

# The ArkLaMiss Observer



Spring 2007 Edition

SEE OUR HOMPAGE!

[www.srh.noaa.gov/jan/](http://www.srh.noaa.gov/jan/)

## INSIDE THIS EDITION!

ANALYSIS OF A  
SURPRISE EARLY  
JANUARY SEVERE  
WEATHER EVENT 1

DROUGHT TO  
REASSERT ITSELF  
OVER THE  
ARKLAMISS? 3

AVAILABLE  
OPPORTUNITIES  
WITH THE  
NATIONAL  
WEATHER SERVICE  
IN JACKSON, MS 5

TRUTH ABOUT  
LIGHTNING AND  
THUNDER 5

FUN STUFF FOR THE  
KIDS 6

REACHING OUT TO  
YOU 7

## Analysis of a Surprise Early January Severe Weather Event

*By: Eric Carpenter, Senior  
Forecaster, Chad Entremont,  
Senior Forecaster, and Brad  
Bryant, Journeyman Forecaster*

Little in the way of severe weather was anticipated across central Mississippi on January 4<sup>th</sup> and 5<sup>th</sup> as a low pressure trough moved across the lower Mississippi Valley region. Recent heavy rainfall and a shield of steady rain progressing across the area brought concerns for flooding, but limited amounts of instability and a rain-cooled airmass were not supportive of thunderstorms. However, a dramatic change in the environment took place on the evening of the 4<sup>th</sup>, and a squall line of severe thunderstorms developed (Fig. 1) and swept across the eastern half of the state during the overnight and into the early morning hours of the 5<sup>th</sup>, producing major wind damage and isolated tornadoes (Fig. 2).

This narrow but intense line of thunderstorms was deep and strong

enough to produce frequent cloud-to-ground lightning strikes despite the limited instability. Forecasters realized the potential implications of thunderstorms in an environment that contained strong wind shear, but for days in advance, most computer models had been predicting that instability would be limited (Fig. 3) over the region during this time period. Observations indicated that the intensity of the low pressure trough was responsible for making the atmosphere more unstable than expected.

The intense upward motion associated with this trough (Fig 4) helped make the atmosphere more unstable and this allowed thunderstorms to develop and form into a squall line. Because of the strong wind shear that was in place, damaging winds were frequently observed with this squall line as it moved across eastern Mississippi, and tornadoes occasionally developed within the squall line. Typically in mid

winter, when thunderstorms complexes form near the Gulf Coast, it is very difficult to get significant instability as far north as central Mississippi, but in this case, we surmise strong low pressure trough was enough to overcome the deficient environmental instability.

Figure 1: KDGX (Brandon, MS) radar image of the intense, quick-developing squall line as it moves across eastern Mississippi during the overnight and early morning hours of January 4<sup>th</sup>-5<sup>th</sup>

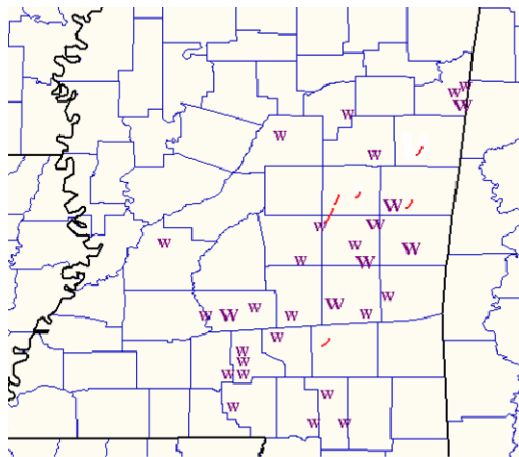
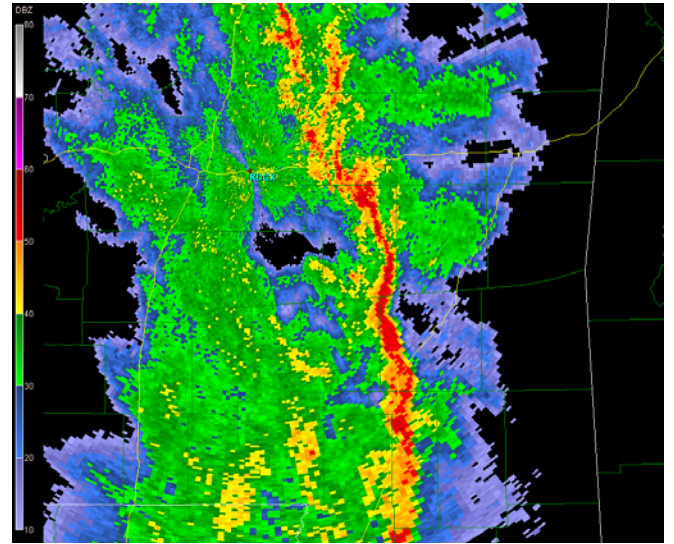


