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The RCC Report

NEWSLETTER OF THE REGIONAL CLIMATE CENTERS

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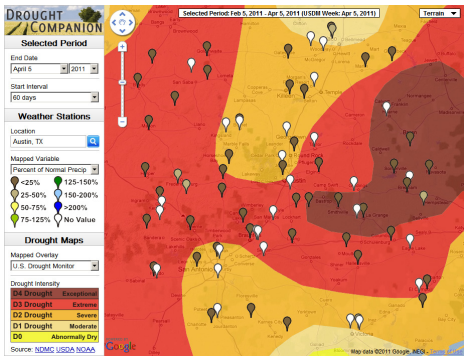
"Drought Companion" Aids Drought Monitoring

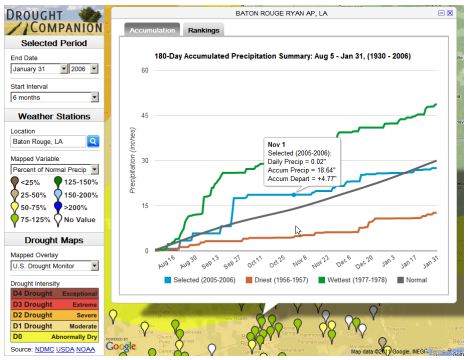
Drought Companion is a new drought monitoring tool produced by the Southern Regional Climate Center (SRCC) to merge station data products from the Applied Climate Information System (ACIS) with drought mapping products. The tool is adaptable to match changing needs of drought monitoring and expandable to include additional information. Users can assess drought in a given week at specific locations, compare and contrast current and past drought events, and place events into a historical perspective.

Drought Companion is in its final phase of testing and is not yet available to the public. It will be posted on the SRCC website by the end of May. Currently, Drought Companion has one mapped overlay and one mapped variable. The mapped overlay consists of the entire United States Drought Monitor Map archive, and the mapped variable is station precipitation. Further map overlays and variables will be added as testing continues. ACIS-powered station products now available on the tool include interactive precipitation accumulation charts and seasonal rankings. These products are adaptable to the user-selected period and location. All products and maps update automatically if these inputs are changed.

Drought Companion was presented at the 2011 Drought Monitor Forum, held on April 13 & 14, 2011 in Fairfax, Virginia. The monitoring tool was very well received by forum participants and should further improve Drought Monitor information. □



The default view of Drought Companion. Shown are the National Drought Mitigation Center's United States Drought Monitor Map and clickable ACIS station locations, which are color-coded based on percentage of normal precipitation.



An example of the interactive precipitation accumulation charts. Charts include lines for the wettest year, driest year, 1971–2000 normal, and selected year, all for the time period of selection (Shown: six-month period ending January 31, 2006).

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RESEARCH

Reanalysis Comparison Supports National Assessment

In preliminary planning for the next national climate change assessment, the Northeast Regional Climate Center conducted analyses comparing regionally downscaled global circulation model (GCM) output with historical observed data to determine how well the models could replicate climate conditions in the recent past. Using the model data, analyses were also conducted in which current and future climate conditions were compared to determine the possible effects of climate change across the U.S.

In all, seven regional model-GCM pairs were compared with regional model simulations driven by observations for the 1980–2000 period. Comparisons between the 1971–2000 and 2041–2070 periods were also made using the seven regional model–GCM pairs. Global circulation models describe the large-scale features of the atmosphere at a spatial scale of hundreds of kilometers. This information can then be fed into regional models that incorporate finer scale features, such as mountain ranges and the Great Lakes, and thus are able to simulate climate conditions at smaller spatial scales (tens of kilometers).

The comparisons were made possible using a component of the Applied Climate Information System (ACIS) that is being developed for gridded data. This allows standard climatological analyses to be

