the University of Nebraska-Lincoln organized a workshop, "Detecting the Atmospheric Response to the Changing Face of the Earth: A Focus on Human-Caused Regional Climate Forcings, Land-Cover/Land-Use Change, and Data Monitoring," sponsored by the NSF and held in Boulder, CO, August 27-29, 2007. The faculty, post-doctoral researcher, and student representing KCC delivered several papers at this workshop. They have also presented

research papers at the Annual Meetings of the American Meteorological Society, the Association of American Geographers, the Kentucky Academy of Sciences, and the Southeastern Division Association of American Geographers.

Members of Center also took lead in writing several large grant proposals currently in review. These proposals were submitted to the NSF and NOAA.

Outreach

The KCC provided outreach via the media, including interviews through the television, radio, and newsprint media on topics including the late spring freeze, the drought and heat wave, and record-setting October rainfall occurring during 2007. In addition, a representative of the KCC was a guest for a special on global climate change filmed and broadcast by WKYU-PBS.

The Kentucky Geographic Alliance and the KCC partnered to host a week-long institute to introduce the Kentucky Mesonet to K-12 teachers. In addition to learning about the Mesonet, teachers drafted more than 40 lesson plans for integrating Mesonet data into their classroom curriculum.

Drought was a significant feature of Kentucky's climate in 2007. The KCC served on the Kentucky Division of Water's Water Availability Advisory Group, providing periodic status and outlook updates. In the aftermath, the KCC contributed climatological perspective as a participant in the Southeast Drought Summit held in Nashville, TN, and jointly sponsored by the American Water Works Association and the Environmental Protection Agency.

Monitoring and Impact Assessments

The Kentucky Climate Center continued developing and building infrastructure of the Kentucky Mesonet. Six automated environmental monitoring stations are operating as of the end of February, and our station installation schedule will ramp up through the spring and summer. The Mesonet instrumentation laboratory has implemented testing and calibration procedures for all sensors used in the network. The information technology division of the Mesonet has developed a metadata database and a database for meteorological data. Project staff has worked with local NWS staff to develop a data access solution that allows Mesonet data to be displayed directly within the Advanced Weather Interactive Processing System (AWIPS). Data from the Kentucky Mesonet is freely available to the public at http://www.kymesonet.org/.

Louisiana Office of the State Climatologist

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Barry Keim, State Climatologist
Kyle Brehe, User Services Coordinator
Malcolm Moe Moreau, NWS Liason
Ricardo Noguiera, Graduate Assistant

The LOSC is located on the campus of Louisiana State University (LSU) and is housed within the Department of Geography and Anthropology.

Mission

The mission of the Louisiana Office of State Climatology (LOSC) and the LA State Climatologist is to serve as the State focal point for activities pertaining to the climate of Louisiana. Responsibilities include:

- to collect, archive, and make available climate data for the state of Louisiana
- to provide climate education and information to the citizens of the region through various outreach programs including the media
- to maintain an active research program pertaining to the climate of Louisiana and the region.

To achieve these goals, the LOSC cooperates with LSU, the National Weather Service (NWS), Southern Regional Headquarter of the NWS, the Southern Regional Climate Center (SRCC), and the National Climatic Data Center (NCDC). LSU provides the infrastructure for the LOSC, and the National Weather Service Offices maintain the quality of weather observations in the region, with climate data exchanged between the LOSC, NWS, SRCC, and the NCDC.

ARSCO Qualifications

LOSC is designated by the AASC as the official state climate office for Louisiana. Over recent years, the number of data requests describes the ways in which LOSC addresses each of the ARSCO qualifications:

Communication Capabilities

LOSC has full access to internet, email, multiple phone lines, facsimile machines, and regular mail. We maintain a website with updates of daily, weekly, and monthly summaries for the State.

Information Services

A primary role of the LOSC is to collect and archive high quality climate data for Louisiana and then make these data available to the general public, often with some interpretation or forensic application. Users of these data include researchers, attorneys,

construction companies, federal and state planning agencies, private consultants, power companies, insurance companies, teachers and students, among others. The number of requests are declining, whereby the LOSC averages around 400 data requests annually, down from between 700-900 data requests annually only 5 or more years ago. We suspect this drop is related to greater availability of data over the internet. We also maintain a list of approximately 50 subscribers that receive updated climate data monthly, which totals to ~600 additional data requests

Research

The LOSC maintains an active research agenda involving the State and region, and sometimes beyond. Over the past year, this research primarily focused on hurricane climatologies, applied climatology involving Probable Maximum Precipitation (PMP), recurrence intervals of extreme events, and human dimensions of climatic change.

Outreach

The LOSC conducts frequent interviews with radio, newspaper, and magazine media. Several hundred media contacts were logged in 2007. We cooperate and coordinate efforts closely with the NWS Offices in the region. We also remain primed and ready to work with Louisiana Office of Emergency Preparedness when needed.

Monitoring and Impact Assessments

The LOSC has taken on the responsibility of producing a weekly summary of the State's weather and climate in the form of the Louisiana Weekly Climate Review available on the LOSC website at the following URL: <www.losc.lsu.edu> . This report is also e-mailed to over 100 recipients across Louisiana, including most television weather-casters in the State, concerned State Office Officials, as well as the National Weather Service Offices that oversee Louisiana. The Office also provides a weekly summary of Louisiana Climate Data to the National Agricultural Statistics Service (NASS) that is published weekly in the Louisiana Crop Weather Summary. In addition to these weekly products, the LOSC also produces monthly summaries of the State's Climate data, which is also available on the LOSC website. The office also produces event-based summaries for significant weather events that impact Louisiana. The LOSC is also active on the ad hoc committee of the U.S. Drought Monitor

Maryland State Climatologist Office

University of Maryland
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Past Year Synopsis

Dr. Jim Carton, Department chair of Atmospheric and Oceanic Science (AOSC) has undertaken the task of re-establishing the office to active status. For the past 5 years the office has been under the care of Emily Becker (AOSC PhD student), but in September 2007 transferred responsibilities to Kathrine Collins (AOSC student). The office has been moved from old building into new wing sharing locale with the AOSC Department Library. Maryland State Climatologist Office is not state-funded and not officially established. Website is maintained by Kathrine Collins on a monthly basis, updating station data and posting new research findings to the website.

Current Activities

- Provide weather information from NCDC and other sources to Maryland users
- To maintain data archive of Maryland climatological information
- Complete renovation of Maryland State Climatologist website:
- Maryland Climate and Historical Temperature Trend Analysis Scholarly Paper by Kathrine Collins
- NEW Historical data & History of the Maryland Weather Service
- Title frame navigation
- MD Climate data page reorganized to 4 pages
- NEW Student page
- NEW Current & ACON Stations map
- NEW Javascript WeatherBug Applet on Current Weather Page

Minnesota State Climatology Office

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Jim Zandlo, State Climatologist

The Minnesota State Climatology Office (MN_SCO) exists to manage, analyze, and disseminate climate information in service to the citizens of Minnesota. The MN_SCO is funded by the State of Minnesota Department of Natural Resources - Division of Waters, and housed at the University of Minnesota - Department of Soil, Water, and Climate. This partnership was formed in 1973.

The MN_SCO assists its customers in their investigations of the climate's impact on various components of the natural environment, and on socioeconomic activities. The MN_SCO uses its climate monitoring resources to quantify weather conditions and to place these conditions within historical and geographical context. The MN_SCO also provides quantitative summaries of historical climate conditions, allowing users to make informed decisions about future activities.

In order to provide its services, the MN_SCO requires an extensive historical climate data set. The climate database managed by the MN_SCO consists of over 100 million numbers. The database features data collected by Minnesota's high spatial density precipitation monitoring program, formed in the early 1970's. This "network of networks" utilizes the efforts of water-oriented state and local agencies to assemble precipitation data from approximately 1500 observers each year. Additionally, the National Weather Service (formerly the U.S. Weather Bureau) has maintained a large scale, volunteer-based climate monitoring network in Minnesota since 1890. Other, smaller scale climate monitoring efforts extend the historical record earlier into the 19th century. The MN_SCO also archives multi-element hourly weather data gathered at Minnesota's airports.

The MN_SCO provides customers with free access to a comprehensive electronic climate database. The MN_SCO also serves its customers by offering a variety of value-added analyses of climate data in the form of narratives, maps, graphs, and tables. Customers access MN_SCO products and services via a Web site, e-mail, telephone, and office visits.

The customers of the MN_SCO are many and varied. Customers can be grouped in the following categories:

- Minnesota Department of Natural Resources (sponsoring agency)
- State, Federal, and Local Governmental Agencies
- Private Sector Professionals
- Academic Community

- General Public

ARSCO Qualifications: the MN_SCO is designated by the AASC as the official state climate office for Minnesota. The following describes the ways in which the MN_SCO addresses each of the ARSCO qualifications:

Communication Capabilities:
- full-featured web site
- fully staffed information line
- near-immediate response to e-mail inquiries

Information Services:
- Web site – the MN_SCO Web site receives visits from approximately 2000 users per day. The Web site offers users free access to nearly all of Minnesota's digitized climate data, as well as a host of value-added products such as narratives, maps, and tabular summaries.
- the Web site offers online daily data entry and data maintenance capability to volunteer precipitation observers. These near real-time data are automatically transferred to the National Weather Service North Central River Forecast Center.
- phone and e-mail – the MN_SCO answers dozens of phone calls and e-mails per week from customers with climate questions.

Research:
- in 2007, the MN_SCO conducted time-trend analyses of various environmental measures. For example, the MN_SCO evaluated daily precipitation data in an effort to discern temporal tends in the relative number of heavy rainfall events. The MN_SCO also explored techniques for identifying patterns in lake ice-out dates, both spatial and temporal. This work focused on estimating lake ice-out dates for years when data were unavailable.
- in 2007, the MN_SCO continued its collaboration in a research project titled "Impacts on Minnesota's Aquatic Resources from Climate Change". The research goal of this State of Minnesota-funded project is "to quantify climate, hydrologic, and ecological variability and trends and identify indicators of future climate."

Outreach:
- staff are commonly requested to attend multi-agency, multi-displinary meetings where a climatological perspective is required.
- staff give frequent interviews to the state's electronic and print media.

Monitoring and Impact Assessments:
- Web site offers a variety of routinely prepared summaries of weekly and monthly temperature, degree day, precipitation, and snow depth data.
- Web site offers a chronological journal of significant weather events, providing a description of the event, impacts, and historical context.
- the MN_SCO utilizes a list server to deliver a monthly electronic newsletter summarizing climate conditions observed during the previous month and the resulting impact on water resources (approximately 500 subscribers).
- The MN_SCO is in frequent communication with authors of the U.S. Drought Monitor.

Office of the Mississippi State Climatologist

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Charles Wax, State Climatologist
Michael Brown, Assistant State Climatologist

Dr. Charles L. Wax was appointed Mississippi State Climatologist upon nomination by Governor William Winter and the execution of a Memorandum of Agreement between NCDC, NWS Southern Region, and Mississippi State University dated April 21, 1983. The MOA was signed by University President James McComas and the SC Office was vested in the Department of Geosciences at Mississippi State University, where the office remains today. The SC is not funded beyond one-quarter time release from teaching in the department. The SC is involved in teaching, research, and service through the university, and has been granted ARSCO status.

The Department of Geosciences has a Climatology Laboratory with access to all NWS products as well as several vendor products such as Baron Radar, Weather Services, Inc., Genesis (Weather Central), Galileo, Digital Atmosphere, and others, all of which provide a wide base of support for the SC to use in filling the climate needs of the people of Mississippi. Additionally, some unique records resulting from research projects conducted over the years are maintained in the SC program. Full access to the South Central and Southeastern Regional Climate Centers has been granted in recent years, and has proved to be the most useful addition to the Mississippi SC program since its inception. These RCCs have made a significant difference in the level of services the SC can provide in a program like Mississippi's. This point should be emphasized strongly when the RCCs need help justifying their budgets.

Service activities of the SC this past year include the routine handling of daily requests for data or information, and provision of data analyses for more complex requests. The same sort of climate data consumers are found in Mississippi as elsewhere—lawyers, engineers, professors, researchers of all types, businessmen, housewives, farmers, teachers, students with science fair projects, and every other imaginable user. Much time is spent providing weather summaries to other government agencies upon request, but no routine publication of this sort is attempted.

Activities this past year have been heavily focused on the continuing repercussions of Hurricane Katrina and the perceptions and possible effects of climate change. The SC office has been overwhelmed with requests for information and for presentations about potentially changing weather characteristics to groups throughout the state. The SC has been cast in the unwelcome role of "expert" on climate change! The Mississippi public is also manifesting a heightened awareness of the effects of weather and climate on all types of activities, due most likely to increased media coverage of weather and climate.

Several international companies (like Toyota) have built or are considering locating plants in Mississippi, and their corporate offices have requested special information on hurricanes, insurance complications, and other severe weather events, in addition to mundane things like humidity and maximum temperatures!

The following specific outreach activities and presentations on weather and climate were conducted this year:

- Member of Mississippi Mesonet Steering Committee attempting to establish a mesonet in the state.
- "Severe Weather and Storms." Presented to MSU Women's Club, Starkville, MS, January.
- "Weather and Climate Change." Presented to Mississippi Crop College, MSU, February.
- "Global Warming." Presenter and panelist, St. Andrews Episcopal School, Jackson, MS, February.
- "Mississippi Weather and Climate Change." Presented to Scott County Conservation District, Forrest, MS, March.
- Taped interview for The Weather Channel "Weather Warriors" segment on conservation of groundwater in the catfish industry in Mississippi. March.
- "Climate and Climate Change." Presented to Oktibbeha County Federation of Democratic Women, Starkville, MS, April.
- "Weather Processes and Stability Classes in Mississippi." Shortcourse for Southern Region Foresters on Prescribed Burning, Mississippi Cooperative Extensive Service, Mississippi State University, Pearl, MS, April.
- "Mississippi Weather and Climate Change." Presented to Rotary Club, Columbus, MS, May.
- "Mississippi Weather and Climate Change." Presented to Trinity Place Retirement Center, Columbus, MS, May.
- Television interview on the summer drought. National Weather Service press conference, Tupelo, MS, June.
- Conducted a teleconference for Mississippi Cooperative Extension Service on "drought briefing" for producers during the summer drought. June.
- Attended the National Weather Service award ceremony for MSU's cooperative weather observation station's 125th year of operation. July.
- "Severe Weather, Storms, and Climate Change." Presented to Starkville Newcomers Club, Starkville, MS, September.
- "Weather Processes and Stability Classes in Mississippi." Shortcourse for Southern Region Foresters on Prescribed Burning, Mississippi Cooperative Extensive Service, Hattiesburg, MS, October.
- "Severe Weather and Storms." Presented to Rankin County Beef Producers, Brandon, MS, November.
- "Weather and Climate Change." Presented to Mississippi Cotton Producers, Starkville, MS, December.
- "Hurricanes in Mississippi." Louisville Elementary School, Louisville, MS.