Figure 2: Numerous reports of straight-line wind damage, six confirmed tornadoes, including four tornadoes rated F1 and two rated F2, were reported from East Mississippi on the night of January 4<sup>th</sup> 2007

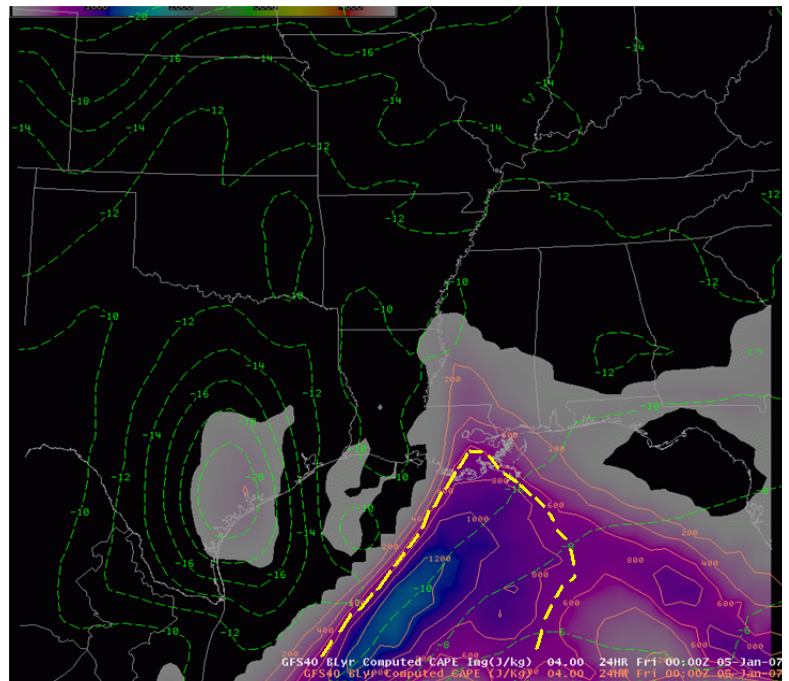


Figure 3: Image shows instability (shaded in j/kg) and mid level temperatures (green dashed in deg C) forecasted by a computer model valid at 6 pm on January 4<sup>th</sup>. Colder temperatures aloft normally correlate with greater instability. In this forecast, temperatures were relatively warm across the lower Mississippi Valley and instability was marginal as a result.

