Internet Applications for Agrometeorological Products - Experiences from USA *

Robert J. Stefanski
World Agricultural Outlook Board, Office of the Chief Economist
U.S. Department of Agriculture, Washington D.C.

Abstract

Agrometeorological products have been produced for many decades in the United States. This paper has two objectives. The first is to give an overview of the various internet applications of agrometeorolgical products found at the national, regional, and state level in the United States. The second is to report on the experiences of agrometeorological product generation and dissemination at the U.S. Department of Agriculture's Joint Agricultural Weather Facility.

Introduction

There is no one agrometeorological institution at the federal level in the United States that directs nationwide agrometeorological activities. Instead, there are numerous agencies at the federal, regional, and state level that provide agrometeorological products and services.

Joint Agricultural Weather Facility

The *Weekly Weather and Crop Bulletin* (WWCB) was first published as the Weekly Weather Chronicle in 1872 and has been published under various names. Since 1978, the WWCB has been produced by the Joint Agricultural Weather Facility (JAWF), which is jointly operated by the U.S. Department of Agriculture's (USDA) World Agricultural Outlook Board (WAOB), Department of Commerce's Climate Prediction Center (CPC), and USDA's National Agricultural Statistics Service (NASS) (Puterbaugh and Rippey 2001; Motha and Heddinghaus 1986).

In 1995, portions of the WWCB started to be disseminated on the Internet, but all the products were not linked on a single web site (WWCB 1995). By July of 1996, a JAWF web site had been developed and was operationally available online (WWCB 1996). At this time, the various portions of WWCB consisted of graphic images, text files, and tables that were available to users but were difficult to directly view or print out. It was not until January 1999, that Adobe Portable Document Format (PDF) versions of the actual bulletin were available online. This enabled users to download and print the pages of the WWCB exactly the same as the printed version of the bulletin. Now, users have the choice of download selected sections (grouped by the table of contents) or the whole WWCB. The WWCB's prior to 1999 have been scanned in and converted into PDF's, thus providing a seamless connection of WWCB from 1991 to present.

* This paper will be published in the forthcoming Proceedings of the Expert Group Meeting on Internet Applications for Agrometeorological Products held 6-9 May 2002 in Washington, D.C. USA.

The following is a list of products typically available in the WWCB at http://www.usda.gov/oce/waob/jawf/wwcb.html (Figure 1):

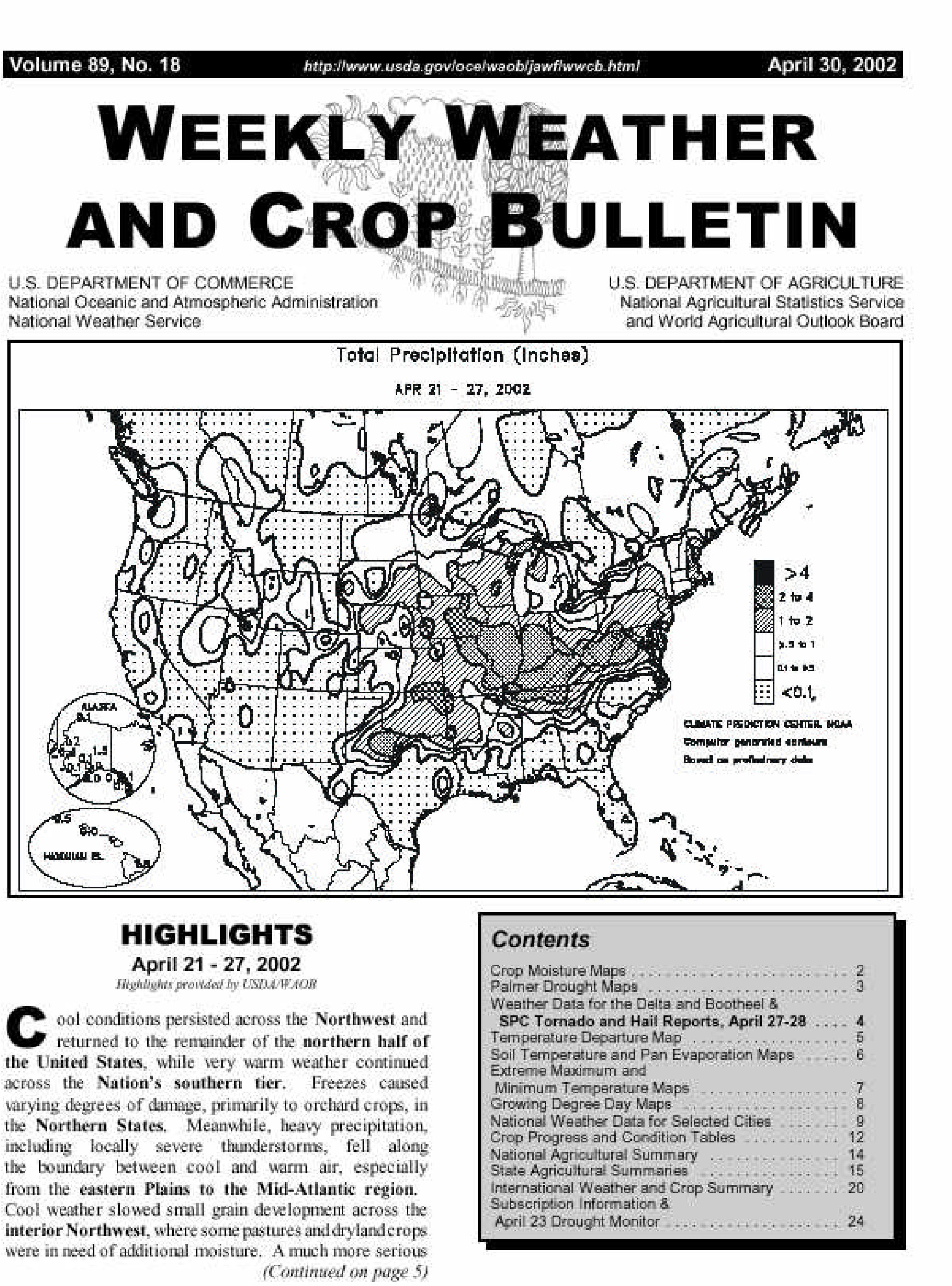
- Precipitation and Percent of Normal Precipitation Maps
- Temperature and Departure from Normal Maps
- Pan Evaporation Plots
- Growing Degree Day Maps
- Soil Temperature Maps
- Tabular Weather Data for Selected Cities
- National Crop Progress and Condition Tables
- National and State Agricultural Summaries
- International Crop Summaries