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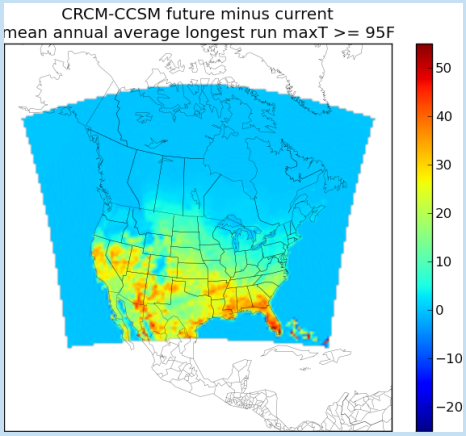
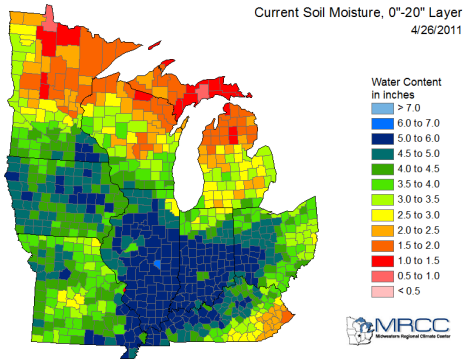


Difference in the length of the mean annual longest run of days with maximum temperature ≥ 95°F between 2041–2070 and 1971–2000, based on the Community Climate System Model run based on the Canadian Regional Climate Model.

Midwest County-Level Soil Moisture Maps

Soil moisture measurements are important to agriculture and hydrology, but actual measurements of soil moisture are complex, expensive to obtain, and not widely available. The Midwestern Regional Climate Center (MRCC) has developed a new set of county-level soil moisture maps for the Midwest using a multi-level soil model. These maps can be found in the Midwest Drought Information section of the Midwest Climate Watch on the MRCC website (http://mrcc.isws.illinois.edu/cliwatch/watch.htm).

Maps of current soil moisture, departure from normal (inches), and percent of normal are generated for the 0- to 4-inch, 0- to 20-inch, and 0- to 72-inch layers. Soil moisture amounts for the three different layers are calculated using a multi-level soil model responding to daily temperature and precipitation in the counties of the region. Daily estimates of precipitation are obtained from The National Weather Service Multi-sensor Precipitation Estimate product (http://water.weather.gov/precip/). Daily temperatures are derived from the NOAA cooperative observer network, and county-level soil characteristics were acquired from the State Soil Geographic (STATSGO) climate division database. If necessary, missing county temperature and precipitation data are estimated using the MRCC daily gridded data. Average values of county soil moisture are computed by week using county data from 1972 to 2010. The maps are produced using GIS and updated twice daily. The model is designed for the growing season when temperatures are above freezing. □



Map of Midwest soil moisture for the 0- to 20-inch layer for April 26, 2011.

Forecast Perspectives Tool Helps Assess Extreme Events

The Southeast Regional Climate Center (SERCC) is developing a new add-on to its web-based Climate Perspectives tool to assess and compare weather and climate conditions across the region (http://www.sercc.com/perspectives/). Forecast Perspectives combines recent temperature and precipitation values with those forecasted by the National Weather Service over the next five days. Climate Perspectives obtains daily time series of temperature and precipitation from the Applied Climate Information System (ACIS) several times a day. From these data, a rich mix of climatological information is produced that allows the user to readily assess the severity of an ongoing weather event or system (e.g., exceptionally hot, cold, or wet conditions) over the prior days, weeks, or months. The user can also ascertain how the ongoing event compares with historical records during the same calendar period.

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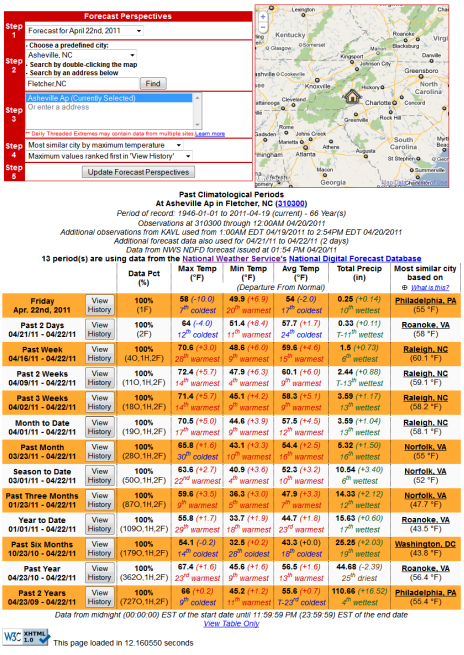


Sample output from the Forecast Perspectives web page.