- Hosted visits of dozens of school groups to the Climatology Lab.

Three invited conference presentations:

- "Changing Climate Trends and Cycles." Mississippi Association of Conservation Districts, Inc., 62nd Annual Meeting. Jackson, MS, January.
- "Severe Weather in the Southeast Region of the U.S." 2007 Southeastern Utility Pole Conference and Trade Show. Tunica, MS, February.
- "Weather and Climate in Mississippi: Are They Changing?" Mississippi Vegetation Managers Association. Jackson, MS, November.

Research activities this past year included investigating the effects of a management plan to conserve groundwater use in aquaculture in the southern region, effects of physiographic regions on weather in the state, development of a dynamic fire risk model for the southeast, and development of a simple method to estimate daily evaporation at inland and coastal locations. New funded research included the climatological suitability for growing bio-fuels in Mississippi and the physical and human impacts on water resources from the shallow alluvial aquifer of the Mississippi Delta region. An article has also been submitted on climatically controlled disposal of large hog farm wastewater in Mississippi to the new AASC Journal of Service Climatology! Publications resulting from research activities are listed below:

2007. C.L. Wax. "Severe Weather in the Southeast Region of the U.S." In, Proceedings, 2007 Southeastern Utility Pole Conference and Trade Show. Tunica, MS.

2007. Cooke, W., V. Anantharaj, C. Wax, J. Choi, K. Grala, and M. Jolly. "Integrating Climatic and Fuels Information into National Fire Risk Decision Support Tools." In Butler, B.W., Proceedings: The Fire Environment—Inovations, Management, and Policy. USDA Forest Service, Rocky Mountain Research Station-P-46. http://www.fs.fed.us/rm/pubs/rmrs_p046/rmrs_p046_555_569.pdf

2007. T.P. Cathcart, C.L. Wax, J.W. Pote and Sugeng Triyono. "A Climatological Basis for Conserving Groundwater and Reducing Overflow in Aquaculture Ponds in the Southeast United States." Aquacultural Engineering, 36: 225-232.

2007. Brown, M.E. and C.L. Wax. "Temperature as an Indicator of the Influence of Landforms on Atmospheric Processes." Physical Geography, 28(2): 148-157.

In press. Cooke, W.H., K. Grala and C.L. Wax. "A Method for Regional Estimates of Evaporation for Use in GIS-Based Dynamic Forest Fire Risk Models." Southeastern Geographer.

In Press. C.L. Wax. "Mississippi's Climate," In Mississippi Encyclopedia. Center for the study of Southern Culture, University of Mississippi Press, University, MS.

Submitted. C.L. Wax, J.W. Pote and M.E. Brown. "Integrating the Natural Climate Regime Into Management Plans for Swine Wastewater Lagoons." Journal of Service Climatology.

Submitted. C.L. Wax. "April 2007 Hard Freeze in Mississippi." Technical Bulletin, NOAA/USDA.

In summary, the enormous effects of Hurricane Katrina and the global warming scare continue to have a big impact on the SC's operations. The Mississippi SC has a small program, but a viable one that is fairly well-known in the state. It is recognized by a growing number of concerns, both public and private, as a source of weather and climate information. The level of support provided by the state for the SC activities is not nearly commensurate with the output of the program, and it must be realized this level of activity is heavily dependent upon support from the Department of Geosciences at Mississippi State University.

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ARSCO Qualifications: The Missouri Climate Center (MCC) is designated by the AASC as the official state climate office for Missouri. The following describes the ways in which MCC addresses each of the ARSCO qualifications:

Communication Capabilities:

- The MCC web site provides easy access to weather and climate information including links to specialized web sites for real-time and historical weather in Missouri. Additionally, a drought and agricultural weather web site exists for the citizens of Missouri;
- An agricultural weather forecast is developed every morning and e-mailed to all the county extension offices in Missouri;
- Over 4000 lines of data arrays are collected daily from a network of 27 automated weather stations. The daily and hourly arrays are posted on a server for free access.
- The Meteorological Assimilation Data Ingest System (MADIS) incorporates 5-minute weather conditions from 14 real-time weather stations in Missouri associated with the Commercial Agriculture Automated Weather Station network.
- Submitted Missouri climate information thru the AASC web site.
- Recruited more than 100 new volunteers for Missouri CoCoRaHS
- Continued development and recruitment for an e-mail delivery agricultural weather product called Horizon Point. Horizon Point is a custom weather analysis system for farmers and provides an opportunity to have specific weather reports sent directly to their e-mail address. Currently over 400 Missouri agricultural producers and agents are enrolled. New Horizon Point products added in 2007 include:
  - -Weed scouting advisories
  - -Grain bin drying forecasts
  - -Additional insect advisories
  - -Livestock stress forecast

Information Services:

- Submitted numerous press releases and updates to the Extension news service related to weather, climate and the environment;

- Serve as an information source for the media including national, state, and local mediums;
- Provide impending or continuing drought status reports for Missouri to the National Drought Mitigation Center;
- Fulfilled hundreds of requests for climate information and provided climatological expertise to numerous individuals, groups and agencies;
- Submit weather and soil information published in a national bulletin **Weekly Weather and Crop Bulletin:** http://www.usda.gov/oce/waob/jawf/wwcb.html;
- Run the black cutworm forecasting program over the internet for public utility: http://agebb.missouri.edu/weather/reports/bcwforecast.htm;
- Run the rice model program to predict rice growth stages: http://agebb.missouri.edu/rice/ricemodel.htm;
- Provide a weekly climate summary table for the **Integrated Pest and Crop Management** Newsletter: http://ipm.missouri.edu/ipcm/ ;
- Provide a 2-inch and 6-inch soil temperature table for the Agricultural Electronic Bulletin Board (AgEBB): http://agebb.missouri.edu/weather/reports/soilTemp2.asp
- http://agebb.missouri.edu/weather/reports/soysoil6.asp;
- Brought one weather station online real-time: http://agebb.missouri.edu/weather/stations/ ;
- Real-time weather data from automated network is made available to local NWS offices;
- Campus weather station linked to main MU web site: http://www.missouri.edu/ ;
- Campus weather station linked to College of Ag web site: http://cafnr.missouri.edu/
- The real-time stations are providing 5-minute weather conditions to the Meteorological Assimilation Data Ingest System (MADIS);
- Writing a monthly weather column for the **Missouri Ruralist** publication, circa: 30,000;
- Participate in a weekly radio show on KMIZ, Carrollton, MO, featuring Ag Weather.

Research:

- Weather and climate monitoring at Ozark National Scenic Riverways in the context of watershed control;
- Assessing the decline of paper birch stands in the Niobrara River, NE through the interaction of weather, microclimate and genetics;
- Providing real-time weather status to 14 weather stations in the Commercial Agriculture Automated Weather Station Network for Integrated Pest Management;
- Provide climate data for graduate students and faculty research projects
- Refereed journal article: Temperatures and Cold Damage to Small Fruit Crops Across the Eastern U.S. Associated with the April 2007 Freeze. Michele Warmund, P. Guinan, G. Fernandez. HortScience, in press. 2008.

- Contributor to NOAA's Technical Report: An Assessment of the 4-10 April 2007 Freeze Event: Scope, Impacts, and Services. National Climatic Data Center, in press. 57 pp.
- Journal article: The Presentation of Precipitation Information in Television Broadcasts: What is Typical? Lupo, A.R., T. Hagen, J. Glisan, E. Aldrich, P. Guinan, P. Market. National Weather Digest, in press. 2007.

Outreach: Education, Awareness, and Contact Activities

- Instructor for People, Plants, and Environment. Reid Smeda and Mary Ann Gowdy, Instructors. University of Missouri, Columbia. Topic: Global and Regional Climate;
- Instructor for Allen Thompson's Ag Systems Management class. Topic: Automated Weather Application for Irrigation Scheduling;
- Instructor for Crop Physiology class. Instructor: Will McClain;
    - Topic: Missouri Weather Patterns, Drought Frequency, and Historical Trends;
- Instructor for Peter Motavalli's Soils and Environment class. Sanborn Field tour and applicability of automated weather stations;
- Participated as a judge panelist in Tony Lupo's Climates of the World class. Topic: Climate Change;
- Weather presentation to numerous field days across the state;
- Agricultural weather presentation associated with MU's Winter Crop Conferences in Maryville, Sedalia, and Wentzville, MO;
- Weather presentation at the MU Viticulture and Enology Institute's workshop titled: Understanding and Preventing Freeze Damage in Vineyards;
- Weather presentation at the Missouri Ag Extension Professionals meeting;
- Lightning, Tornadoes and other Disasters presentation for high school students at the State 4-H congress;
- Automated weather station presentation for special needs children and adults-a Kiwanis Club sponsored meeting;
- Weather resource presentation at the Master Gardeners Spring Gardening workshop;
- Climate Change presentation at the Missouri Society for Conservation Biology Workshop;
- Automated Weather station tour for extension staff participating in the Council to Campus Workshop;
- Missouri Climate presentation to the Master Naturalists group in Blue Springs;
- Ag Weather session at MU's Annual Crop Management Conference;
- Weather updates for MU Exntension Quarterly Ag-Marketing Teleconferences;
- Weather updates for weekly for MU's Integrated Pest Management and Horticulture Teleconferences (April-August);
- State Co-Coordinator of the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) in Missouri and conducted training sessions;
- Member of the Missouri Drought Assessment Committee;
- Member of the Plant Protection Programs steering committee;
- Member of the North Central 1018 Regional Climate Committee, Impact of

Climate and Soils on Crop Selection and Management;
- Member of NOAA grant review committee
- Contributor to a book written by Becky Homan and published in May 2008: The Missouri Gardener's Companion: An Insider's Guide to Gardening in the Show Me State. 176 pp.
- Information resource for the following media outlets: Missouri Net, Brownfield Network, Cooperative Video Group, and numerous local television, radio, and newspaper outlets across the state.

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Dr. Jeffrey Underwood, Nevada State Climatologist & Assistant Professor

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The Nevada State Climate Office (NVSCO) is located in Reno, Nevada on the Campus of the University of Nevada. The Office operates as part of the Department of Geography at the University.

Accomplishments:
During academic year 2007-2008 the NVSCO completed a project which included the production of a hazardous weather climatology for the state of Nevada. This project was funded by FEMA and the Nevada Division of Emergency Management. The climatology was included in the 2008 Nevada Hazard Mitigation Plan that was recently approved by FEMA. This is the first time that Nevada has included a detailed climatology in the Hazard Mitigation Plan. The approved plan will allow additional federal mitigation funds to flow to the state of Nevada and to the NVSCO. State Climatologist Jeffrey Underwood also serves on the Nevada Hazard Mitigation Planning Subcommittee (the oversight body for hazard mitigation in Nevada).

The NVSCO sponsored two interns for the academic year 2007-2008. These interns created a number on new products for the climate office including an Arc-IMS (GIS) interface that links users to the weather hazards data base created as part of the hazard mitigation planning process.

Personnel in the NVSCO produced a number peer-reviewed publication over the past year. Additionally two former assistants in the NVSCO completed their M.S. degrees during the past year. These individuals are: David Walker and Cassandra Hansen. Ms. Hansen will continue her affiliation with the NVSCO as she pursues a Ph.D. under the direction of State Climatologist Jeffrey Underwood.

The NVSCO is involved in research across the state of Nevada. Office personnel are currently conducting NSF funded research to determine the impact of urbanization on the convective climate of the Las Vegas Valley. Personnel are also cooperating with a BLM funded study of wildfire ignitions in the Great Basin. Additionally, the NVSCO is involved (State Climatologist is co-PI) in a 1.5 million dollar NASA-EPSCoR proposal to study the monsoon climatology of the southwestern US and the Great Basin.

The most exciting news concerning the NVSCO is the recently announced expansion of the office. As of July 2008 the NVSCO will be expanding operations and with this

expansion will hire an Assistant State Climatologist. The hiring notice will be posted by August 2008 and the hire will be made in the fall-winter of 2008. There will be a national search for this position. The pay and benefits will be competitive for applicants at the M.S. level. This hire will allow the NVSCO to expand operations and outreach. Interested parties can contact the NVSCO at the address above.

Office of the New Jersey State Climatologist

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Founded in 1979, the Office of the New Jersey State Climatologist (ONJSC) resides within the Rutgers University Center for Environmental Prediction. Our mission is to monitor and understand the diverse weather and climate conditions experienced across the Garden State on various temporal and spatial scales. Included are efforts to inform and educate, thus making the 8.5 million residents of this most densely populated state weather and climate aware.

The ONJSC operates the New Jersey Weather and Climate Network, or NJWxNet. This unique network of over 175 weather stations <http://climate.rutgers.edu/njwxnet> serves as a one-stop Internet resource for New Jersey weather and climate data. The NJ WxNet is a network of networks, including, among others, NJ Dept. Transportation RWIS, NWS ASOS, South Jersey Resource Conservation and Development Council RISE, NOAA IFLOWS, USGS stations and two networks operated by the ONJSC. Stations operated by ONJSC include 15 NJ Mesonet sites, monitoring a rich suite of atmospheric and surface variables, and 25 NJ SafetyNet stations, monitoring a subset of important variables primarily at public safety agencies. Hourly observations are collected and displayed in real time as colorful maps and tables on the NJWxNet web site. This past year marked a major upgrade of the web site, the addition of the IFLOWS and RISE networks, Mesonet upgrades and renewed support from the NJDEP, US Forest Service and NJ Office of Emergency Management.

New Jersey also joined the ranks of Community Collaborative Rain, Hail and Snow Network states on February 2. The first three months of operation saw 125 volunteers sign on. In addition to the NJ WxNet and NJ CoCoRaHS, the ONJSC maintains a comprehensive archive of historical data, metadata and climatologies from National Weather Service primary and cooperative stations. This is supplemented with data submitted by ONJSC volunteer observers. This information is manually processed and displayed in event, weekly and monthly maps and tables.

Research endeavors within the ONJSC range from student projects on topics such as regional heat islands and snow climatologies to collaborative efforts with Rutgers colleagues and state and federal agencies. Examples of ONJSC outreach activities include participation in the Liberty Science Center teacher training program, the creation of online weather training materials for NJ public safety officials, and a wealth of interviews and presentations. Over 200 media interviews were given 2007, indicative of a rather tranquil year, devoid of a lengthy drought, a tropical storm threat or major snow event.

ARSCO Qualifications: The ONJSC is an American Association of State Climatologists (AASC) Recognized State Climate Office (ARSCO). As such, the office fulfills a number of qualifications outlined below.

Communication capabilities
- Ingest, process, archive and disseminate historic and real time climate data.
- Maintain numerous web sites related to the ONJSC mission <http://climate.rutgers.edu/stateclim>.

Information Services
- More than 500 specific requests for data and products each year.
- More than 500 unique visits to ONJSC web sites each day.
- Weekly and monthly climate summaries in map and tubular form.