In addition to the WWCB, here is a list of other USDA JAWF agrometeorological products available online:

- Daily U.S. Agricultural Weather Highlights
- Major World Crop Areas and Climatic Profiles
- Monthly World Agricultural Weather Highlights
- Monthly Ag-Weather Highlights for the Former Soviet Union and China
- Worldwide Crop Calendars
- Selected El Niño/ La Niña Graphics
- Useful Agricultural Weather Links

Other Agrometeorological Products on the Internet

The following is a listing of the major agrometeorological products available from the Internet from U.S. sources. This is not an exclusive list but is provided to show the scope of what is currently available.



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WEEKLY WEATHER AND CROP BULLETIN

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

U.S. DEPARTMENT OF AGRICULTURE
National Agricultural Statistics Service
and World Agricultural Outlook Board

HIGHLIGHTS

April 21 - 27, 2002

Highlights provided by USDA/WAOB

Cool conditions persisted across the **Northwest** and returned to the remainder of the **northern half of the United States**, while very warm weather continued across the **Nation's southern tier**. Freezes caused varying degrees of damage, primarily to orchard crops, in the **Northern States**. Meanwhile, heavy precipitation, including locally severe thunderstorms, fell along the boundary between cool and warm air, especially from the **eastern Plains to the Mid-Atlantic region.** Cool weather slowed small grain development across the **interior Northwest**, where some pastures and dryland crops were in need of additional moisture. A much more serious

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Figure 1. Example of recent Weekly Weather and Crop Bulletin front cover.

