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1. INTRODUCTION

The Climate Monitoring Branch (CMB) of NOAA's National Climatic Data Center (NCDC) provides operational monitoring of U.S. and global climate conditions to provide scientific insight into the Earth's climate and historical perspective on its variability and change. The CMB also monitors the influence of climate on vital socioeconomic sectors to serve the economic and societal interests of our nation and the global community. These activities have grown in value as evidence of man's influence on the Earth's climate continues to grow and as the vulnerability of populations to climate extremes has increased in recent decades (IPCC, 2001).

Some of the most prominent climate changes include a global surface temperature rise exceeding 0.6°C/Century since 1900 and a rate of change almost three times greater during the past 30 years. Precipitation has increased in many mid- and high-latitude regions of the world with the greatest increases in heavy and extreme precipitation events. Other indications of a changing climate include reductions in Arctic sea ice and Northern Hemisphere snow cover extent, melting permafrost, and rapid melting of glaciers throughout the world. Observational evidence of more frequent and severe extremes such as drought, tropical cyclones, and heat waves has also been documented during recent decades.

Established in the late 1990's, NCDC's Climate Monitoring Branch has ensured the continuity and availability of climate information to scientists, public and private sector decision-makers, and the general public for almost a decade. Numerous local, national, and international media outlets have been an essential part of NCDC's effort to broaden the availability of its climate monitoring products, and as such, NCDC is also intently focused on meeting the needs of the broadcast community. Through the production of monthly web-based *State of the Climate* reports, press releases, personal communication with media outlets and through peer-reviewed journal articles, broadcasters are provided with a continuing source of up-to-date information on the Earth's climate.

The degree to which broadcasters find these products useful in communicating climate information to their target audiences is directly related to the degree to which the products are easy to access, understand, and tailor to individual needs. As such, CMB is intently focused on delivering products which meet these

requirements. Additionally, feedback assists CMB in its effort to provide the types of data and products in a form which is most useful to broadcasters and other customers.

This presentation addresses a number of climate monitoring issues of specific interest to the broadcast community and describes the most popular products. Included are details on NCDC's *State of the Climate* reporting process, CMB scientist interaction with media outlets, and additional types of data and products often of most interest to broadcasters and other media sources.

2. STATE OF THE CLIMATE REPORTING

Data are continuously collected at NCDC from a wide variety of land and ocean in situ observing systems as well as an ever-expanding array of radar and satellite systems. These near real-time data are combined with numerous high quality historical data sets, many of which have been adjusted to remove artificial effects, such as observing system changes and urbanization, which can artificially amplify or diminish trends (see e.g., Karl et al. 1988; Easterling and Peterson, 1995; Gallo et al. 1996). These resources provide the CMB with a unique capability to monitor numerous aspects of the Earth's climate on an ongoing basis and to provide timely information for public and private sector users through a variety of avenues.

State of the Climate reports, which place conditions for the past month, season, and year-to-date period in historical perspective, are provided as data become available. Parts of the report are available online as early as the 5th of each month, and the full report is available no later than the 15th. Each report includes hundreds of graphics and text summaries of global and U.S. climate conditions with historical perspective provided by more than 100 years of instrumental observations and hundreds of years of paleoclimate data from sources such as tree rings, ice cores, and sedimentary records.

The reports, as shown by the example in Figure 1, consist of several sections summarizing conditions on both a U.S. and global scale. The section on global conditions includes data on surface and upper air temperatures, precipitation, ENSO conditions, sea ice, and snow cover. The Global Hazards and Significant Events section summarizes major extreme events that occurred throughout the world and their impacts. This section is updated on a weekly basis for more frequent reporting of the most hazardous weather and climate conditions. A U.S. National section provides statewide, regional, and national rankings for mean temperature and precipitation. User-friendly graphics and short explanatory discussions make determination of

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conditions quick and easy. The *State of the Climate* report also includes a U.S. Drought section providing numerous drought indicators and summaries of national, regional, and local drought conditions during the past month with perspective on how the conditions compare with those during the preceding centuries. A U.S. Pre-instrumental Perspectives discussion uses paleoclimate reconstructions to extend historical perspective for the current month's conditions to the centuries before instrumental climate observations were widespread. The U.S. Climate Extremes section contains a list of new all-time U.S. records of significance for temperature, rainfall, snowfall, wind, and pressure.

NOAA Satellite and Information Service
National Environmental Satellite, Data, and Information Service (NESDIS)

National Climatic Data Center
U.S. Department of Commerce

Climate Monitoring / Climate of 2006 / August / Help

Climate of 2006 - August in Historical Perspective

Including Boreal Summer

National Climatic Data Center
14 September 2006

Contents of this Report:

- Major Highlights
- Global Analysis
- Global Hazards and Significant Events
- National Overview
- United States Drought
- U.S. Pre-instrumental Perspective
- U.S. Climate Extremes

Selected Global Significant Events August 06

Map of Selected Global Significant Events

Legend: Drought, Heavy Rain/Flooding, Tropical Systems, Fires

Figure 1. Web-based *State of the Climate* report for August 2006; contents and links to individual sections <http://www.ncdc.noaa.gov/oa/climate/research/2006/aug/aug06.html>.