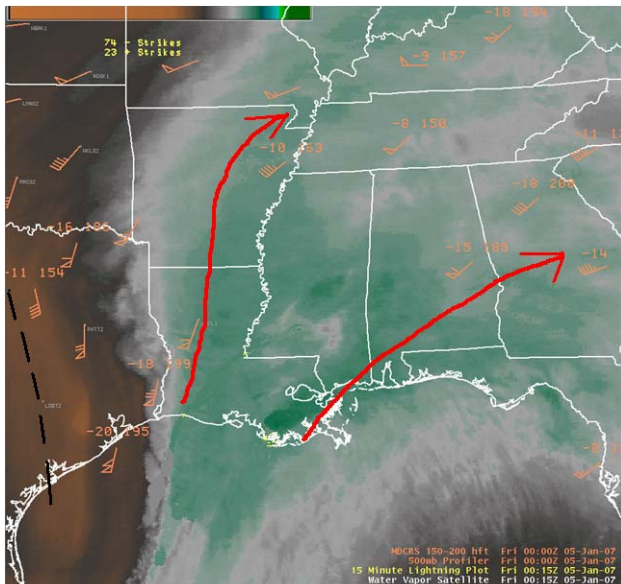


Figure 4: Water vapor image (satellite image of mid/upper level moisture) taken about 6 pm on January 4<sup>th</sup> shows the developing thunderstorm complex (deep moisture is green). Notice the divergent looking pattern to the moisture shield (red arrows). Upper level divergence such as this signifies intense upward motion ahead of the low pressure trough.

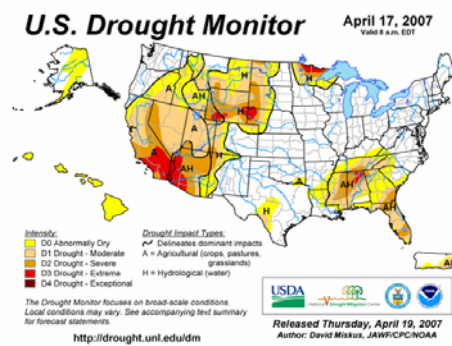
# Drought to Reassert Itself Over the Arklamiss?

By: Brad Bryant, Journeyman Forecaster

Most residents of the region probably know that the Arklamiss has had its share of dry spells over the past few years. Unfortunately, these dry spells have generally been far outweighing the number of wet periods since 2005. Agricultural interests suffered last season due to lack of appreciable rainfall in the Spring and Summer months and the trend seems to be continuing thus far this Spring. Many locations already have an unusually dry March under their belts for 2007. In fact, dryness for this particular month was unprecedented at airports in Greenwood, Vicksburg-Tallulah, Meridian, and Jackson as records were set. This month was preceded by a rather dry February in most spots, and the drier-than-usual trend is continuing into the latter half of April. In response to these precipitation trends over the past couple years, the region has generally been dealing with various stages of drought conditions. Drought was very predominant going through the summer months after less rain than usual during the Spring of 2006. An overall increase in precipitation from this past Fall through mid-Winter helped alleviate acute drought, although long term rain deficits remained. That has set the stage for another dry spell to push the drought situation to the fore again over the region and the timing is unfortunately

linked to the start of another growing season. Please see Figures 1 and 2 for details on precipitation deficits for 2007.

The U.S. Drought Monitor, issued by a branch of the Climate Prediction Center, has now placed most of central and southern Mississippi in an area of moderate to severe drought classification while locations in the extreme southeast Arkansas and northeast Louisiana fair a little better with conditions only being classified as “abnormally dry”.