Research
- Collaborate with Rutgers colleagues, as well as state and federal agencies on projects associated with issues such as forest fire management, pest management, agriculture, transportation, water resources, public safety, homeland security.
- Student research on topics such as urban heat islands, state snow cover variability, ocean influences on state weather and climate.

Outreach
- Average approximately 300 media interviews each year.
- Presentations to schools, civic organizations, Liberty Science Center, etc.
- Conference presentations to the NJ Emergency Preparedness Conference, the NJ Earth Science Teachers Association, the NJ Farm Bureau, the NJ chapter of the American Water Works Association, local nature and many others.
- The NJ State Climatologist is a member of the NOAA Climate Working Group, the NWS StormReady Community Program advisory board, the NOAA Integrated Surface Observing System ad hoc advisory committee, and recently completed a stint on the AMS Applied Climatology Committee. He also just finished chairing the National Research Council Committee on Archiving and Accessing Environmental and Geospatial Data at NOAA

Monitoring and impact assessment
- Operation of the NJWxNet. <http://climate.rutgers.edu/njwxnet>

- State operation of NJ CoCoRaHS
- Web site updates for significant winter events.
- The NJ State Climatologist is a member of the NJ Drought advisory committee.
- Statewide climate variability and change is being assessed through the NJ Climate Report Card project.
- <http://climate.rutgers.edu/stateclim_v1/climreportcard/climate_report_card.html>

New Mexico Climate Center

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General Information

The New Mexico Climate Center (NMCC) resides within the Department of Plant and Environmental Sciences of the Agricultural Experiment Station at New Mexico State University (NMSU) in Las Cruces, New Mexico. The climate center is comprised of two faculty positions, a full-time staff position, and an undergraduate student assistant. By law, the duties of the NMCC are to (1) assess the effect of climate on the natural environment, agricultural production, land and natural resources and human health, (2) coordinate climate impact studies and programs, (3) consult and coordinate with the federal and state agencies government in climate related activities, and (4) disseminate climate data, information, advice and assessments to state and local agencies and the general public.

Information Services

The NMCC collects, archives, and disseminates climate data from official U.S. government and private observing stations throughout New Mexico. Additionally, the NMCC maintains a network of 16 automated weather stations throughout the state that are used primarily for agricultural purposes. In all, daily data from approximately 136 sites is collected, processed, and distributed via the NMCC website (http://weather.nmsu.edu/). In 2007, the NMCC website had an estimated one million page hits for climate information and data. Requests were also answered by phone and email. In addition, the New Mexico Climate Center provides a variety of web based tools for decision support in the areas of agriculture, hydrology, construction, health and economic development. In 2006, the NMCC began the development of a new web page to improve both its usefulness and usability (http://nmcc.nmsu.edu/web/). This work continues to present with the, the new system deploying a new web interface, data access tools, and posting of drought information and Cocorahs rainfall data.

Research

Research activities in 2007 consisted primarily of applied research in which climatic information was used for studies involving crop improvement and irrigation/water management. NMCC staff members worked collaboratively with the NMSU Water Task Force, other university researchers, and local stakeholders on the Rio Grande Basin Initiative, a joint Texas A & M University and NMSU effort aimed at improving water conservation through research and education of irrigation efficiency.

The Jose Fernandez Chair in Field Crop Production awarded to Dr. Sammis continued to provided undergraduate students with real world experience in agricultural meteorology with the student gaining information on climate data acquisition and management Students in an introductory horticulture class for the second year in a row built hoop-shaped green houses and learned how to use data loggers and instruments to measure temperature, humidity and soil moisture inside and outside the structures. In addition research results on water use studies of pecans (Wang et al. 2007a, Wang et al. 2007b, Simmons et al 2007) using eddy covariance meteorological measurements was published. Studies on measuring and simulating local dust dispersion from field agriculture operations using meteorological and LIDAR instrumentation were presented at three professional meetings.

Outreach

In 2007, the state climate office actively participated in the Drought Monitoring Workgroup of the New Mexico Drought Task Force. The Assistant State Climatologist generated 8 drought status reports for New Mexico drought conditions through out the year. (http://nmcc.nmsu.edu/web/drought/) The New Mexico Climate Center also continued to work in cooperation with the Colorado Climate Center on the Community Collaborative Rain, Hail and Snow Network (DeMouche et al. 2007). The New Mexico Climate Center started a new web site on climate risk in conjunction with CLIMAS (http://nmclimate.nmsu.edu/ClimateToolsDoc.html)

Goals for 2008

Plans for 2008 include the continued development of our web resources including implementing a mapping protocol for displaying the entire climate data that is collect by the center. The NMCC will be working with the Climate Assessment of the Southwest (CLIMAS) program at the University of Arizona to continue developing and evaluating web resources, to maintain and build stakeholder relationships, and to improve drought monitoring and impact reporting capabilities. The center is also implementing new communication methods with the data loggers that will include meteor burst and wireless internet communication. Documentation of the communication system and the quality control currently used on the climate data will be placed on the web site.

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The State Climate Office of North Carolina is a public service center for climate-environment interactions at NC State University. It serves the State of North Carolina as the American Association of State Climatologists Recognized State Climate Office (ARSCO) for North Carolina. Its public service mission includes extension, research, and educational components. Highlights of activities and efforts during 2007 in support of the center's mission include:

- Continued public outreach through improved Internet resources, decision support applications, and enhancement of the NC ECONet.
- Providing numerous vital information and services related to weather and climate of NC to several state and federal agencies and the private citizens. This covers a wide variety of weather and climate related problems that the state has faced in the recent past and the ones it could experience in future, including hurricanes, floods, drought, air quality challenges.
- External support from NC DENR Division of Water Resources, NC DENR Division of Air Quality, and NC Department of Transportation, and NOAA.
- Public education on drought – the 2007 drought in NC was the worst on record, and created challenges for agriculture and water supply management.

Extension Services

- SCO web site continues to be a leading source of climate information for NC. The web site was renovated in 2007 to improve navigation, information access, and user feedback. The SCO website is averaging over 10,500 unique visitors and 670,000 hits each month, an increase of more than 10% since last year.
- NC CRONOS database allows access to real-time and recent historical observations of hourly, daily, and monthly weather and climate data. Users with SCO accounts (including state agencies and University faculty) have access to the complete database. Other enhancements include:
  - Enhanced quality control of all automated observations
  - Addition of CoCoRaHS observations

- NC ECONet continues to expand and improve the quality of environmental observations. There are now 30 stations in this network, including new stations installed and maintained with other University partners. Five more stations are planned for 2008.
- Automated fungicide spray advisories for peanut growers (based on previous research effort with Dr. Barbara Shew, NCSU Plant Pathology).
- Automated turfgrass irrigation advisories for urban areas in collaboration with Turf scientists at NCSU Crop Science.
- SCO provided hundreds of hours of service to federal, state, and local government agencies. These agencies included NC Department of Transportation, US Environmental Protection Agency, NC Division of Air Quality, NC Division of Water Quality, NC Division of Water Resources, NC Division of Forest Resources, NC Division of Emergency Management, NC Department of Justice, NC Department of Agriculture and Consumer Services, US Geological Survey, NC Flood Warning Program, NC Flood Mapping Program, US Army Corps of Engineers, and county economic development agencies.

Educational Outreach

- Hosted ten undergraduates, each with individual projects.
- More than 250 contact hours of direct outreach to school and community groups.
- Lead the launch of CoCoRaHS in North Carolina along with partners from 6 NWS offices that serve NC. As of April 2008 there are 463 registered CoCoRaHS observers in NC.
- Four 7th grade students participated in a year-long intern program which involved group projects consisting of data collection, analysis, and hypothesis testing.

Research

- SCO collaborated with researchers at Appalachian State University, the University of North Carolina at Asheville, the University of North Carolina at Chapel Hill, and NC State University on various research projects and applications, including:
    - Winter weather in the southern Appalachian Mountain
    - Evaluation of real-time numerical weather prediction
    - Evaluation of peanut disease guidance
    - Impact of surface data assimilation to severe weather forecasts
    - Precipitation climatology of the southern Appalachian Mountains
    - Impacts of sea breeze circulations to regional precipitation

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Adnan Akyüz, State Climatologist

About the North Dakota State Climate Office

Weather affects our daily lives in many ways. Climate information is essential to every citizen of the state of North Dakota. The North Dakota State Climate Office (NDSCO) is part of the Department of Soil Science, in the College of Agriculture, Food Systems, and Natural Resources of the North Dakota State University. The State Climate Office is in a position to provide linkages and to serve as liaison between the users of weather and climate information in the state of North Dakota and the national and regional climate centers such as National Climatic Data Center (NCDC), National Weather Service (NWS), and High Plains Regional Climate Center (HPRCC).

Mission Statement: The mission of the North Dakota State Climate Office is to advance the use of climate information for the economic and environmental benefit of North Dakota and the public safety of its citizens, through climate monitoring, research, education, and extension and information services.

Objectives: The North Dakota State Climate Office has defined its objectives based on a 3-pillar system: Research, Education and Outreach.

Research

- Conduct applied climate research on issues of importance to North Dakota, the high plains, and the nation.
- Study North Dakota's climate and its interaction with the environment
- Analyze and identify climatic averages, extreme events such as storms, freezes, droughts and floods for various stations, climate divisions and the entire state.
- Promote interdisciplinary research of climate and natural resources in collaboration with other departments in the School of Natural Resources and with the North Dakota Field Station, a research and monitoring unit of the U.S. Geological Survey which is housed in the Department of Soil and Atmospheric Sciences.
- Publish research results in journals, the State Climate Office's World Wide Web page, and the media.

Education

- Offer undergraduate and graduate courses refining the "**Atmospheric Science**" in North Dakota State University.

- Interact with K-12, community colleges teachers and students, and with other community organizations on different aspects of North Dakota climate.
- Provide high-quality database for use in classroom activities.
- Facilitate graduate student research in the college on aspects of North Dakota weather and climate.

Outreach

- Establish an effective climate information service program to provide two-way communication between the State Climate Office and the information-end-user.
- Provide information and analysis of ongoing climate events and interact with local, state and national officials, and media as conditions warrant.
- Assist local, state and national agencies in climate-environment interaction issues such as Drought Response/Mitigation Plan and related application.
- Interact with other scientists by integrating climate information into applications such as agricultural and environmental models.
- Increase public awareness of variations in North Dakota climate and environment.

ARSCO Qualifications: NDSCO has been recognition by the AASC as the official state climate office for North Dakota since March 2007. NDSCO also enjoys the support from local National Weather Service Forecast office in Fargo-Grand Forks, High Plains Regional Climate Center and holds a Memorandum of Agreement between NCDC and the State Representative. In addition, the following describes the ways in which NDSCO addresses each of the ARSCO qualifications:

Communication Capabilities: The State Climate Office operates a state of the art Automated Environmental Weather Monitoring Network called The North Dakota Agricultural Weather Network (NDAWN) which consists of 70 stations distributed across North Dakota, the Red River Valley, and border regions of surrounding states. Through careful site selection it is assumed each station adequately represents all weather conditions except rainfall, in a 20-mile (32 km) radius area.

Stations provide hourly averages or totals for all variables and hourly maximum wind speed plus daily summaries consisting of maximum and minimum air temperature, maximum wind speed, times of occurrence, and various totals or averages for all other variables in English or metric units. Measured and calculated variables and more complete descriptions of each may be found in the site description and archived data areas.

Data are retrieved via telephone modem shortly after midnight each day. A computer program identifies missing or erroneous values which are replaced by estimates calculated from data at surrounding stations. Following this initial quality control (QC) data are loaded into the NDAWN data base and made available to the general public via the NDAWN web site free of charge. Every Monday thru Friday morning, except holidays, data from all stations are visually compared in order to identify suspicious or erroneous data that the computer program cannot detect. In addition, weekly and monthly average data are similarly compared to identify possible calibration or other problems.

Information Services: The North Dakota State Climate Office oversees the operation of the NDAWN Center. The access information to NDAWN Center and the services are listed below:

- North Dakota Agricultural Weather (NDAWN):
- http://ndawn.ndsu.nodak.edu/
- NDAWN Weather Data
    - Tables and Maps (Hourly, Daily, Weekly, Monthly, Annually, Normals, Departure from Normals)
        - http://ndawn.ndsu.nodak.edu/hourly-table-form.html
- NDAWN Agricultural Applications
    - Barley, Canola, Corn, Potato, Sugar beet, Sunflower, Wheat, Small Grains, Crop Water Use, Insect Development, Degree day for the energy use.
        - http://ndawn.ndsu.nodak.edu/applications.html
- Answers e-mails requesting climate information or asking climate related questions frequently.
- Regularly answers to telephone requests
- Frequent media contacts

2007 Activities pertaining to the Goals stated above:

Refereed papers published:

- Lupo, A. R., E. P. Kelsey, K. Derrick, I. Mokhov, F. A. Akyüz, J. Woolard, 2007: Interannual and Interdecadal Variability in the Predominant Pacific Region SST Anomaly Patterns and Their Impact on Climate in the mid-Mississippi Valley Region. Atmosfera 20(2), 171-196 (2007).

Non-refereed Extension and Popular publications:

- Akyuz, F. A., B. A. Mullins, 2007: 2007 Growing Season Weather Summary for North Dakota. Crop Production Guide 2008. NDSU Extension Service, AES. No.18, 368-372.
- Akyuz, F. A., B. A. Mullins, 2007: Winter 2007 North Dakota Climate Bulletin. Electronic Publication. (http://www.ndsu.nodak.edu/ndsu/ndsco/Reports/b2007/winter07.pdf)
- Akyuz, F. A., B. A. Mullins, 2007: Spring 2007 North Dakota Climate Bulletin. Electronic Publication. (http://www.ndsu.nodak.edu/ndsu/ndsco/Reports/b2007/spring07.pdf)
- Akyuz, F. A., B. A. Mullins, 2007: Summer 2007 North Dakota Climate Bulletin. Electronic Publication. (http://www.ndsu.nodak.edu/ndsu/ndsco/Reports/b2007/summer07.pdf)
- Akyuz, F. A., B. A. Mullins, 2007: Fall 2007 North Dakota Climate Bulletin. Electronic Publication. (http://www.ndsu.nodak.edu/ndsu/ndsco/Reports/b2007/fall07.pdf)

Invited Presentations:

- **"North Dakota Agricultural Weather Network and its Agricultural Applications":** Irrigation Workshop. December 19, 2007. Williston, ND.