While the monthly *State of the Climate* reports are often of greatest interest to the media and general public, NCDC also leads the preparation of an annual *State of the Climate* report which is published in the June issue of the *Bulletin of the American Meteorological Society* each year (e.g., Shein, 2006). This 100-page report, which is produced in cooperation with more than 90 national and international scientists, is a comprehensive summary of global climate conditions during the past year written in a manner which can be understood by a wide audience.

3. COMMUNICATING WITH MEDIA OUTLETS

Communicating the state of the climate is aided through interaction with radio, television, and print media. Public and political attention to climate issues heightened during the very strong 1997-1998 El Niño episode. Sixteen straight months of record-breaking global temperatures and several extreme events resulting from the El Niño episode and the subsequent strong La Niña, focused public attention in a new way on the power of weather and climate to affect the lives

of people throughout the world. The continuation of record-breaking US and global temperatures in subsequent years along with a number of deadly severe weather events kept people's attention focused on climate and what humans might be doing to influence it. Extreme events such as the 2003 summer heat wave that killed more than 20,000 people in Europe, the Hurricane Katrina tragedy in New Orleans and along the Mississippi coast, and the record-breaking Atlantic Basin hurricane season in 2005 have been major factors in this interest.

As part of the effort to deliver answers to questions about such extreme events and other climate monitoring issues, NCDC prepares routine monthly press releases which are issued by NOAA in association with the online posting of each month's *State of the Climate* report (Figure 2). Press releases are also often issued between reports when major weather events occur. Releases are written with the intent of placing each period or event in historical perspective and helping the public understand the climatological significance and human impact.

NEWS FROM NOAA
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FOR IMMEDIATE RELEASE
September 14, 2006

U.S. HAS SECOND WARMEST SUMMER ON RECORD
Nation Experienced Warmest January – August Period On Record

Summer 2006 was the second warmest June-to-August period in the continental U.S. since records began in 1895, according to scientists at NOAA's National Climatic Data Center in Asheville, N.C. Additionally, the 2006 January-to-August period was the warmest on record for the continental U.S. Above-average rainfall last month in the central and southwestern U.S. improved drought conditions in some areas, but moderate-to-extreme drought continued to affect 40 percent of the country.

U.S. Temperature Highlights

- The average June-August 2006 temperature for the contiguous United States (based on preliminary data) was 2.4 F (1.3°C) above the 20th century average of 72.1°F (22.3°C). This was the second warmest summer on record, slightly cooler than the record set in 1936 during the Dust Bowl era. Eight of the past ten summers have been warmer than the U.S. average for the same period.
- The persistence of the anomalous warmth in 2006 made this January-August period the warmest on record for the continental U.S., eclipsing the previous record of 1934.
- A historic heatwave in July impacted most of the nation, breaking more than

Figure 2. Example of NOAA press release on Summer 2006 *State of the Climate*.

State of the Climate reports and, press releases, and the occurrence of extreme events typically result in additional questions from reporters. The greatest number of inquiries come from the print media, but most releases also result in interviews with radio outlets for taped delay or live broadcast. These include both local and national outlets. Interviews with local and national television stations also take place from time to time, primarily when there is a story perceived to be of particular interest to the broadest audience.

One of the primary goals of CMB scientists in any interview is to communicate with the reporter in a clear and understandable way so that the information gets translated correctly into the story. Conversations almost always include the question of whether the event or conditions during the past month were a result of global warming. Given that multiple contributing factors typically come into play in any weather and climate event, the products and data sets provided by NCDC are extremely valuable in understanding how different

factors affect Earth climate. Through the interview process, whether for print or broadcast, these data are communicated and the particular event is placed into the broader context of well documented changes that have occurred over the past decades to centuries.

4. OTHER PRODUCTS OF INTEREST TO THE BROADCAST COMMUNITY

Providing climate information through *State of the Climate* reporting and interaction with the media is a primary focus of CMB scientists. However, a number of other products and decision-making tools are available to further support retrospective analysis and understanding of climate and its impacts. Each product is available on the NCDC CMB website and may be highlighted from time to time in the monthly press releases. Details on those which have proven to be of most interest to the broadcast community are included below.

The Residential Energy Demand Temperature Index (REDTI) is a tool for explaining year-to-year fluctuations in energy demand for residential heating and cooling (Heim et al. 2003; NCDC, 2006a). Residential energy consumption is known to be highly correlated with temperature as measured through heating and cooling degree days. (Quayle and Diaz, 1980). Energy consumption increases as the number of heating and cooling degree days increases and falls as the number of heating and cooling degree days falls. Using this relationship NCDC developed an index which is used to estimate the degree to which residential energy consumption is influenced by anomalous climate conditions each month. The information is provided as the percentage of energy consumption above or below that which would be expected under average climate conditions.