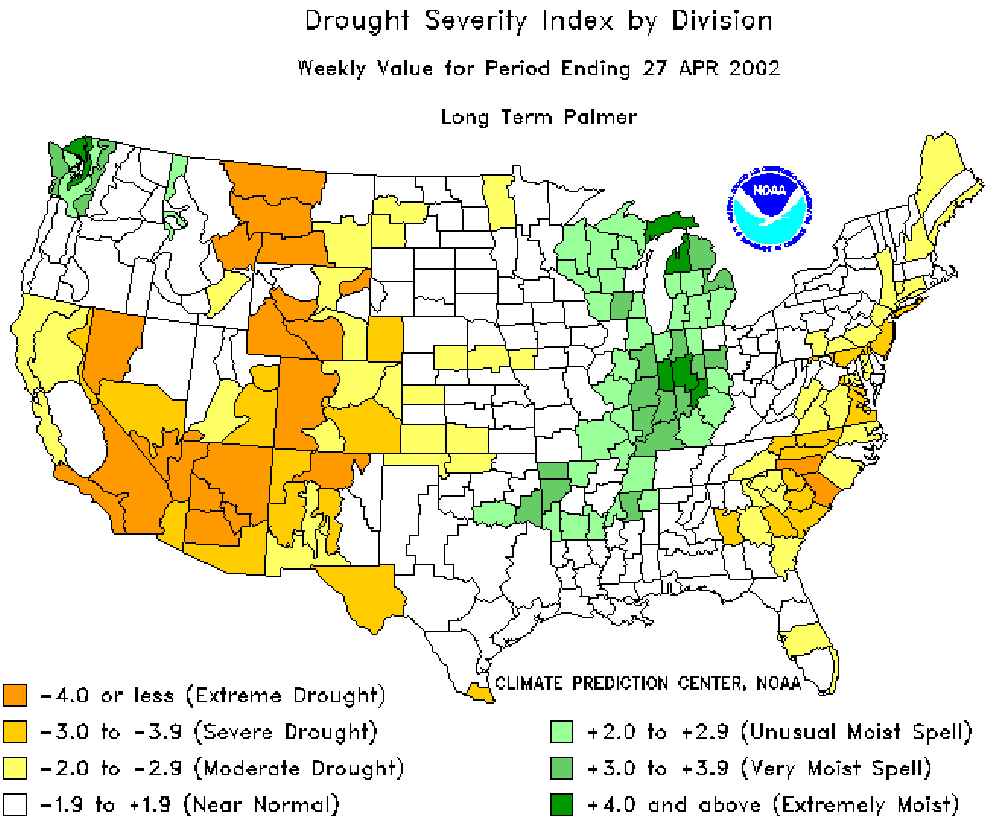

Figure 2. Recent Palmer Drought Severity Index map.

National Level

Climate Prediction Center

http://www.cpc.ncep.noaa.gov/

- Palmer Drought and Crop Moisture Maps (Figure 2)
- Soil Moisture Anomaly Model
- Long-term Outlooks
- U.S. Hazards Assessment

National Climate Data Center

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

- Climate Data Archives
- Rankings
- Historical Climate Comparisons

National Weather Service

- Short-term Forecasts
- Model Guidance

Regional and State Level

Western Regional Climate Center
http://www.wrcc.dri.edu/
High Plains Regional Climate Center
http://www.hprcc.unl.edu/
Midwestern Regional Climate Center
http://mcc.sws.uiuc.edu/
Southern Regional Climate Center
http://www.srcc.lsu.edu/srcc.html
Northeast Regional Climate Center
http://met-www.cit.cornell.edu/nrcc_home.html
Southeast Regional Climate Center
http://www.sercc.com/

Delta Research and Extension Center Mississippi State University
http://www.deltaweather.msstate.edu/

- View temperature, growing degree days, pan evaporation, and soil temperature
- Rice Growing Degree Day Model
- Planting Recommendations for Cotton, Corn, and Soybeans

Iowa Environmental Mesonet
http://mesonet.agron.iastate.edu/

Oklahoma Mesonet
http://www.mesonet.ou.edu/public/

Discussion

The mesonets and regional climate centers are excellent examples of a state or regional institutions providing agrometeorological data via the Internet for their users. The cost of the providing a high-density station can be offset by charging for online access. However, some centers charge for actual data access but will provide graphics of analyzed agrometeorological parameters for free. This is a crucial point for national meteorological/hydrometeological service developing agrometeorological products. By analyzing the data and producing a graphic or map on the internet, they can serve the public without distributing data. This will allow them to produce effective warnings, educational products, and/or raise the visibilities of their institutions. Figure 3 depicts actual station data from the Oklahoma mesonet and Figure 4 is a graphic analysis of the same data.

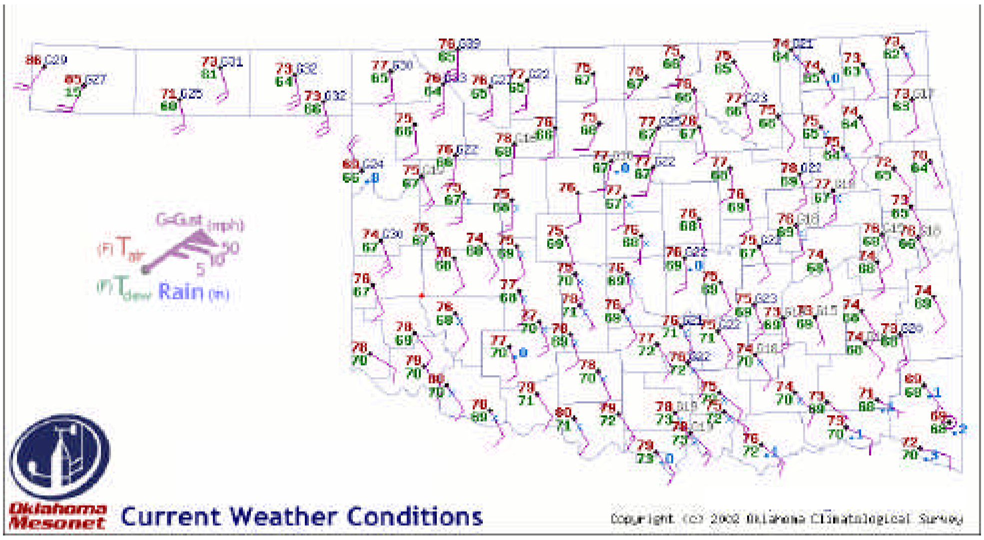

Figure 3. Example of Oklahoma Mesonet Data Network.