- **"North Dakota Agricultural Weather Network and its Agricultural Applications":** Irrigation Workshop. December 6, 2007. Bismarck, ND.
- **"Climate Forecasting":** Natural Resources Management Seminar. December 3, 2007. Fargo, ND.
- **"North Dakota Precipitation Observation Capabilities":** Precipitation Working Group Workshop. November 19, 2007. Moorhead, MN.
- **"North Dakota State Climate Office and the NDAWN Center":** Atmospheric Science Seminar. University of North Dakota. August 23, 2007. Grand Forks, ND.
- **"North Dakota Drought Assessment":** The 7th Annual Legislators Forum. July 25-27, 2007. Pierre, SD.
- **"North Dakota State Climate Office and the NDAWN Center":** American Association of State Climatologists Annual Meeting. July 16-19, 2007. Coeur D'Alene, ID.
- **"North Dakota Tornadoes":** ND Science and Engineering Fair. March 29, 2007. Fargo, ND.
- **"Climate Forecast Made Easy":** Soil Science Seminar. March 28, 2007. Fargo, ND.
- **"NDAWN Center":** North Dakota Association of Extension Agents Spring Meeting. March 27, 2007. Fargo, ND.
- **"Assessment of 2006 climate for ND and 2007 Growing Season Forecast":** Advanced Crop Advisors' Workshop. February 22, 2007. Fargo, ND.
- **"Assessment of 2006 climate for ND and 2007 Growing Season Forecast":** Winter Agronomic Seminar. February 20, 2007. Fargo ND.

Programs planned solely or jointly NDSCO

- National Data Stewardship Meeting. June12/13, 2007. Fargo
- National Drought Mitigation Workshop. October 22, 2007, Bismarck

- List of radio and TV presentations and spots made:
- **NCDC says it is the 10th Warmest Year since 1885. How about ND?":** In-Forum. December 12, 2007.
- **"Snow Assessment, Drought and Spring Forecast":** KFGO Radio. December 7, 2007.
- **"December Snowfall. Is it going to be another 1997 for the Red River Valley?":** Local CBS and NBC TVs, Fargo. December 5, 2007.
- **"Winter Weather Forecast for ND":** Farm and Ranch Guide. November 11, 2007.
- **"Climate Change impacts on Frost Free Days in ND":** Grand Forks Herald. October 16, 2007.
- **"NDAWN Real time Weather Information for Langdon":** KNDK Radio in Langdon. October 9, 2007.
- **"Is the Drought Over":** Ag-Week. June 25, 2007.
- **"Drought Status in ND"** The Farm and Ranch Guide. June 22, 2007.
- **"1957 Fargo Tornado":** In-Forum. June 20, 2007.
- **"Drought":** KFYR Radio, Bismarck. June 19, 2007.

- **"Drought":** Prairie Public TV, Bismarck. June 18, 2007.
- **"Precipitation Deficits in ND":** Grand Forks Herald. June 7, 2007.
- **"The 1957 Fargo Tornado":** In-Forum, Fargo. May 30, 2007.
- **"The 1957 Fargo Tornado":** In-Forum, Fargo. May 21, 2007.
- **"The North Dakota State Climatologist--A Personal Profile":** Ag-Week. April 4, 2007.
- **"The Drought and the Flood. Can they Occur at the Same Time?":** In-Forum. March 30, 2007.
- **"Akyüz Teaching Show--A Personal Profile":** Prairie Public Television, Fargo. March 29, 2007.
- **"Drought or No-drought":** WDAY (ABC-Fargo). March 27, 2007.
- **"Drought Monitor and Drought Outlook":** Bismarck Tribune. February 28, 2007.
- **"Global Warming":** KVLY (NBC-Fargo) TV. February 28, 2007.
- **"IPCC Report on Global Warming":** Prairie Public Radio. February 2, 2007.
- **"Global Climate Change":** KVLY (NBC-Fargo) TV. January 31, 2007.

Oklahoma Climatological Survey

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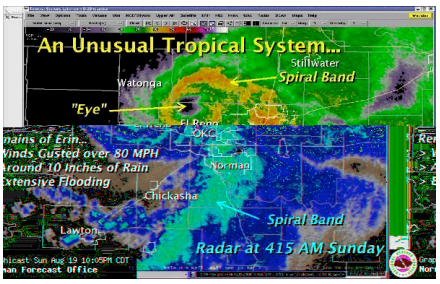
Dr. Ken Crawford, Director and State Climatologist
Dr. Mark Shafer, Director of Climate Services
Derek Arndt, Associate State Climatologist
Gary McManus, Assistant State Climatologist

About OCS

The Oklahoma Climatological Survey was established in 1980 to provide climatological services to the people of Oklahoma, conduct research on the impacts of climate on human activities, and serve as a support facility for the State Climatologist. OCS has a legislative mandate to acquire, process, and disseminate climate and weather data and information for use by the state's citizens. The Survey maintains an extensive array of climatological information, operates the Oklahoma Mesonet, and hosts a wide variety of educational outreach and scientific research projects. OCS, a research unit of the College of Atmospheric & Geographic Sciences at the University of Oklahoma, employs 34 full-time staff and 15 part-time or student employees.

The extended, severe drought of 2005-2006 gave way to floods in 2007. Reservoirs that had been near record lows quickly rose beyond capacity as record-setting rainfall fell across Oklahoma during the spring and summer. Three ice storms and four separate flooding events led to seven presidential disaster declarations and two emergency funding requests, setting a new national record for the most disasters to affect any state in a single year. OCS provided frequent assessments and context on these, including providing detailed assessments to FEMA and Oklahoma Emergency Management in support of several flooding episodes.



Perhaps the most unique meteorological phenomenon observed in Oklahoma's history occurred on August 18-19, 2007, as the remains of Tropical Storm Erin re-developed over central Oklahoma. During the overnight hours, TS Erin's circulation intensified, forming a new eye, recording sustained wind speeds over 40 mph for several hours and severe winds continuously for two hours, peaking as high as 70 mph. Central pressures dropped to the lowest recorded at any point in its life cycle, including the portion over the Gulf of Mexico. A CoCoRaHS observer reported more than 11 inches of rainfall was recorded in a 5-hour period.

In response to an increasing interest in climate change, OCS climatologists accelerated their examinations into climate variability and change across Oklahoma, with an emphasis on aiding state and local decision-makers with their questions on how a changing climate may impact Oklahomans. The findings were summarized in a Statement on Climate Change, published on the OCS website (http://climate.ok.gov) and distributed to state officials.

Notable staff accomplishments included Ken Crawford being elected AMS Councilor and receiving an Oklahoma Water Pioneer from the state's Water Resources Board. Roberta Chance, a teacher associated with OCS' EarthStorm program, received the National Weather Association's Public Service Award.

Information Services

OCS served 125 million files of data and products to our customers in 2007. On our web servers alone, we served 6.7 Terabytes of information from 841 million hits to our web pages. We also fulfilled 216 detailed information requests from phone or e-mail – a 58% increase from 2006. OCS was referenced in more than 100 articles in the state's major newspapers.

A significant upgrade to our weather display software, WeatherScope, resulted in renovation of many of our decision-support web sites, including the OK-First site dedicated to Oklahoma's public safety officials. The upgrade allows us to consolidate our code base and rely on more modern graphics technologies, such as OpenGL. Now our desktop application and our web browser plugin are merged into a single piece of software.

The systems administrators conducted a system audit, which led to improved performance of webpages, data processing, and file production. Major efforts were undertaken to convert older programs to a new code base and incorporate forecast data into several agricultural models. New products and websites were developed for the OK-FIRE program for fire management and the Simple Irrigation Plan (sip.mesonet.org) for urban irrigation management.

OCS introduced new products, including "climate trends" graphs for all states, national drought tables, and freeze duration maps. We also provided information for the Oklahoma Wheat Commission in response to a late freeze episode. That information was subsequently included in a national post-event assessment led by the National Weather Service.

Outreach

OCS hosted 18 K-12 programs, providing education to 731 students and teachers, and conducted 18 OK-First workshops, educating 200 public safety officials. OCS now supports over 450 public safety officials, representing 215 agencies, with their weather-related decisions. Our *WeatherWise* series was distributed to 900 Oklahoma schools, representing 189,584 individual newspapers.

OCS staff provided more than 30 presentations at events across the state. ScienceFest at the Oklahoma City Zoo drew nearly 4,000 4th and 5th grade students and another 2,000 members of the public attended WeatherFest at the National Weather Center. Topics included Oklahoma's hazards and history, the Dust Bowl, climate change, interpretation of weather radar, weather basics, road weather, scientific communication, science in the classroom, severe weather preparedness, and climate services. Presentations at many national professional meetings were also given.

OCS collaborated with North Carolina State University and the Renaissance Computing Institute (RENCI) to replicate OK-First in the state of North Carolina. Efforts included exchange visits with RENCI staff to teach them about our system and help them build support within North Carolina for theirs. NC-First includes a workshop, a decision-support system, and collaboration with Working Coordination Meteorologists from the area National Weather Service Forecast Offices.

OCS partnered with the state Insurance Department to host another Climate and Loss Mitigation Conference, which drew nearly 100 insurance agents and adjusters.

Research

Research and development efforts continued on the Clarus Project, sponsored by the Federal Highway Administration in support of their smart highways initiative, and ongoing work with the Ministry of Natural Resources of the Province of Quebec. With the conclusion of the NERON grant, we completed technical documentation, provided training and support to National Weather Service officials and their contract personnel, and transitioned our prototype system to the NWS contractor.

OCS partnered with Weather Decision Technologies, Inc., to provide decision-support using OCS's software for customers in Dubai, UAE. OCS assisted scientists from Italy in the Cloud and Land Surface Interaction Campaign (CLASIC) and hosted two students from the Institut Universitaire de Technologie du Limousin (France).

Monitoring and Assessments

During 2007, we completed 2,138 laboratory calibrations of sensors. To maintain our remote sites and sensors in the field, we conducted 788 site visits to 119 Oklahoma Mesonet stations, 151 to 20 Little Washita Micronet stations, and 108 to 15 Fort Cobb Micronet stations. We found and repaired 377 sensor or communications problems in these three networks. Technicians took more than 5,000 photos to document the characteristics of vegetation before and after maintenance was performed at each Mesonet site.

Three new Mesonet sites were installed on the periphery of Oklahoma City, as part of developing an urban Micronet. Several calibration facility upgrades were completed and new sensors were tested for possible future deployment.

Oregon Climate Service

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George Taylor, State Climatologist*
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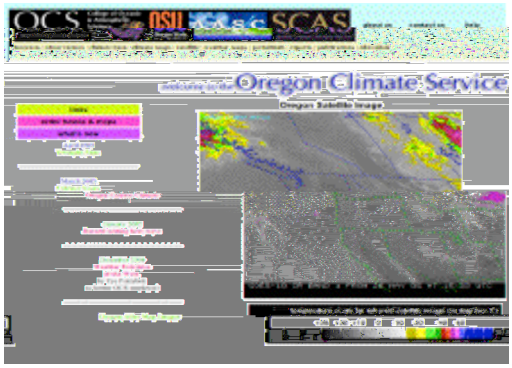

The Oregon Climate Service (OCS), located on the Oregon State University (OSU) campus in Corvallis, Oregon, is the state repository for weather and climate information. OCS is affiliated with OSU's College of Oceanic and Atmospheric Sciences (COAS).

Mission:

To collect, manage and maintain Oregon weather and climate data.
To provide weather and climate information to those within and outside the state of Oregon.
To educate the people of Oregon on current and emerging climate issues.
To perform independent research related to weather and climate issues.

Linkages

OCS acts as the liaison with:

- National Climatic Data Center
- Western Regional Climate Center
- National Weather Service
- USDA Natural Resources Conservation Service
- Climate Prediction Center
- American Association of State Climatologists
- Other state climate offices

Services

On average, OCS handles about 6,000 telephone or mail data requests per year. OCS' Web site averages about 4 million "hits" per month. OCS provides a full range of climate-related services to both the public and private sectors. Services/products include, but are not restricted to:

- Site-specific climate reports/summaries.
- Various statistical analyses, such as means, extremes, probabilities, percentiles, threshold exceedances, etc.
- Climate tables/inventories.
- Precipitation maps.
- Customized research.

- Current climate data and information

Publications

Publications in the last 2 years:

Wallis, J.R., M. G. Schaefer, B. L. Barker, and G. H. Taylor, 2007. Regional precipitation-frequency analysis and spatial mapping for 24-hour and 2-hour durations for Washington State. Hydrol. Earth Syst. Sci., 11, 415-442.

Valentine, Beth A., George H. Taylor, Jeffrey K. Stone and Richard R. Halse, 2007. Equine cutaneous fungal granuloma: a study of 44 lesions from 34 horses. European Society of Veterinary Dermatology. 17; 266–272.

Daly, C., W.P. Gibson, G.H. Taylor, M.K. Doggett, and J.I. Smith. 2007. Observer bias in daily precipitation measurements at United States Cooperative network stations. Bulletin of the American Meteorological Society, August.

Daly, C. and G.H. Taylor. 2006. Production of rainfall frequency grids for Puerto Rico and the US Virgin Islands using an optimized PRISM system. NOAA Atlas 14, Vol 3. National Weather Service Hydrometeorological Design Studies Center.

Daly, C. and G. Taylor. 2006. Developing "Smart" PRISM Climatologies for Improved Areal Precipitation Analyses and Forecasts. National Weather Service Western Region, Scientific Services Division. 98 pp.

PRISM group

OCS maintains a strong relationship with the PRISM Group, which was established at Oregon State University (OSU) to provide spatial climate research, education, analysis and mapping services for public, private, and educational institutions in the United States and abroad. Starting as a research program aligned with OCS in 1993, the PRISM Group was formally established in 1999. The PRISM Group and OCS continue to operate as sister agencies. Dr. Christopher Daly, OSU Professor, is Director of the PRISM Group.

The PRISM Group is committed to producing the most innovative and sophisticated climate maps available anywhere. Many of the mapping activities involve use of the PRISM model, developed by Daly. PRISM is a knowledge-based system that uses point measurements of precipitation, temperature, and other climate elements to produce continuous, digital coverages. PRISM is unique in that it incorporates expert knowledge of rain shadows, temperature inversions, coastal effects, and more. PRISM coverages are used with Geographic Information Systems (GIS) to construct maps and perform many types of analysis.

Pennsylvania State Climate Office

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Paul Knight, State Climatologist

The Pennsylvania State Climate Office database continues to incorporates observations from more than a half dozen separate networks within the Commonwealth. Approximately 140 new hourly reporting stations (primarily from the Citizen Weather Observation Program) have been added into the office's relational database. When combined with hourly reports from the FAA and Pennsylvania's DEP, there are nearly 300 observations of temperature, dew-point and wind each hour. The State Climate Office has also implemented a new interactive data archive.

The vision for a Pennsylvania Mesonet remains a priority for the State Climate Office. Opportunities arose in the autumn to present this vision to several of the state's regional planning commissions. While interest was high, funds were very limited. The CoCoRaHS network continues to expand across Pennsylvania under the auspices of the state climate office and with the name FROST. By the end of the year, over 140 volunteer observers had enrolled and typically, one hundred reported each day.

Information Technology Capabilities:

- About one hundred web data requests were logged each month (besides those by phone and US mail)
- Primary users are commercial, educational and government organizations
- A raid-array was added to accommodate more data, particularly the entire North American Regional Reanalysis data set (approximately 4.5 terabytes)

Communication Capabilities:

- The web server was separated from the database host to increase the capacity of numerous web inquiries simultaneously. Development of new products has mainly focused on grant-related items, such as those connected with a data inventory for the National Park Service.