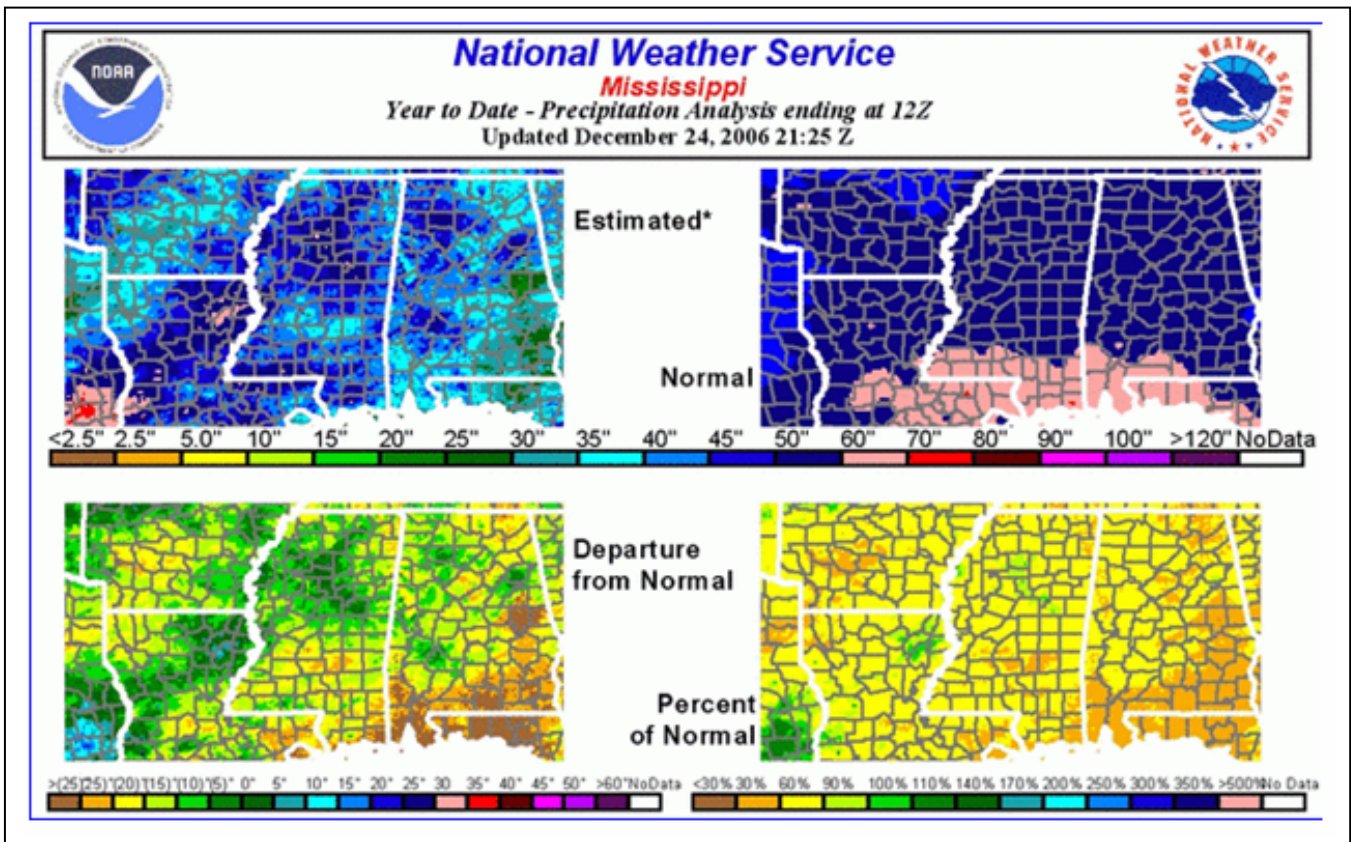
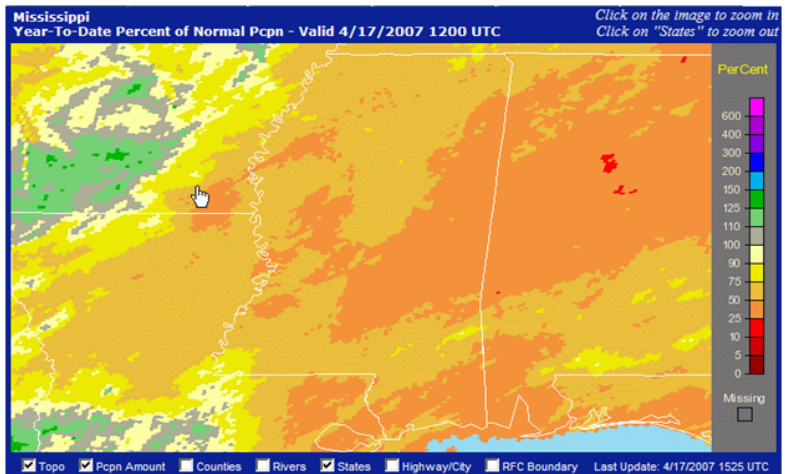
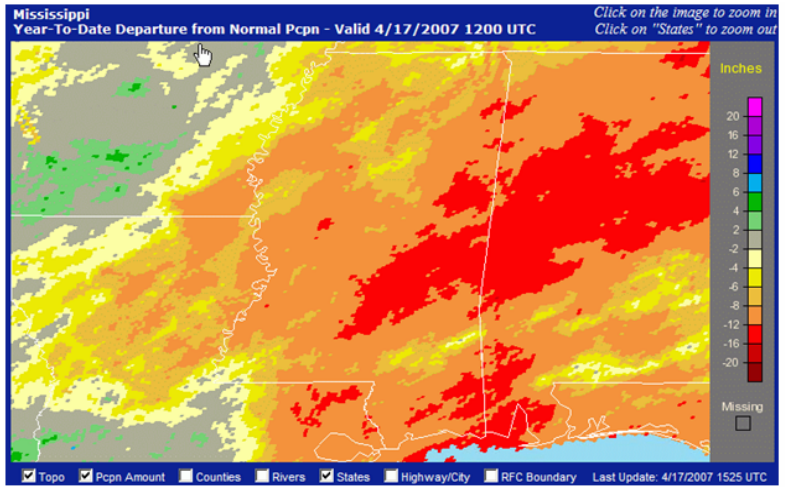
Drought classifications for the Arklamiss have generally worsened over the past several months despite a continued progression of weather systems across the region through Spring. Unfortunately, a good many of these systems have been “underachievers” in terms of rainfall production during a time of year when a significant system bringing a large area several inches of precipitation is not uncommon. This has allowed rainfall deficits to