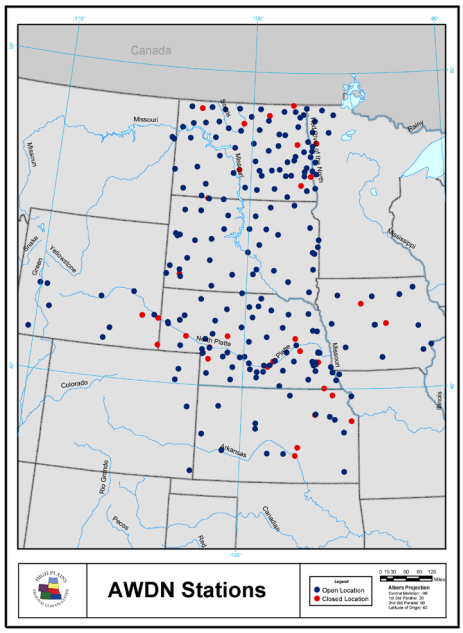
HPRCC Mesonet Expands in Wyoming

Within the past year, the High Plains Regional Climate Center (HPRCC) has doubled the number of observing stations in Wyoming for the Automated Weather Data Network (AWDN). There are now nine stations operating in the southern half of the state. The new stations are located in Upper Green (near the Green River), Boulder, Farson, and Bridger Valley in the southeast, and Pathfinder in south-central Wyoming near the North Platte River. The expansion and new data coverage are particularly useful for water resources management and drought monitoring purposes.

The AWDN program at the HPRCC represents a regional mesonet of weather stations. Through partnerships with various states and agencies, the program operates 206 stations in a nine-state area. The program began with a mere five stations in 1981 and has grown ever since. Hourly observations of the standard weather variables are quality controlled and archived each day at the HPRCC. Additionally, some agriculturally-focused observations such as soil temperature are measured. The HPRCC develops various products from these data to help users with decision-making, such as scheduling of irrigation.

The HPRCC is pleased to have found new partners and to provide enhanced weather and climate monitoring in the region. □

The new AWDN site at Boulder, Wyoming was installed August 2010.



The AWDN sites.

NRCC Co-Hosts Workshop

The 19th Annual Great Lakes Operational Meteorology Workshop was held at Cornell on March 21–23. The Northeast Regional Climate Center (NRCC) co-hosted the event along with the National Weather Service (Binghamton and Buffalo) and the Department of Earth and Atmospheric Sciences. The workshop brought together students, academics, and forecasters from across the Great Lakes Region and Canada. NRCC staff organized a workshop session Monday afternoon in which participants developed snow-roses for stations across New York. Similar to a wind rose, a mapped diagram of wind information that sometimes looks like a rose, snow roses show the amount and frequency of daily snowfall that occurs with daily average wind directions.

Using the Applied Climate Information System (ACIS), participants extracted daily snowfall data and, along with wind data files compiled by the NRCC, plotted snow roses for about 20 stations. Cooperative Network stations were supplemented with CoCoRaHS data to identify finer scale details in snowfall patterns around the Finger Lakes. Individual snow rose plots were placed on a map of New York to illustrate the interaction between the Great Lakes, Finger Lakes, elevation and coastal proximity, and snow frequency. □

PARTNERSHIPS & COLLABORATIONS

U.S. Drought Monitor: Inter-agency Collaboration at Its Best

The United States Drought Monitor (USDM), now in its 13th year, provides an example of how multiple federal, state, local, university, and research organizations can work together effectively and efficiently to create a timely, relevant product that non-scientists can understand and use. This weekly product comprises a map and narrative that describe the extent and severity of drought in all 50 states and Puerto Rico.

The USDM started as a grassroots effort among a small group in 1999—the National Drought Mitigation Center at University of Nebraska, the U.S. Department of Agriculture, and the National Oceanic and Atmospheric Administration. At first this experimental product was hand drawn with a crude graphics program, and included input from a few professionals around the nation as "ground truth" experts. Soon, the USDM was adopted by federal agencies to be the go-to source for drought status monitoring across the U.S.

Today, the USDM is still produced weekly but incorporates data and information on climate and drought impacts from over 300 individuals that currently subscribe to the listserv, including representatives from the six Regional Climate Centers. The impacts are far-reaching, as USDM has created an audience that relies on the monitor for decision-making, such as some disaster relief programs as outlined in the U.S. Farm Bill.