Information Services:

- The development of an Interactive Data Archive continues. This archive allows users to easily obtain data as well as metadata from any of our primary data sources. Currently, we have extended the period of record of available FAA data into the 1920's and 1930's as a result of the CDMP work. A collaborative effort with the Northeast Regional Climate Center continues to bring evapo-transpiration data to the users and is part of a water budget project.

User Base Growth:

- The number of sites has continued to increase from year to year. We anticipate this trend to continue as we work with more state agencies and provide more data products. In the months of October through December in 2007, there have been an average number of over 4,200 visitors to the site. Of these visitors, they view over an average of 3 pages per visit.

Data Quality Control/Assurance:

- A multi-tiered quality assurance system is under development to process and test the increasing volumes of environmental observations. Standards established by other ARSCO's (particularly the Oklahoma Climate Survey) are being adapted for uniformity of data quality control. Data collection of the PA Cooperative Weather Observer Program (CWOP) takes place from the Forecast Systems Lab (FSL) MADIS system. The PA Climate office takes advantage of the sophisticated DQ control routines provided by MADIS on these data sets.

Climate Office Projects:

- In collaboration with the National Park Service, a climate data inventory project is now in its third year. Annual and seasonal summaries are being designed which will have applicability to Pennsylvania climate stations which are not part of this project. The interface for the National Park Service data inventory and retrieval will be modified and used as an upgrade to the current state climate interface in the first half of 2008.

Special Projects:

- Collaboration with experts in the College of Agricultural Sciences continues with the development of environmental data monitoring systems for a Wheat Scab project. A joint project with Pennsylvania DOT and Penn State Civil Engineering concluded successfully with a proto-type of an early alert system for hazardous surface transportation.

Selected Presentations:

- Presentations were given at the Pennsylvania Agronomic Education Society as well as the Central Pennsylvania Crop Conference during the winter of 2007 and numerous talks were given to a variety of groups statewide.

South Carolina Office of Climatology

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Mark Malsick, Severe Weather Program Liaison
Jason Allard, Research Climatologist (Part-time)
Evelyn Johnson, Administrative Assistant (Part-time)
Chuck Little, Computer Programmer (Part-time)
Ziwase Banda, Climate Intern (Part-time)

Created in 1986, the Office of State Climatology (SCO), as mandated by the South Carolina General Assembly (Section 49-25-10 et seq., Code of Laws of South Carolina, 1976), represents the State in all climate and meteorology matters. The SCO resides within the South Carolina Department of Natural Resources (SCDNR). The SCO serves as liaison between the National Weather Service and State agencies, such as the Governor's Office, SCDNR, SC Department of Public Safety, and the SC Emergency Management Division. The SCO assists other State and Federal agencies in data acquisition and interpretation before, during, and after periods of severe weather.

The SCO provides a unique service to the state by archiving and distributing climate and meteorological data, reports, and research that date back to the early 1700s. The SCO also serves as an expert witness in civil and criminal litigation involving weather and climate, averaging 12-24 cases per year. The SCO administers the *South Carolina Drought Response Act*, which requires the office to formulate, coordinate, and execute a comprehensive drought response program for the State of South Carolina.

ARSCO Qualifications: The following describes the ways in which the SCO addressed each of the ARSCO qualifications during 2007:

Communication Capabilities:

- The office developed a new SCO website that provides easier navigation and is compliant with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d). The website was developed to ensure equal accessibility to people with disabilities.
- The office operates an email notification system focused on severe weather notification and tropical advisories. The address list increased to 351 subscribers in 2007. The subscribers are from Federal, State and county agencies, municipalities, and school districts.
- Implementation of the Regional Drought Monitor Application continued. The application was developed through a partnership between Carolinas Integrated

Sciences and Assessments (CISA), SCO, and the NC State Climate Office and was funded by Duke Energy (https://www.dnr.sc.gov/drought/).

Information Services:

- During 2007, the SCO averaged 70 monthly phone and email requests for climate data and 25,000 information retrievals from the SCO web site. During significant weather events these numbers triple with 60,000 web information retrievals and 200 email and monthly phone requests.
- Media inquiries averaged 20 per month.
- The office issued weekly and annual summaries of the State's weather and climate in the *South Carolina Weekly Weather and Climate Report* and the *South Carolina Year in Review,* both of which are available on the SCO website. The SCO also provided a weekly summary of South Carolina Weather and Climate Data to the National Agricultural Statistics Service (NASS) that is published weekly in the South Carolina *Crop Weather Summary*.
- The office implemented a new weather forecast summary for the SC Soybean Rust Newsletter. The newsletter is distributed electronically by Clemson to over 300 subscribers including county agents, soybean growers, seed/chemical & fertilizer industry personnel, and consultants.
- The Drought Response Program requires regular correspondence with
- 48 Drought Response Committee Members, four major power companies, and over 2,000 water utilities. Correspondence includes drought projections, official declarations, and suggested response. During 2007, the SC Drought Response Committee was convened four times to review the drought conditions and issue declarations. Bi-weekly drought updates were distributed after declarations. Six hundred water systems were surveyed to identify their water conservation efforts during the severe drought. The SC water conservation actions are available online at http://www.dnr.sc.gov/climate/sco/Drought/drought_water_restriction.php.
- The office worked with hydroelectric dam operators and other resource agencies to enhance drought mitigation efforts as a part of the implementation of their Federal Energy Regulatory Commission's (FERC) hydro-power dam license. Staff served as a member on the Catawba-Wateree and Yadkin Pee Dee Drought Management Advisory Committees.

Research:

- During 2007, the SCO completed an analysis of the spatial and temporal temperature and precipitation trends for 65 stations in South Carolina, North Carolina, and Georgia for the period 1901-2005. The maximum, minimum, and mean temperature and total precipitation data were analyzed by season and annually. The research is published online http://www.dnr.sc.gov/climate/sco/Publications/temp_study/temp_precip_main.php
- The office is a cooperating institution in the Carolinas Integrated Sciences and Assessments (CISA) project focused on integrating climate science and water management in North and South Carolina. Publication and grant submission related to the CISA program during 2007 include:

- -Carbone, G.J., J. Rhee, H. Mizzell, and R. Boyles. January 2008. A Regional-Scale Drought Monitor for the Carolinas. *Bulletin of the American Meteorological Society.*
- Additional office publications include: Allard, J. and Keim, B.D., Chassereau, J.E., Sathiaraj, D., 2008: Spuriously Induced Precipitation Trends in the Southeast United States. *Theoretical and Applied Climatology*. DOI 10.1007/s00704-008-0021-9.

Outreach:

- During 2007, the SCO provided approximately 50 annual presentations to various governmental, private sector, and civic organizations.
- Staff attended state and national conferences such as the American Association of State Climatologists Annual Meeting, National Integrated Drought Information System Workshop, and the Annual Meeting of the Association of American Geographers. The office played an active role in the new SC Governor's Climate, Energy and Commerce Task Force that met monthly.
- The SCO produced the *2008 South Carolina Weather Calendar*. The 52-page calendar includes daily facts and photos that illustrate SC's weather spectrum. Monthly feature articles included SC Wintery Mix, Hydropower and SC Water Resources, New Tornado Rating System, Lightning, Hurricane Preparation, Sea Breeze: Science at the Beach, Early Season SC Hurricanes, Cooperative Weather Observers: The Backbone of Climate Records, SC Salutes its Cooperative Weather Observers, and SC Climate Trends.
- SCO article on "Weather You Like It or Not" was published in the *SC Wildlife Magazine*.
- The State Climatologist provides a monthly weather and climate segment on the South Carolina Educational Television show "Making It Grow."
- The Assistant State Climatologist serves as commissioned law enforcement officer to assist SCDNR during weather emergencies.

Monitoring and Impact Assessment:

- The office maintains a network of 12 climate observers to supplement the National Weather Service Coop Network.
- Staff work closely with the National Weather Service to monitor the COOP and ASOS data networks to maintain the quality of SC climate observations.
- Six press releases were issued on the State Drought Committee's declarations.
- As a member of the State's Emergency Operations Team, SCO staff participated in quarterly hurricane task force meetings, annual exercise, and training. SCO staff participated in conference calls with State agencies and county officials concerning the January 18 Winter Weather Event and the passage of Subtropical Storm Gabrielle. SCO staff issued 16 weather outlooks, 14 fire weather outlooks, 12 severe thunderstorm/tornado advisories, 9 tropical cyclone advisories, 29 weekly tropical updates, and four cold weather/freezing precipitation advisories.

South Dakota Office of Climate and Weather

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Dr. Dennis Todey, State/Extension Climatologist
Chirag Shukla, Climate Data Specialist

The South Dakota Office of Climate and Weather is part of the Cooperative Extension Service (CES) at South Dakota State University. Consequently, the mission of the state climate office of providing data and information to the people of the state overlaps the mission of the extension service in providing science-based information to the people of the state. As part of the SD CES, it has connections in every county of the state to communicate with people of the state providing for a direct set of users as well as an information gathering mechanism to feed back to the office. The South Dakota Office of Weather and Climate (SDOCW) was granted ARSCO status in 2005.

New weather stations and upgrades

The South Dakota state climate office manages a network of 34 automated weather stations with some additional stations in process. Here are some updates on the network.

Four new weather stations were installed in 2007 –

- **Antelope Range:** Antelope Range Research Farm is a research facility owned and operated by South Dakota State University in the far northwest part of the state between Bison and Buffalo. The planning phase ended in 2006 and the station was installed in August 2007. Alltel based CDMA cellular modem is used with CR10X to transmit data twice a hour.
- **Edgemont:** The State Climate Office teamed up with RESPEC, a consulting company based in Rapid City, to do environmental monitoring for an EPA environmental assessment. The station is located about 13 miles NW of town. The station has wind speed and direction sensors at 3 m and 10 m. Along with standard instruments, the station is equipped with Alltel based CDMA cellular modem for transmission, tipping bucket and Vaisala's VRG 101 all weather rain gauge, and barometric pressure sensor.
- **Sioux Falls:** The City of Sioux Falls is working on different methods of managing municipal water use with the city's expanding population. Weather conditions across the city will be monitored using one newly installed station (Nov. 2007) and a planned station in May 2008, along with the ASOS at FSD Airport.
- **White Lake:** White lake is mid-way between Mitchell to Chamberlain (both ASOS/AWOS) on I-90. The station was sponsored by a local farmer and in addition to the standard instruments, 5 levels of soil temperature measurements are being done.

- **Oral, Cottonwood and South Shore stations:** Updates to near real time reporting after station was upgraded to use radios for communication.
- **Bowdle, Highmore, Leola, Brookings, Parkston, and South Shore:** Five level soil moisture probes were added. Two stations were funded by local interests. Two stations were funded in cooperation with South Dakota Natural Resources Conservation Service.
- **Brookings:** The NWS COOP and automatic weather stations were relocated because of development of a university research park.

Major projects
The state climate office joined with other agricultural engineers in securing USDA funding to develop an ET network for the city of Sioux Falls for lawn watering recommendations. Two new weather stations, a water use web site and extension training will be involved as well as some research on lawn water usage across the city.

Dr. Todey was called to intervene in an exchange about a new rangeland insurance product being tested in western South Dakota. He worked to validate on-ground conditions to compare with satellite-derived rangeland conditions.

South Dakota welcomes CoCoRAHS
South Dakota joined the CoCoRAHS network in June 2007. Management tasks of the program were distributed with the help of South Dakota Cooperative Extension Services and the National Weather Service. The State Climate Office leads and coordinates the management of the program. The three National Weather Service offices are regional coordinators. Some counties witnessed more than 15 volunteers that report precip on a regular basis. Specific comments in the reports help the National Weather Service in reviewing coop reports and assessing weather conditions. Extension educators are managers in many counties. County conservation board members are also helping in several locations. Several agencies have joined hands to make CoCoRAHS a success.

The State Climate Office implemented two new instruments/technologies
The State Climate Office (SCO) implemented the following technologies:
- **CDMA Cellular modem:** The SCO implemented cellular data communication on three of its stations in 2007 – Antelope Range, Edgemont and Leola. Radio communication is widely used to communication data on a near real-time basis. Some remote locations, as the ones mentioned above, were not in the vicinity of an Internet uplink. These remote stations were upgraded with a powerful directional antenna and cellular modems. The data transfer results are satisfactory. The SCO transferred knowledge from Steve Marquie (Michigan SCO) and Glen Roebke (HPRCC) in setup and troubleshooting of cellular communication.
- **Vaisala's VRG 101 all weather rain gauge:** The weather station in Edgemont was equipped with VRG 101 all weather rain gauge. The gauge was tested in house and placed in the field for production use.

Outreach

- SC met weekly giving update to extension agronomy staff on growing season conditions
- SC wrote and delivered regular drought and flood updates to the state drought task force, congressional delegation, extension staff, governor's office and general public
- Delivered over 35 talks and responded to over 100 specific data requests (not including web site requests)
- Did over 50 media requests along with weekly updates to a SDSU-produced gardening program
- Added a state climate blog on the web site to include more discussion type highlights for users

New/Renewed Cooperation and Collaborations

- SCO extended its service to the South Dakota Ag Statistics again this year supplying data and weekly weather updates for their weekly Crop Progress report.
- Water and Natural Resources consulting company, RESPEC, based in Rapid City, and the SCO are planning to work together on irrigation related projects in the Belle Fourche Irrigation District including three new weather stations and one station upgrade
- Tripp County and SCO join hands to plan for one, and possibly two, weather station(s) in Tripp County
- DOT and SCO are planning on receiving and distributing RWIS data through the SCO's LDM server
- SCO transfers near-real time weather data from its mesonet to NWS-CRH, Kansas City, which eventually gets distributed over LDM as an RR5 product
- SCO receives and distributes data from SuperAWOS weather stations
- SCO continues to obtain ACARS, RAWS and NLDN data through LDM
- Cooperated with NWS offices to confirm two new state records, 24 hr precip (8.75") and record hail stone (18" circumference and 6.9" diameter).

Office of the Texas State Climatologist

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Dr. John W. Nielsen-Gammon, Texas State Climatologist
Adam Wiley, Undergraduate Assistant

Physical Location and Funding:

The Office of the State Climatologist is housed in the Department of Atmospheric Sciences, Texas A&M University. Continuing funding for each fiscal year includes: assistance from the Texas A&M Vice President for Research and Graduate Studies, the half-time services of a graduate student during the fall and spring semesters, and an administrative supplement for the State Climatologist. Office space is provided free of charge by the University. The largest out-of-pocket expense for the Office is hourly wages for one part-time undergraduate assistant. Cost recovery is available for large data requests. External funding is provided for sponsored research projects.