mount up in February, March, and through much of April, and for previously minor drought issues to reach greater magnitudes.

Correlations can often be made between particular global circulation patterns and short term climates changes in specific regions. During the latter half of 2006 an El Nino regime dominated the tropical Pacific and this pattern usually helps bring the Lower Mississippi Valley above average rainfall. That is one reason why our drought status managed to improve late last year and it is also part of the explanation for the quiet hurricane season over the Atlantic Basin last Summer. This El Nino was originally supposed to last well into this year, but the regime never grew strong and therefore quickly became less of a factor in global weather circulations at the beginning of this year. Now climatologists from the National Oceanic and Atmospheric Administration (NOAA) predict water temperatures in the equatorial Pacific are cooling and a La Nina will soon form. Historical records indicate that La Nina patterns generally correlate with wetter than average Summer conditions over the Arklamiss. Some of that increased precipitation probably has to do with elevated tropical storm activity in the Atlantic Basin that occurs when unfavorable wind shear over the Gulf of Mexico and southern Atlantic Ocean diminish

as the La Nina takes shape well to the west.

The expectation of a developing La Nina in the coming months is therefore good news for those wishing to avoid severe drought later this year. However, if a La Nina does not take shape over the coming months, then a “neutral” state to the ocean temperatures in the equatorial Pacific unfortunately correlates to drier than normal Summers for the Arklamiss in the historical record. An even worse scenario would be for the rest of the Spring to pass with relatively little rainfall and for our region to pass into non-La Nina Summer with low soil moisture. That sequence of events will be highly conducive for worsening drought through the Summer months and a drastic increase in rainfall deficits which have accrued over the past few years.



# Available Opportunities with the National Weather Service in Jackson, MS

*By: Ashley Wester, Journeyman Forecaster/Editor*

The National Weather Service in Jackson, MS offers opportunities for college students to participate in a student volunteer program. With this program, students will have the opportunity to obtain operational hands-on experience. Students will learn how to quality control data, work with climate for selected stations, release the weather balloon, and exercise their forecasting skills.