The Climate Extremes Index (CEI) was originally developed to help identify trends in a variety of climate extremes indicators; maximum and minimum temperature, drought severity, and precipitation intensity and frequency (Karl et al. 1996). More recently a sixth extremes indicator (hurricane intensity) was added (Gleason et al. 2006). This index measures the percent of the contiguous U.S. influenced by climate extremes from 1910 through the present and is updated on a monthly basis (Figure 3). It is helpful in studying the long-term trend and variability in climate extremes over the past century. Because each indicator which comprises the CEI can be analyzed individually, it is also helpful in quantifying the aspects of the climate which contribute to some of the most unusual, and often the most hazardous, weather conditions that effect the nation each month. For example the CEI was helpful in determining that extremes in minimum temperature were much more prevalent than extremes in maximum temperature during the 2006 summer heat wave which affected large parts of the country.

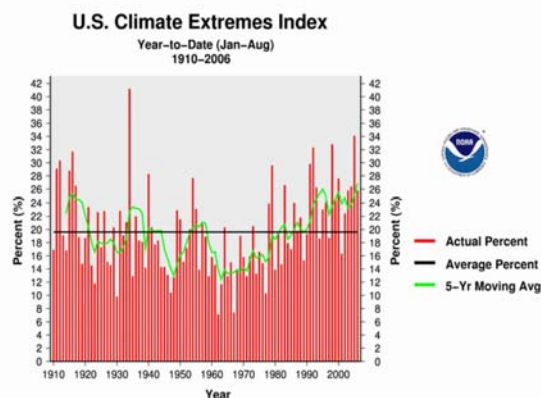


Figure 3. The January-August Climate Extremes Index time series for the period 1910-2006. Red bars indicate the yearly CEI value, the green line the 5-year average, and the horizontal black line the period of record average. The CEI is available at <http://www.ncdc.noaa.gov/oa/climate/research/cei/cei.html>.

The Northeast Snowfall Impact Scale (NESIS) characterizes and ranks high-impact Northeast snowstorms using five categories in a manner similar to the Fujita and Saffir-Simpson scales for tornadoes and hurricanes, respectively: Extreme, Crippling, Major, Significant, and Notable. The index uses population information in addition to meteorological measurements, and thus gives an indication of a storm's societal impacts. This scale was developed because of the impact Northeast snowstorms can have on the rest of the country in terms of transportation and economic impact. Originally developed by Paul Kocin of The Weather Channel and Louis Uccellini of the National Weather Service (Kocin and Uccellini, 2004), NCDC produced an operational version (Squires and Lawrimore, 2006; NCDC, 2006b) that has been in use since early 2006 to quickly assess the impact of snowstorms on the Northeast. Similar snowfall impact scales are currently being developed for other regions of the U.S.

The U.S. Climate At A Glance website is a popular and easy-to-use source of climate information on national, regional, statewide, and city temperature and precipitation trends and rankings (NCDC, 2006c). A few clicks of the mouse can provide a user with a number of different statistics in addition to a bar or line graph; temperature or precipitation values for any month or season from 1895 to present, the respective ranking for each year from warmest to coldest or driest to wettest, the climatological average for any selected base period, and the linear trend over the period selected. Mapping of statewide temperature and precipitation values for any month or season during the period of record is also possible. There is also a Global Climate At A Glance website providing graphing and summary statistics information by country and for any user-defined region (NCDC, 2006d).

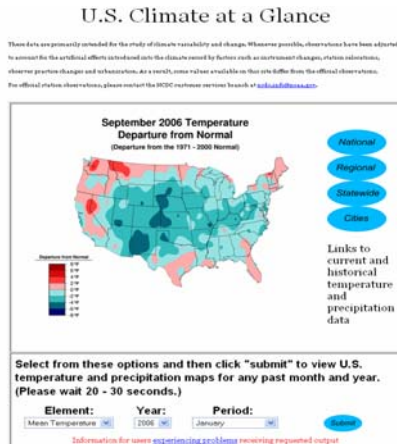


Figure 4. NCDC's U.S. Climate At A Glance website <http://www.ncdc.noaa.gov/oa/climate/research/cag3/cag3.html>.

5. SUMMARY

This paper briefly summarized a number of climate monitoring issues of specific interest to the broadcast community. Included were details on NCDC's *State of the Climate* reporting process, scientist interaction with media outlets, and additional types of data and products of most interest to broadcasters and other media sources.

The climate information and products are made available on an operational basis as part of NCDC's Climate Monitoring Branch activities. They support the needs of broadcasters and other user communities to understand and communicate the state of the Earth's changing climate and its impact on economies and societies throughout the world. These and other climate monitoring products and data are available from the CMB website at <http://www.ncdc.noaa.gov/oa/climate/research/monitoring.html>.

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