Communication and Information Services:

The Office's information services can be broken into two parts: personalized information services and general information services. The personalized information services are conducted using all of the previously mentioned forms of communication with outside individuals. These information services consist of a client requesting data from our Office and the Office finding, recovering, and processing the information in a way that is easily understood by the client, and attached in an easily accessible format. In 2007, about 280 electronic climate requests were received and responded to. The Office has also received approximately 160 phone calls, sent nearly 20 facsimiles, and sent numerous mailings through the postal services.

The general information services consist of regularly produced documents that are made available in publications such as the Texas Almanac, and summaries and forecasts on the office's website. In the Texas Almanac, the Office provides and verifies a significant amount of climatological data for the publication. On the Office website, http://www.met.tamu.edu/osc, there are monthly climate summaries for the state and the Bryan/College Station area as well as weekly weather forecasts for Texas. The Texas Monthly summary includes a crop report, precipitation and temperature deviations from normal for the major cities in Texas, and a summary of the previous month's weather. The weekly summary and forecast for the state includes a general summary of the previous week's weather and significant weather events, if any, and a forecast of the coming week's precipitation and temperatures. Bulletins are also produced whenever the Climate Prediction Center releases its long-lead forecasts. These forecasts are analyzed and the information regarding the state of Texas within the forecast is posted in a bulletin with a short summary and graphics. Occasionally, if severe weather has affected the state or the climate is in an unusual state, a bulletin will be released addressing these issues.

Research:

During the past year the Office of the State Climatologist received funding from the National Oceanic and Atmospheric Administration (NOAA) and the Texas Commission on Environmental Quality (TCEQ) for participation in three research projects. The NOAA project is directed toward documenting and understanding decade-scale changes in observed climate in Texas and Oklahoma. The TCEQ projects included collection, quality control, and analysis of special meteorological observations collected during the Second Texas Air Quality Study (TexAQS-II), 2005-2006.

In addition to these funded projects, the Office of the State Climatologist is also investigating the local-scale and large-scale controls on summertime precipitation in Texas, with the eventual objective of developing ways to forecast drought on a monthly and seasonal time scale.

Research Findings:

The NOAA project has found that climate division data are relatively reliable on annual and interannual time scales, but that they do not properly represent long-term climate variations in precipitation prior to about 1950. Despite the lack of a trend in climate division data, we have found that overall precipitation has actually been steadily increasing in Texas over the past century. We have developed interpolation techniques to produce maps showing the estimated spatial extent and severity of droughts in Texas and neighboring states during the past century.

The TCEQ projects have revealed the specific patterns of air polllution in the Houston area during the field intensive. Meteorology conditions during the field program were quite a bit different on a day-to-day basis than during the first field program in 2000. Using our conceptual model of the relationship between large-scale winds, local weather, and air pollution, we found that collectively the two field programs together sampled the full range of meteorological scenarios for high air pollution events.

The initial summertime precipitation project was completed last summer. The study was designed to examine direct relationships between precipitation the factors that control it, using tools developed for convective forecasting. Our study found that precipitation on monthly time scales during the summer in Texas is primarily controlled by variations in convective inhibition (CIN) and is almost unaffected by CAPE. Variations in CIN may be approximated by variations in the difference between the 700 hPa temperature and the surface dewpoint. While the surface dewpoint responds strongly to precipitation and represents a feedback mechanism prolonging drought or wet spells, the 700 hPa temperature is strongly affected by transport of warm air aloft from northern Mexico and the desert Southwest United States. We are now engaged in a followup project to apply this methodology to global convective precipitation. So far, we have learned that control by CIN is common over continents, while CAPE and precipitable water have a more important effect over the oceans.

Outreach:

The Office's primary means of outreach is through data access and publications available on the OSC web site. In addition, the OSC responds regularly to media requests and requests for guest lectures. During the past year, the greatest interest among

the public has been with regard to topics related to drought, hurricanes, and climate change. During 2007, the Texas State Climatologist gave invited lectures to the following groups and venues: the Texas Farm Bureau Leadership Conference, the Washington County Master Naturalist Chapter, the Texas and Southwestern Cattle Raisers Association Annual Conference, the Texas Legislature, the Texas A&M University System Annual Risk Management Conference, the Anderson County Master Gardener Annual Conference, the Bastrop Rotary Club, Northeast Texas Community College, the Texas A&M Hurricane Frequency Analysis Workshop, the Fort Bend/Waller Master Naturalist Chapter, the Gideon Lycecum Master Naturalist Class, the University of Texas System Annual Risk Management Conference, East Texas Baptist University

Monitoring and Impact Assessments:

The State Climatologist is an appointed member of the Texas Drought Preparedness Council, a statewide interagency committee created by the Texas Legislature in 1998 to monitor drought conditions and coordinate drought mitigation activities. The Council meets monthly in Austin. The State Climatologist is also an active participant in the U.S. Drought Monitor mailing list.

Utah Climate Center

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Robert Gillies, State Climatologist

Plan of Work for the Coming Year

The website / climate and weather database will continue development in the core areas of data distribution but will expand capabilities to deliver innovative climate products and visualizations. Dr Gillies will oversee this development and will coordinate the activities with the IT group at the Space Dynamics Lab housed at the Innovation Campus of USU. As the topic of climate change becomes more focused in the State of Utah it is anticipated that Dr. Gillies will be called upon, as was the case in 2006, to provide expertise in the area of climate science and will fulfill this role through presentations and reports as are requested.

Alan Moller was hired as a meteorologist for the Utah Climate Center (UCC) in late July 2006. It is anticipated that he will continue to serve in the established role of assisting individuals and other entities whom call the center with metrological and climate related queries. In addition, the process of compiling a the updated version of the Utah Climate book will be a responsibility of Mr Moller – this task is largely dictated by the completion of data structures in the climate database. A suite of quality assessment and controls algorithms (QA/QC) will have to be implemented to assess the data exported from the old system that resided in the climate center prior to Dr Gillies taking the position – this being digital data that is prior to 1947 that is not included in the NCDC archive.

Data collection and instrument maintenance will be provided for the State of Utah. The National Atmospheric Deposition Program (USDA), the UVB Project (Colorado State University / USDA) and the COOP (NWS) are all integral responsibilities of the UCC. Both Dr. Gillies and Mr. Moller will continue to share these responsibilities.

In the context of modern data collection of climate data the 2006 report stated, " … it is hoped to coordinate the various state entities (e.g., NRCS, BLM) that systematically collect such data into a common structure that will facilitate the transfer of such data for the state into the climate center's database schemas" – Dr Gillies will take the initial lead. The coordination of climate sites is an on-going process and will continue into 2008. In this capacity, negotiations are underway with NRCS to coordinate efforts in line with the SCAN and SNOTEL sites.

As part of the climate site coordination mentioned previously, an initiative that the climate center has undertaken the provision of a web-based pest prediction model for the fruit growing industry of Utah; this is in partnership with other faculty at USU. Jobie Carlisle has taken the lead on this and will coordinate with the programmers at SDL to

implement the web-based tool.

The UCC will join the CoCoRaHs network in 2008 and initial observations are set to begin in July of 2008. Dr Malek is the leader for this project.

The UCC will continue its outreach educational efforts through demonstrations and lectures in the areas or weather and climate – Dr Gillies and Mr Moller have responsibility here.

Negotiations are underway with Utah Public Radio to serve weather and climate expertise through this medium. The faculty (i.e., the meteorologists) and meteorological students of the Plants, Soils and Climate will rotate and be responsible as weekly duty meteorologists to coordinate weather discussions and prepare the information for UPR. Dr Gillies, however, will lead and coordinate this initiative – current plans are aimed at a August / September start.

Major Accomplishments for the Year
The climate center continued service for the State of Utah during 2007.

As in the past, the level of service at the Utah Climate Center continues but evolves. As stated in the report of 2006 the following still applies – "The number of data requests dropped substantially, the slack being taken up by the climate database web server as was intended – the extent of this is monitored by google analytics the statistic" – a recent example visitor overview is appended for the period 15th February to 16th March 2008.

A shift has occurred as a result of the IT infrastructure that is now in place in the UCC towards a more service oriented base that is more focused on scientific queries and expertise. Such is now the experience of the climate center as evidenced by calls to the center for interpretation of climate data for instances like those of court cases. Examples include but are not limited to, the US Department of Justice and the Cache County District Attorney, all of which were initially drawn by the information and capabilities of the website.

The climate center was asked to participate in the **N**ational **A**ssociation of **S**tate **U**niversities and **L**and-**G**rant **C**olleges (NASULGC) reception on capital hill (Washington DC) on February 27, 2007 – USU poster presentation was entitled "Protecting the Homeland. Droughts in Utah: Learning from the Past, Preparing for the Future".

Dr Gillies presented at various venues on the subject of climate change:
- **Climate Change: Its Impact on Precipitation and Water Supply in Utah's Major Drainage Basins: The Colorado River and the Great Basin** (October 01, 2007), Marriott Downtown - Salt Lake City - Utah, Water Law Institute CLE International
- **Historic Watershed Trends in the Arid West - What evidence have we seen in each of the areas of climate change?** (November 05, 2007), Las Vegas Springs Preserve - Las Vegas, NWRA Climate Change Symposium

- **BRAC Climate Science Report (Plus - some further insights)** (December 04, 2007), Davis Convention Center, Layton, Utah, Utah Water Users Association Annual Water Summit Conference
- **Running Dry: Climate Change and Utah's Water Outlook** (October 20, 2007), Westminster College - Salt Lake City - Utah, Utah Bioneers
- **Climate: Utah Faces Bleak Fate (Salt Lake Tribune, 10 Oct 2007)** (October 24, 2007), Utah State University - Logan - Utah, CNR Seminar Series.

The UCC was responsible for the UCAR Member Renewal Application for USU – re-application is every 10 years and involves compiling a teaching and research portfolio in meteorology and climate that resides here at USU. The effort was successful as noted following:

> "Hello As you know, Utah State University was reelected to membership in UCAR at their annual meeting in Boulder this past October. Congratulations on the reelection of the Utah State University! Best regards, Aneka Finley Office of Corporate Affairs UCAR"

Dr Gillies served on the Governor's Blue Ribbon Advisory Council on Climate Change: In recognition of work to summarize the present scientific understanding of climate change and it potential impact on Utah and the Western United States he was awarded a "Certificate of Appreciation - Governor's Blue Ribbon Advisory Council"

A major effort was expended in organizing and running Focusing Cache – Utah State's involvement in Focus the Nation – an effort to engage the local population in understanding the science of climate change. The symposium was a distinct success with over 425 registered and participating.

Facility Upgrades or Changes, Including Anticipated expenditures

Last report it was noted – "In addition, due to UDOT traffic regulations for the new veterinary science building construction at 5SW, the climate center weather observatory (which includes NWS-COOP, UVB & NADP programs) was relocated to a new site in the vicinity. It is likely that there will be some auxiliary expenditure that the UCC may incur with the development of the relocated site" To this end funds ($6,198.00) will be expended to provide permanent power to the weather station located at the South Farm and funds will be required to landscape (irrigate etc) the site. Furthermore, it is anticipated that funds will be allocated to develop a communications / visualization setup in the climate center.

Vermont State Climate Office

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Lesley-Ann L. Dupigny-Giroux, State Climatologist

The Vermont State Climate Office (VTSCO) received its ARSCO recognition in June 2005. The office is housed within the Department of Geography at the University of Vermont (UVM) & State Agricultural College, a land-grant institution that emphasises outreach as one of its core missions. In July 200, the VTSCO moved to new a laboratory setting donated by the Geography department. Climate Database Modernization Program (CDMP)-funded equipment, archival publications and documents are housed there, with adequate facilities for the undergraduate and graduate assistants.

The core mission of the VTSCO is to provide climate research and services to Vermonters and other constituents (university researchers, policy makers, state agencies, legal firms or school children) in a timely and efficient manner. This is facilitated via a dedicated website and e-mail address.

Over the course of the AY 2007-2008, the VTSCO continued to support two undergraduate Geography interns via federal work-study funding. An M.Sc. student in Natural Resources assisted by updating some of the most commonly used/requested databases. Another M.Sc. in Mathematics provided statistical analyses for historical climate research using VT and NH diaries.

ARSCO Qualifications: The VTSCO is the AASC-designated state climate office for Vermont. The following activities address each of the Office's ARSCO qualifications.

Communications capabilities:

- Continued enhancement of the VTSCO website (http://www.uvm.edu/~ldupigny/sc) with access to both hydrometeorological and geospatial data; ongoing CDMP historical data collection; mitigation awareness resources; data access and; a streamlining of the most commonly requested NCDC datasets
- Provide free data, expert opinions and recommendations via the telephone, facsimile, electronic mail and regular mail

Information services:

- Provided four interviews on drought, historical storms, climate change issues and fall foliage to the Wall Street Journal, Boston Globe, Vermont Quarterly and NBC Nightly News with Brian Williams.

- Handled over 35 non-CDMP related email, mail and telephone requests.

Research:
- CDMP-related data collection of weather and climate data in personal diaries from the 1700s to early 1900s in the Library Research Annex of the UVM's Bailey/Howe Library. These were imaged and forwarded to the CDMP for uploading to WSSRD. Databases of the contacts, findings and progress of visits around the state were updated.
- Book chapter "Multiangular imaging of wetlands in New England," in Wetlands: Ecology, Conservation and Restoration, Frank Columbus (editor), Nova Science Publishers, Inc. written with a former VT ARSCO student intern (Eden Furtak-Cole).
- Book chapter on the use of bioindicators as a proxy for climate, as part of a co-edited book manuscript with Cary Mock entitled Historical climate variability and impacts in North America. Manuscript was solicited by Springer Publishers.

Outreach:
- Invited panelist at the National Emergency Management Association Mid-Year conference in Washington, D.C..
- 7 presentations on Vermont's perspective in terms of climate change; natural hazards and their influence on urban forestry; climatology teach-ins for students; Lake Champlain's climate over the last 400 years in the context of the Quadricentennial of its discovery by Samuel de Champlain at a Champlain Quadricentennial Workshop; AAAS meeting; Vermont Department of Forests, Parks and Recreation; UVM Focus the Nation.
- Liaise with the Vermont Department of Agriculture, Food and Markets on drought, flooding and nonpoint source pollution issues.

University of Virginia Climatology Office

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The University of Virginia Climatology Office is a Research and Public Service Center in the Department of Environmental Sciences. The office is also an integral member of the Southeast Regional Climate Center.

The office provides information and conducts research on the atmospheric environment and the impact of weather and climate on economic and ecologic systems to government, education, industry, the media and individuals. Its on-line, "Climate Advisories" feature current climate research and/or educational material, and its web site offers an extensive array of climatic information and guidance to a broad spectrum of climatic data services.

ARSCO Qualifications: The AASC has designated the Climatology Office at the University of Virginia as the state climate office for Virginia. The following describes the ways in which the office addresses each of the ARSCO qualifications:

Communication Capabilities
The University of Virginia Climatology Office has phone, fax, email and video-conferencing capabilities with high-speed Internet service for the rapid transfer of data. The office maintains a web site devoted to a variety of its educational, informational, data provision and outreach goals.