There will be two volunteer terms, corresponding with a school year schedule. One will be the summer term, which will extend from May until August. The second term will be during the academic school year, which will run from August until the following May. Students will be required to complete at

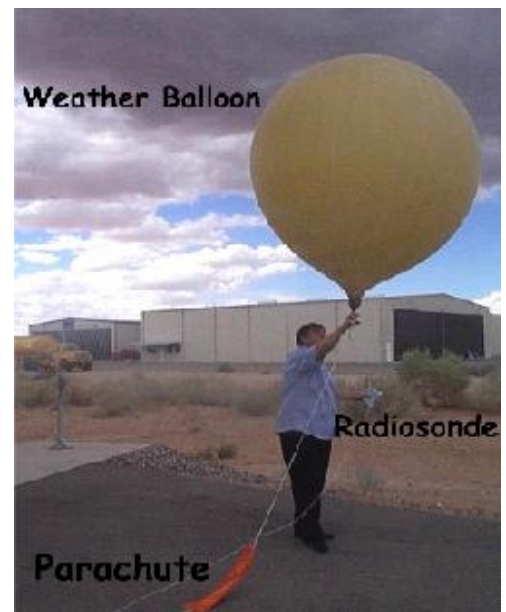
least 16 hours per week during the summer term, and 8 hours per week during the academic year term.

Students interested in this opportunity will be required to apply. Materials needed for this application include the student's resume, essay explaining why he/she wants to volunteer at the National Weather Service, a possible schedule for availability, and any supporting documents that he/she feels necessary. If applying for the summer term, applications need to be in by May 2; and if applying for the academic year term, the deadline is August 1. Applications can be mailed to the following address:

National Weather Service  
c/o Ashley Wester  
234 Weather Service Drive  
Flowood, MS 39232

Or the information may be faxed to (601) 965-4028.

If you have any questions about this program, please contact Ashley Wester at (601) 936-2189.



## The Truth About Lightning and Thunder

*By: David Hamrick, Meteorologist Intern*

All of us have seen lightning and heard thunder, but did you know that there are many different types of lightning flashes? Here are ten classifications of lightning along

mention of a "return stroke". A return stroke is the bright bolt of light you see coming from the electrical discharge of lightning.

a) Forked lightning: This is a cloud-to-ground lightning strike

emanating away from the main bolt. Oftentimes with lightning strikes, only the main bolt can be seen.

b) Ribbon lightning: This occurs when a lightning strike, composed of multiple individual return

strokes, is blown by a strong wind. The movement of each return stroke by the wind gives the entire strike a small ribbon-like effect, especially when photographed.

c) **Bead lightning:** This is a name given to the decaying stage of a lightning channel in which the luminosity of the channel breaks up into segments. It is more properly a stage of a normal lightning discharge rather than a type of lightning in itself.

d) **Ball lightning:** It is a rare phenomenon described as a floating, illuminated sphere that occurs during thunderstorms. It may move fast, slow or stay stationary. There is some controversy as to exactly what it is.

e) **Staccato lightning:** A bright cloud-to-ground lightning strike that consists of only one return stroke. This type of lightning has a very brief duration.

f) **Blue jets and red sprites:** These are electrical discharges that occur above the cloud tops of large thunderstorms. They consist of faintly lit flashes of blue and red light and are very difficult to see

from the ground. They are best viewed from mountaintops and better yet, from aircraft.

g) **Heat lightning:** Often seen on warm and humid summer evenings, this is actually light from distant flashes of actual lightning from thunderstorms occurring very far away. The observer usually cannot see the storm clouds or the actual lightning bolts, but does see a faint illumination in the sky. Thunder is inaudible since the storm is so far away.

h) **Sheet lightning:** Illumination of the entire cloud by a lightning flash. The actual bolt of lightning that caused the light is hidden by the cloud and not seen by the observer. Also called intra-cloud lightning, it is the most common form observed, since most lightning discharges occur between the upper and lower regions of a thunderstorm cloud.

i) **Bolt-from-the-blue:** A cloud-to-ground lightning discharge that strikes well away from areas of rainfall associated with thunderstorms. It typically

originates in the highest regions of a thunderstorm, traveling horizontally a good distance away from the storm before making a vertical descent to earth. Due to the final strike point being a significant distance from the storm

(sometimes up to ten miles away), these lightning events can occur at locations with clear 'blue' skies overhead – hence the name. It is also called anvil lightning.

j) **Spider lightning / anvil crawlers:** Perhaps one of the most spectacular forms of lightning, this occurs as a lightning discharge travels horizontally along the underside of a thunderstorm cloud. The lightning actually travels slower than cloud-to-ground lightning, and it also branches out in many directions, giving the appearance of a spider.