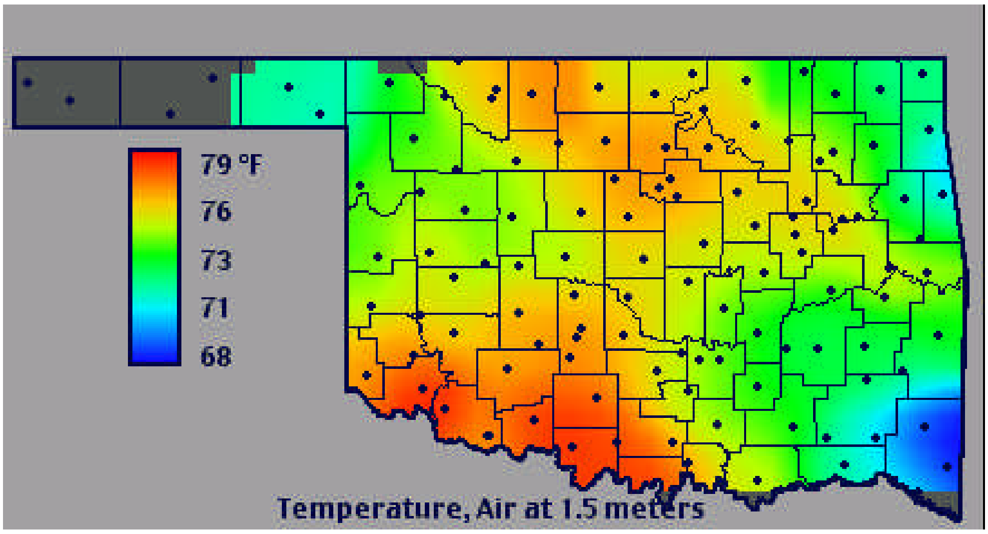

Figure 4. Example of Air Temperature Analysis from Oklahoma Mesonet.

The staff of the JAWF have had several years of experience in publishing the *Weekly Weather and Crop Bulletin* and in using other agrometeorological products from the internet. In developing agrometeorological products for the internet, the staff has found that the PDF format of the Adobe Acrobat Reader is a very useful software package.

Before the JAWF products were in Adobe PDF format, GIF, JPG, and text was used on the internet. While easy to disseminate, the JAWF staff received a number of phone calls every week from the public on how to print graphics or tables. Complaints were often voiced ranging from:

- Portions of graphics not being printed
- Colors not being reproducible from particular printers
- Relevant Products not being found together

These and other complaints forced the JAWF staff to look for alternatives. The WWCB was already being routinely published in WordPerfect and making a PDF version from WordPerfect was relatively easy. Therefore, it was decided to make the internet version of the WWCB in PDF format based on the feedback from the users.

The following is a list of guidelines for producing internet applications that the JAWF staff have compiled over the years:

- Keep Web Pages Simple
- Avoid frames
- Pseudo-Frames look for Web pages
- Keep User Feedback in Mind when Updating Sites
- Use PDF format whenever possible
- Maintain Publication Schedules
- Update and maintain links
- Archive Products
- Make Sure Products are Consistent
- Put Sensitive Products on Intranet

Summary

There is a long history of producing agrometeorological products in the United States. With the advent of the internet in the 1990's, various agrometeorological products have been provided to users at the national, regional, state, and local level. National meteorological/hydrometeological services can develop agrometeorological products by analyzing the data and producing a graphic or map on the internet without distributing data, which for whatever reason, cannot be distributed. The JAWF staff has learned some valuable lessons over the years of providing agrometeorological products on the internet. The main lessons include keeping web pages simple, using PDF format, and providing archived reports online.

References

Motha, R. P. and T.R. Heddinghaus. 1986. The Joint Agricultural Weather Facility's Operational Assessment Program. Bull. Amer. Meteor. Soc. 67: 1114-1122.

Weekly Weather and Crop Bulletin. 1995. Bulletin Information of the Internet. USDA/DOC. Vol 82, No. 21, p. 23.

Weekly Weather and Crop Bulletin. 1996. JAWF Goes Online. USDA/DOC. Vol 83, No. 26, p. 23.