Information Services
The University of Virginia Climatology Office serves as the official repository and provider of climatic records within the Virginia. It handles thousands of direct requests for information annually, as well as more general guidance on climate issues of all spatial and temporal scales. Its web-based information services are accessed tens of thousands of times a year, with an estimated total download of information in the hundreds of thousands of pages. These inquiries come from individuals, industry, the media and dozens of governmental and educational entities, worldwide. In addition, the office's monthly "Video Climate Advisory" is televised statewide as a PSA on Public Television, Public Access Channels and agricultural information networks.

Research
The office is an integral participant in the ShenAir Institute Research Program, which is designed to expand understanding of the atmospheric environment of the Shenandoah Valley region. Under this program, the office is involved with two projects:

- Air Quality Climatology for the Shenandoah Valley

- Asthma Alert System for Shenandoah Valley

In addition, major research efforts of the office include:

- Examination of the relationships between U.S. climatic regimes and exacerbation of respiratory distress — in collaboration with the U.Va. Health Sciences Center.
- Study of the climatic effects on outbreaks of hemorrhagic disease in Virginia wildlife — in collaboration with the Virginia Department of Game and Inland Fisheries.
- Drought impact monitoring research and data system development.
- Participation in the development of a proposed RISA program for the Mid-Atlantic region.

Outreach

- Provides data and expertise to dozens of state, federal and local government entities, and educational institutions each year.
- The office distributes information via hundreds of contacts with the print, radio and television media.
- The office serves as a lead scientific contributor to the Virginia Drought Monitoring Task Force, with periodic drought reports and analyses.
- Video Climate Advisories regarding aspects of Virginia climate are produced monthly for television and web-based distribution.
- The office has been increasing emphasis on its web site as a vehicle for making information available to potential users. This has been successful in reaching more individuals and organizations in a more cost-effective fashion. The estimated amount of information accessed has more than doubled in the past year.
- Presentation of education and training lectures for the Virginia Master Naturalist Program.

Monitoring and Impact Assessment

- Development of a web-based interactive system for ready access to short-range forecasts of human health related atmospheric information.
- Provision of data and impact assessment for and service as a member of the Virginia Drought Monitoring Task Force
- Work in collaboration with James Madison University to provide detailed, long-term atmospheric monitoring in the Shenandoah Valley.
- Participation as a member of the Virginia Hazard Mitigation Steering Committee, including development of climatic hazards analyses.
- Work in collaboration with James Madison University to provide detailed, long-term atmospheric monitoring in the Shenandoah Valley.

Papers Submitted For Publication in 2007:

McLaughlin, A.P., P.J. Stenger, J. Patrie, M.A. Brown, D.G. Hillman, J.M. El-Dahr, T.A.E. Platts-Mills, P.W. Heymann, Emergency Department Visits and Hospitalizations For Asthma Among Children Living In Locations With Different Climates**,** *Journal of Allergy and Clinical Immunology*, In review.

Hondula, D.M., L.J. Sitka, D.B. Knight, R.E. Davis, S.D. Gawtry, T.R. Lee, P.J. Stenger. A Comparison of Back-Trajectory and Air Mass Climatologies for the Shenandoah Valley, Virginia, *International Journal of Climatology,* In review.

Knight, D.B., R.E. Davis, S.C. Sheridan, D.M. Hondula, L.J. Sitka, S.D. Gawtry, T.R. Lee, P.J. Stenger, F. Mazzei, B.P. Kenney. Detection of Climate Change by Examining Trends in Air Mass Frequencies Across the United States, *Geophysical Research Letters,* In review.

Office of Washington State Climatologist

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Philip Mote, PhD, State Climatologist
Gary Grove, PhD, Associate State Climatologist; Professor, Washington State University
Josiah Mault, Assistant State Climatologist
Rob Norheim, Assistant State Climatologist

Now entering its sixth year, OWSC has achieved many of its initial goals and capitalized on new opportunities.

Online data access
We expanded and updated the map-based inventory that allows users to search for observations by weather variable and averaging period (e.g., monthly precipitation or hourly solar radiation). It now includes solar radiation and cloud cover as well as the more traditional weather variables.

We expanded and updated the online trends plotting utility, which allows users to plot monthly mean maximum and minimum temperature, monthly precipitation, and now first-of-the-month snow water equivalent.

Inquiries for data from citizens, businesses, and public agencies range from casual to research-level.

December 3-4 Chehalis River flood
Dr. Mote appeared before a State Senate work session on the December 3-4 flood on the Chehalis River in southwest Washington, which was followed by a public report. Special attention on this flood came after the Seattle Times published an article alleging that Weyerhaeuser Company had logged steep slopes on its land in the Willapa Hills, causing landslides and exacerbating the flooding.

eWaCH.net
In June 2007 OWSC launched an effort called "enhancing Washington's climate and hydrology networks", www.ewach.net. The purpose of this effort is to augment and make better use of existing observation networks for purposes of climate monitoring, drought diagnosis and prediction, and streamflow forecasting on timescales from days to months. Major accomplishments during 2007 included holding a multi-stakeholder workshop, surveying nearly all USHCN sites in the state as well as some non-HCN long-term COOP sites, and preparing an initial report on the state of the HCN network in Washington. Discussions with NOAA NWS and state agencies continue, and we anticipate working with legislative and gubernatorial staff in the fall to develop a funding package for the state's portion of eWaCh.net to match NOAA's HCN-M commitment.

Mt. Rainier microclimates
On October 1, 2006, Philip Mote and Josiah Mault placed 16 Maxim i-Button microsensors on two transects on the south slope of Mt. Rainier in Mt. Rainier National Park. These sensors, about the size of a dime, are capable of recording hourly temperatures for 11 months. We returned August 30, 2007, and retrieved 14 of the sensors - two were lost. We have analyzed the data and are preparing a journal article.

These sensors could be deployed in every COOP station (easily in CRS, not sure yet how we would attach them to an MMTS), providing continuous measurements even when the COOP observer misses an observation.

Extreme precipitation
Prodded by the State Senate's questions regarding the Chehalis flood, OWSC undertook an analysis of extreme daily precipitation events throughout the state. Assistant SC Mault was aided in this analysis by Dr Valérie Dulière, a post-doc working with Dr Mote a closely related project. She determined that most of the state's rain gauges have posted increases in the 10-year extreme rain event despite negligible changes in mean precipitation.

Funding and Legislation
During its 2007 session, the Washington State Legislature considered a bill that would establish the Office of Washington State Climatologist, specify how the state climatologist would be appointed, and delineate the duties and functions of the Office. Though the bill passed the State Senate, the final version of the bill that passed the House of Representatives did not include the provisions to establish OWSC. However, the Governor's budget for the 7/1/07 - 6/30/09 biennium included the requested funds for OWSC, which enabled us to maintain the existing level of funding and continue to employ Assistant SC Josiah Mault full-time.

During its 2008 session, The Washington State Legislature again considered a bill to establish the state climate office in the context of a bill to create a working group to advise the governor on adapting to climate change. It is a testament to the reputation of OWSC that the legislation arose and marched through the legislature without any effort on our part - Dr Mote needed only to answer some questions by one committee staffer. SB6308 passed the state senate 42-5 and was referred to the House of Representatives, where it died in committee as the session expired. However, the legislature provided additional funding for the Office, so we can continue expanding our work.

Wisconsin State Climatology Office

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The Wisconsin State Climatology Office (SCO) is affiliated with the Department of Atmospheric and Oceanic Sciences at the University of Wisconsin-Madison. As a partner with the Midwestern Regional Climate Center, the SCO collects data and information for climate monitoring, provides climate information and interpretation to residents of Wisconsin, demonstrates the value of climate information in the decision making process to the user community, and conducts applied climate research.

The office contains an extensive collection of original manuscript records for Wisconsin weather stations, some dating back to the 19th century.

The mission of the SCO includes:

- acquisition and archiving weather observations from nearly 200 weather stations throughout the state.
- summarization and dissemination of the information to users and for SCO climate monitoring.
- demonstration of the value of climate information in the decision making process, and advice to the government on droughts, temperature extremes, and climate change.
- conducting applied climate research on climate trends and interdecadal oscillations.

INFORMATION SERVICES

Website: The SCO maintains its website http://www.aos.wisc.edu/~sco that provides an expanding variety of graphical climate information and data to citizens, scientists and various interested parties. Approximately 700 requests were made per day to this website during 2007. A major revision and upgrade of the site was undertaken in 2007 to improve organization and usability. Some special features appearing on the site include:

- Season Pages. A winter page for snow and lake ice information, and an autumn page for fall color continue to be popular pages.
- Climate Watch: A section with extensive graphics of contemporary conditions.
- Climate History: Graphics that demonstrate observed climate variability by year and locations through the state are routinely updated. The records allow inspection of interannual fluctuations, interdecadal oscillations, and recent climate trends.

Data Services: The SCO staff provides advice on web links to climate data and maps from regional and national centers. In addition, they also answer questions and fill data requests made by telephone, fax, email and office visits. The public, the media, industry (e.g., legal, insurance), and governmental agencies made approximately 63 data requests per month via these tradition means.

While most requests made by the public are answered without charge, a minimal service charge plus costs is assessed for special data requests that require significant time, labor or photocopying.

OUTREACH – The SCO continues to make its presence more widely known to University colleagues and residents of Wisconsin. In addition to interviews with the electronic and print media in the state, the staff gives lectures at service groups, universities and business conferences. The Office informally collaborates with the National Weather Service offices in Wisconsin, and is one of the sponsors for the CoCoRaHS (Community Collaborative Rain, Hail and Snow Network) network in Wisconsin. The Assistant State Climatologist, Ed Hopkins, is a member of the Forage Suitability Database Review Committee for state agriculture and Prof. Young has given talks on "Regional Climate Change in a Chaotic Climate" to researchers in other University departments.

RESEARCH—Ed Hopkins is analyzing weather extremes reported at individual stations throughout the state and is a member of the State Climate Extremes Committee. He coauthored a chapter on early weather observations in the Old Northwest that will appear in an edited book on the early instrumental record and climate variability in North America. The SCO continues to collaborate in a climate research project with the Center for Climatic Research and the Nelson Institute for Environmental Studies at the University of Wisconsin-Madison involving regional climate change.

CURRENT PROJECTS –

- Create a more formal relation of the SCO with the University
- Formally define all staff positions and develop funding for them
- Establish ARSCO status
- Partner with local, state and federal government agencies on matters relating to long-term climate change
- Continue expansion of website information and smoothed graphics
- Expand collaborative applied climatology research with campus and state.
- Continue contacts with media and issue timely press releases.
- Develop small applied research projects & collaborations with AOS researchers.

Wyoming State Climate Office

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The **Wyoming Water Resources Data System** (WRDS; http://www.wrds.uwyo.edu/) and its **State Climate Office** branch (SCO; http://www.wrds.uwyo.edu/wrds/wsc/wsc.html) are the single largest providers of water and climate-related data in the state. Housed within the Department of Civil and Architectural Engineering at the University of Wyoming, WRDS and the SCO are funded primarily through contracts with the Wyoming Water Development Commission.

The WRDS-SCO office provides a variety of services, ranging from the development of enhanced drought-monitoring products to the online dissemination of water and climate data. WRDS and the SCO also support a wide range of groups by assisting in the development of the State Water Plan and helping to coordinate climate- and hydrologic-monitoring efforts throughout Wyoming.

Activities Related to the ARSCO Mission

Information Services

Data and information services at the Wyoming SCO are provided primarily via the World Wide Web. The links below provide a sampling of related products:

- http://www.wrds.uwyo.edu/
- http://library.wrds.uwyo.edu/
- http://www.wrds.uwyo.edu/wrds/coop.html

In addition to internet services, we also responded to > 140 direct requests (i.e. via phone, mail, or other personal contact), many of which required extensive research and analysis. We also worked with several state agencies, federal agencies and conservation districts to (1) improve infrastructure related to climate monitoring and (2) ensure that their needs for climate and water-related data are being met. Towards these ends we began developing cooperative agreements with the NRCS, USGS, NOAA-NWS, Wyoming Dept. of Agriculture and Wyoming State Engineers Office that will allow for cost sharing on new instrumentation, upgrades to existing climate/water monitoring sites, and improved data access. Highlights of this work include new equipment installations or upgrades at 18 soil-moisture monitoring sites, and a cooperative agreement that will bring six new NRCS SNOTEL sites to the state.

Outreach

Dry conditions gripped our state for much of 2007, and climate change continues to be a topic of tremendous interest. In turn, we focused much of our effort on high-impact outreach events designed to educate the public and members of state government about drought and climate science. Out of some 30 invited presentations, key examples include:

- "Climate change and potential impacts on Western rivers" *U.S. Bureau of Reclamation, Lovell, Wyoming. October 18, 2007.*
- "Drought, climate change, and the future of Western rivers" *Annual Summit on the Snake, Jackson, Wyoming. June 1, 2007.*
- "Drought and the future of Water in Wyoming" *Wyoming Bankers Association, Worland, Wyoming. May 5, 2007.*
- "Wyoming drought update: Spring 2007" *Wyoming Association of Municipalities Spring Meeting, Douglas, Wyoming. April 11, 2007.*
- "What we know and what we wish we knew about Wyoming's changing climate" *Ruckleshaus Institute Special Legislative Reception, Cheyenne, Wyoming. February 7, 2007.*
- "Long-term perspectives on drought in Wyoming" *Wyoming Farm and Ranch Days, Riverton, Wyoming. January 31, 2007.*

In addition, the Wyoming SCO co-organized a special session on drought, climate variability and climate change for the annual meeting of the Wyoming Stock Grower's Association. We also worked with the State Department of Agriculture, State Forester, and Governor's Drought Task Force to produce a variety of press releases and organize news conferences in promotion of drought awareness and water conservation efforts. In total, we conducted over 70 print, radio and television interviews with media outlets from throughout the state and surrounding region.

Developing Improved Communications Capabilities

Work continues on the development of an Internet Map Server that will supplement existing methods of data retrieval. In late 2007 we launched a prototype version of this system that allows users to access real-time and historical climate data provided by multiple state and federal. This system provides "one stop shopping" for data, and allows users to explore and view Wyoming's climate in a variety of user-friendly contexts. The system will be ready for full launch in mid-2008.

Research

In 2007 the Wyoming SCO was directly involved in a variety of research projects, including work related to:

- Impacts of climate variability/climate change on water resources
- Design of climate monitoring systems for high-mountain areas
- Long-term history of Wyoming and western U.S. climate
- Tree-ring based reconstructions of river flow
- Ecosystem impacts of drought

AASC 2007 Annual Meeting Minutes
July 16-19, 2007, Coeur d'Alene

Business Meeting (phase I) July 18, 2007
Items to be discussed: minutes were approved online, the treasurer's report including a proposed budget, AASC non-profit status, followup from the RCC/ARSCO meeting, and membership status, role purge, and new members.