## !! Fun Stuff for the Kids!!

### Water Cycle

**Materials:**  
Small Paper Cup  
Small Plastic Bag  
Tape  
Water

## Procedures:

Put a small amount of water in the cup and set the cup in the bag. Seal the bag closed with the cup of water inside and tape the bag to a sunlit window.

When the sun heats the bag, the water evaporates from the cup, which means that droplets of water so small that they are invisible (called water vapor) rise into the air. The water vapor collects on the inside of the bag and condenses into larger water drops. The larger drops will eventually drip down to the bottom of the bag.

This is what happens to the water in our rivers, streams, lakes, and oceans. The water evaporates into the air and rises with the heat of the sun. It condenses into small droplets and becomes clouds. When the droplets become big enough, they fall to the earth as rain.

# Reaching Out to You!

*By: Ashley Wester,  
Editor/Journeyman Forecaster and  
Alan Campbell, Journeyman  
Forecaster*

Our goal here at the National Weather Service in Jackson, MS is to protect life and property. In an attempt to do this, we issue various types of watches, warnings, and advisories to alert you, the public, of impending hazardous weather that is either occurring or could possibly occur in your area. Knowing that hazardous weather is possible in your area is one thing, but what should you do if hazardous weather is threatening you and/or your family?

Staying calm and knowing the correct instructions to follow could save your life. This is why the National Weather Service in Jackson, MS believes it is important to educate people about severe weather safety and preparedness. In our efforts to accomplish this task, we offer various forms of outreach, such as talks and setting up booths at area events, just to name a few. We provide these services for any community, school, public/private group, or business that is interested in learning about severe weather safety and how to prepare for it.

We also offer office tours that allow you to see what the National

If you would like to schedule to have someone come and talk to your community, school, group, or business, or if you would like for us to set up a booth at your next event, please contact, Warning Coordinator Meteorologist Steve Wilkinson, Alan Campbell, or Ashley Wester. If you would like to schedule an office tour, please contact Karen Dungan or Marty Pope. All can be reached at the National Weather Service in Jackson, MS at (601) 936-2189.





Cream: Jackson, MS service area  
Blue: Memphis, TN service area  
Purple: New Orleans, LA service area  
Green: Mobile, AL service area

## Some events in which we have recently participated:

April 12, 2007: Meteorologist Ashley Wester went to the Copiah-Lincoln Community College to speak with about 20 high school science teachers about basic meteorology for the Science Quest Program.

April 13, 2007: Warning Coordinator Meteorologist Steve Wilkinson went to the Meridian Naval Air Station to speak with local emergency management, and to explain the services that are provided by the National Weather Service.

April 16, 2007: Meteorologist Ashley Wester went to the Walnut Grove Public Library to speak to about 20 senior women about basic meteorology for the National Library Week.

April 20, 2007: Meteorologists Ashley Wester and Jim Fairly attended the Covington County Farm Safety Day in Collins to speak with all of the Covington County 5<sup>th</sup> graders on Severe Weather Safety.

## Thank You!!

### *Editor:*

Ashley Wester, Journeyman Forecaster

### *Contributors:*

Eric Carpenter, Senior Forecaster  
Chad Entremont, Senior Forecaster  
Brad Bryant, Journeyman Forecaster  
David Hamrick, Meteorologist Intern  
Alan Campbell, Journeyman Forecaster  
Ashley Wester, Journman Forecaster

National Weather Service  
234 Weather Service Drive  
Flowood, MS 39232

(601) 936-2189