Drought in the mountainous, snow-dominated western U.S. has many special

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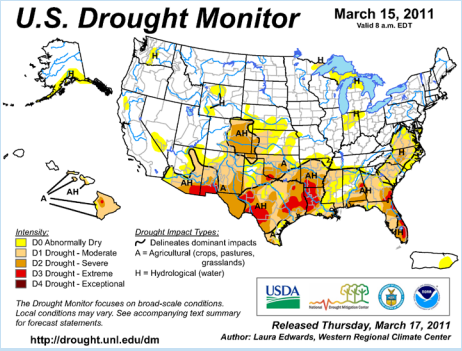

The U.S. Drought Monitor for March 15, 2011, authored by Laura Edwards of the WRCC.

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performed on gridded datasets. In addition to the common comparisons of annual maximum and minimum temperature and precipitation, the system also allowed the modeled values to be compared in terms of number of extreme days (e.g., days with maximum temperature > 100°F or days with minimum temperature < 0°F), daily exceedences of extreme precipitation thresholds (e.g., 2 inches), growing, heating, and cooling degree days; growing season length; and series of extremely hot days and dry days.

Maps of these quantities are posted at http://nrcc.cornell.edu/narccap/.

Using a series of days with maximum temperature ≥ 95°F as an example, the different regional model-GCM pairs vary in their representation of the 1980–2000 climatology, with some overestimating and others underestimating the values produced by using the historical data. In future simulations, most model pairs show an increase in run length across the eastern United States, with runs increasing by as many as 30 days in the Southeast. □

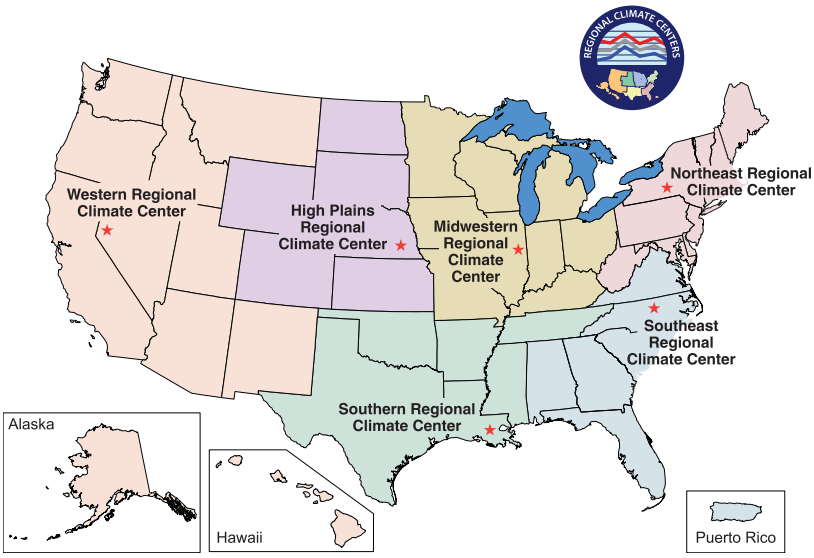
Forecast Tool continued from page 2

With Forecast Perspectives, the user can determine how the severity of a developing or ongoing event will change in the coming days. For example, a user may assess the potential magnitude of a summer heat wave that started two days prior to the current day and is predicted to continue for the next five days. By comparing the predicted magnitude of the heat wave with prior heat waves, Forecast Perspectives can provide the public health and energy sectors with valuable comparative information. Like Climate Perspectives, the user can select any weather station from the U.S. Cooperative Observer Network or a National Weather Service first-order site) and develop perspectives that include the minimum, maximum, and mean temperature as well as precipitation. □

U.S. Drought Monitor continued from page 3

features and nuances. To better represent this area, in 2008 Laura Edwards, Regional Climatologist with the Western Regional Climate Center, became the first of 11 authors who reside in the West. These individuals lead weekly discussions, create the map (now produced using ArcGIS), and write the accompanying narrative. In a typical year, she is the lead author for six to eight weeks, usually for two weeks at a time. WRCC has received many positive comments about Laura's participation in this important national activity. □

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



BY THE NUMBERS

January 1-March 31, 2011

Total Web hits:	20,375,900
Data Requests/contacts:	2,518
Media requests:	160

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