Knight (PA) pointed out that we are poised for important changes. Many activities such as the new Journal, etc. make our AASC more important and we can have an impact. We, not NCDC/NWS/etc., control our destiny.

Mizzell (SC), treasurer, reported that before the meeting, AASC had more than $24k that included encumbered meeting registrations. A list of checks written was shown that paid for meeting and other costs including travel/awards/etc. Expected balance is about $13k.: anticipated carryover is approx. $30k - $17k = 13k.

Knight (PA) mentioned the State Climatologist Exchange Program. McGuirk (NCDC) noted the existence of the 'Preserve America' program has funds for environment, etc. proposals with up to a $12k match. Steve Doty is that contract awardee. $7500 has been granted via AASC.

Knight (PA) talked having applied for and got CCR status (via Dunn and Bradstreet) that allows us to receive federal funds. D&B required that we are officially a 501c3 (nonprofit). The Environmental Research Consortium will host our address. It will all cost $1000 to establish. Since we will be listed in CCR we may need audits.

(Scott Archer, BLM, points out as an aside 'We (feds) actually have an office in Washington that keeps a list of acronyms we haven't used yet'. -- ha ha)

On the SC Exchange Program these items were listed: student program, travel support, and AASC/NCDC collaboration.

Motions were made and 2nd to approve the budget. A motion was made for a vote. A discussion ensued. Budget will drop about $1k next year. Web costs have been made more realistic. Todey (SD) pointed out that once we are a 501 'donations are welcome'. Boyles (NC) asked about donating time as in kind. It was asked if dues recovery is going 'ok' to which Mizzell (SC) said that it should be 100% for this year for SCs. A list of current members will be brought up to date in a couple of months. Qualls (ID) confirmed that using PayPal for registration in the future would be available once we obtain 501 status. Paypal payments were run through Qualls (ID) for this year's meeting and the money then returned to AASC. For the next meeting, we hope to have a shopping cart on AASC website to go to PayPal website. Discussion ended. A vote of 'ayes' signified acceptance.

A followup question asked about removals from membership lists. The membership list was passed around at the meeting to cross out the names no longer associated with the AASC through retirement, job changes, etc,

Action (1) on the need for a communications protocol was brought up. It was pointed out that conference phone systems are available for teleconferencing. Sammis (NM) indicated that there are better teleconferencing choices available. McGuirk (NCDC) indicated that NCDC has purchased a web access system WebEx. Knight (PA) talked of volunteer expert on telecom. Sammis (NM) offered that he will try to get university help. Robinson (NJ) pointed out that the system must be able to be used easily, anywhere. Selover (AZ) pointed out that the University of Arizona capabilities can be expensive. Knight (PA) asked Sammis (NM) to sketch out a range of possibilities. Sammis (NM) suggested a document on the web with links to possibilities.

McGuirk (NCDC) asked a question about SCs vs SCOs. O'Brien (FL) responded that we are climate services regardless of others designations. McGuirk (NCDC) pointed out that AASC and RCCs should be in NOAA's strategic plan. Stookesbury (GA) said that we need to tell our Congressmen that we need to be in the national plan. Livezey (NWS) indicated that formal NOAA planning process has 'wish we could do that' under RDS (Regional Decision Support). The NOAA Strategic Plan is at a very high level; there is really no 'Climate Service Plan'. Knight (PA) will formalize plan for role of AASC in National Climate Service.

Action (2): a call for volunteers for the SC-ACIS issue yielded Zandlo (MN), Leslie-Ann Dupigny-Giroux (VT), Angel (IL), Boyles (NC), Taylor (OR), and (later) Akyuz (ND). Robbins (SRCC) suggested that a mirror of xmACIS could be established for SC use. More functionality is needed; e.g. flags. It can be a conduit for new product development. Knight (PA) asked that Zandlo (MN) be the chair and subsequently requested Eggleston (NRCC) serve as co-chair. Robbins (SRCC) suggested that a brief meeting should occur to discuss how to interact. Eggleston (NERCC) will be the committee liaison. Zandlo (MN) suggested that a tool development discussion could be hosted by the Journal.

Action (3). AASC should look over existing documents for siting, metadata and sensors. Goal to send to Jack Hayes by mid-Fall. AASC also creates documents on QC and storage (Boyles (NC) made a comment on the AASC document. Knight (PA) suggested a start with the documents that Crawford (OK) had prepared while serving at NWS for several years. 'As partners with NOAA we suggest …'. Sammis (NM) offered that there are many standards but was met with the response 'But they conflict.' Livezey (NWS) suggests that standards were not being sought; they want requirements. Foster (KY) commented on a document with NOAA. Robinson (NJ) clarified that the climate focus is for us. Robbins (SRCC) suggested that the committee should work on it and move toward requirements.

Action (4). Knight (PA) reminded us that Karl (NCDC) has said that a policy document would be good; i.e. here are the issues that have to be addressed for data that 'goes into the vault' and be considered 'official'. Redmond (WRCC) offered that other federal

networks already existing have potential record: 'can it be 'official?'. Knight suggested it should be ***this*** is what ***we*** recommend. Livezey (NWS) suggested that we go beyond metadata and address sampling/density requirements as well. Knight asked for and got volunteers. For Action 3: Scott Archer (BLM), Crawford (OK, volunteered by Arndt (OK)-Chair, Foster (KY), and Hubbard (HPRCC). Volunteers for Action 4: McGuirk (NCDC), Todey (SD)-Chair, Hillberg (MRCC), Shafer (OK, volunteered by Arndt), Guinan (MO) and Jeff Andreson (MI). Todey (SD) offered that Karl (NCDC) saying 'I'd like to hear this.'is quite an invitation for the AASC.

Action (5). Hubbard (HPRCC) indicated that QC/QA is being addressed in new ways with the latest procedures/methods and even examines old data. RCCs want SC and NWS participation. Robbins (SRCC) pointed out several issues addressed including scientifically rigorous, routinely defined/refined, and other aspects that are timely and close to the observer. It was pointed out that WxCoder, NCDC, others should all use the same QC/QA. Angel (IL) added that the roles and responsibilities of SCs should be defined. Redmond (WRCC) said we should 'QC the QC' methods themselves as a philosophy. Sammis (NM) offered that there is chaos between the automated systems. Redmond (WRCC) suggested that we should start with the COOP as a model. Livezey (NWS) added that we should get our act together on the 'fab 5' (precipitation, max and min temperature, snowfall and snow depth). Sammis (NM) asked about spatial techniques. Robbins (SRCC) said methods should be exposed to journals instead of being treated as a 'black box' - add scientific rigor. Redmond (WRCC) asked to what extent do you want to allow type 1 and type 2 data, what frequency is allowed?. Knight's call for volunteers yielded Chris Fiebrich (OK), Deke Arndt (OK), Hillaker (IA), and Matt Menne (NCDC) (volunteered by McGuirk (NCDC)), Kevin Robbins (SRCC), Kelly Redmond (WRCC).

Knight (PA) deferred discussion for action items (6)-(8) until the next day.

Knight (PA) asked for meeting location proposals for 2008. Dupigny-Giroux (VT) said 'Welcome to Vermont'. She gave a presentation outlining aspects of a meeting in Burlington, Vermont. 4 possible dates were given. She pointed out that the dinner cruise rate comes down with the number of guests. A discussion of dates quickly vetoed all dates (all summer) except July 8-10. A motion to go to Burlington in 2008 was called for and gotten. O'Brien (FL) asked that other seasons be considered in the future. A vote of all 'ayes' and one 'nay' (Leslie) carried the motion. Robinson (NJ) for the nomination Committee nominated Nolan Doesken (CO) for president. Motions were made and carried. A unanimous vote of 'ayes' made Nolan the president-elect.

New membership names were asked for to be voted on tomorrow.

Thursday, July 19, 2007
Business Meeting (phase II)

Knight (PA) showed Canada model output, which showed a tropical disturbance moving up the coast to Vermont (our meeting location in 2008).

Knight (PA) very briefly summarized some results from the Action items discussion of the previous day. He listed who (what state) will act on the items:

1) NM/PA;
2) MN/NC/VT/OR/IL/ND (SC-ACIS);
3) BLM/OK/KY/HPRCC (guidelines);
4) NCDC/SD/MI/MRCC/OK/MO (mesonet policy);
5) OK/IA/NCDC/SRCC/WRCC(Lincoln accord).

Todey (SD) expressed an interest in doing things faster on (4) than a 1-year timeline. Knight responded that the result for item (3) should be quicker but thought that 12 months for (4) was ok to make it well thought out.

New members nominated were Stephanie Fauver (Coastal Services Center by GA SCO), Preston Leftwich (NWS retiree by COAPS, FL), Tim Carey (USAF grad student by CT), Jim O'Sullivan (NOAA by NJ), Bob Reeves (NOAA by NJ), Chris Friebrich (OK by CO). 'Ayes' voted the members in. It was noted that new members can submit to the Journal cheaply.

Aspects of the AASC website were described. They will continue to host and technically maintain (manage accounts). They will facilitate incorporation of JASC, post web-based presentations, and look into PayPal registration link.

Stooksbury (GA) noted that 50ish people have said they will be submitting papers. It will take a few months to move them through review but the online capability is needed soon. He continued to address Journal plans. He asked what will be the page charges? He pointed out that AMS charges $140/page. Is $5/page too little; is $25 too much? Angel (IL) asked what are plans for archival? Stooksbury (GA) answered that it will be at least in Athens, GA and Oklahoma. May want to distribute hard copy periodically for distribution to, say, libraries and for a paper archive. Young (WI) suggested that a librarian could be consulted about archival. McGuirk (NCDC) offered that NCDC's librarian suggested using 'Scientific Commons'. But it's submission is free no per page charges would be collected by AASC. Angel (IL) pointed out that the Journal will be freely distributed. Boyles (NC) made a motion the currently proposed charges of $5/page for members, $25/page for non-members be used for a year. Livezey (NWS) asked will the low charge cover costs? Stooksbury (GA) answered that 'out of hide' is common. Angel (IL) suggest that some authors may be trolling for low per page costs for their, say, 200 page paper. Maury Roos (CA) pointed out that engineering journals tended to have no per page charges. But a general discussion pointed out that the subscription cost then tended to be high. In a vote 'ayes' carry the (Boyles) motion.

In a follow-up discussion, Dupigny-Giroux (VT) asked about abstract listings.

Stookesbury (GA) said that is being explored. Todey (SD) asked that Extension Services be informed about the publishing possibility.

Knight (PA) brought up that MOAs between SCs and NCDC vary widely. The federal government wants to protect themselves. But we need accountability to ourselves and our partners. We should explore what this document entails (who, what, etc.). This could fit with the review of ARSCO standards.

Action (6). We can say to other 'we follow this …'. Robinson (NJ) said that in many cases MOA do not exist. NCDC wants a 'trace' to the appointing authority (Governor, Legislature, University). ARSCO certification requires a MOA. Pat Michaels (VA) pointed out the need to protect the appointment form the political process. Knight (PA) referred to Karl's (NCDC) slide 'Formalizing the Partnership'. McGuirk (NCDC) pointed out that an SC appointed politically could be a separate entity from an ARSCO (which refers to the office, per se). Angel (IL) reminded that we have talked about substitutes for moribund offices. Taylor (OR) noted that the wording is not 'NCDC State Climatologist' but rather 'AASC approved State Climate Office'. Todey (SD) asked are we adequately recognized, i.e. by a governor? Knight (PA) suggests that community organizations, e.g AMS, does recognition. McGuirk (NCDC) made analogy between WMO (World Meteorological Organization) and the Secretary-General of the United Nation's climate ambassador. Though we recognize the ambassador, for operational activities NCDC works with a WMO-recognized representative. Knights call for volunteers yielded Robinson (NJ), Michaels (VA), Arndt (OK), Curtis (NRCS), Taylor (OR), Young (WI), and Boyles (NC). Stooksbury (GA) suggested that we see what the state forester does - US Forestry funding is funneled. Redmond (WRCC) pointed out the two main ways offices operate: university and state. Zandlo (MN) indicated that the Governor declared the State Climatologist in 1977 but since that time it has been a classified position not controlled by the Governor. A mention of wanting to know who is now appointed by the state was expressed. Redmond (WRCC) asked what would the SC office be, really? Robinson (NJ) asked what does constitute a viable program? Qualls (ID) noting differing levels of funding cautioned not to squeeze out small operations. Robinson (NJ) replied that we do need true minimum standards; one person with a $2000 budget may not be able to be an ARSCO.

Action (7). Form advocacy/information support to establish/strengthen/protect offices. Arndt (OK) pointed out that this is very closely associated with Action item (6). Archer (BLM) stated that a 'personalities orientation' lowers authority; focus on offices and their functions. Volunteers include Arndt (OK), Redmond (WRCC), Schaffer (OK), Anderson (CA), (WY).

Action (8). Knight (PA) and Doesken (CO) as president and president-elect will identify AASC memberships, etc. Dupigny-Giroux (VT) also suggested that affiliations of the past, say 10 years, also be explored. Knight (PA) suggested somewhat fewer years.

Akyuz (ND) suggested that SPC (Storm Prediction Center) be accessible by state rather than by date.

Stookesbury (GA) was recommended as representative for the Board of Oceans and Atmosphere.

Doesken (CO) mentioned a Mesonet survey by Howard Cohen. There are efforts to establish a commercial weather station network. He indicated that AWS ('Weather Bug') was behind this. Knight (PA) pointed out that a dialog would be great; that AASC has a different opinion on these matters. Boyles (NC) said we could respond that standards are coming out. Someone indicated that they are persistent - if they get no response at the level of, say, State Climatologist then they simply make their pitch at a higher level in the organization. Knight (PA) said he would draft a letter with the executive committee saying that we understand the initiative but metadata, standards, and full public access are required. It was pointed out that Senator Mikulski (MD) is a mover. They (AWS) may actually have an MOA with NOAA. McGuirk (NCDC) said 'yes, MOA'. Selover (AZ) asked them (AWS) for a list of relationships but they would not provide that – several answers indicated that it was proprietary. It was pointed that no NOAA money is involved just an MOA.

Doug Kluck (NWS) brought efforts in NOAA to make NOAA regional teams rather than just, say, NWS only teams. He asked 'What kind of funding ideas do you have?'. They are planning stakeholder meetings in next 2-3 years. There will be an opportunity to express data stewardship concerns. They would love to have AASC participation.

Dupigny-Giroux (VT) mentioned a geographers' proposal for mentorships. If you have interested students let Leslie know. A climate literacy effort will include web resources, etc.

Laura Edwards (WRCC) announced that she is stepping down from annual report editor duty. Melissa Griffin from Florida State Climate Office and Deborah Bathke from New Mexico will take over duties.

Stookesbury (GA) asked if JASC editor is on the AASC executive committee? Knight indicated editor may be a member in the future.

Archer (BLM) indicated that the secretary of the Department of the Interior has a climate change workgroup, esp. USGS, with a goal of a strategic plan in about a year. Eail Scott for more information.

'Ayes' closed the business meeting.