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National Weather Service  
Serving the Mid-South

Memphis, TN

## Inside this issue:

Winter Weather Safety Tips and Survival Kit Checklist	2
Winter in the Midsouth	2
Severe Weather Season: Not Just for Spring Anymore	3
Isaac Cline Award Winners	3
Landspouts	4
A Guide for Students Planning Careers in Meteorology	6
Word Search	7

## Memorial Day Weekend Severe Weather Outbreak

By Jason Beaman, Intern Meteorologist

A typical Sunday on Memorial Day weekend would bring family gatherings, barbecues, and relaxation, but on May 30<sup>th</sup>, 2004, a severe weather outbreak drastically changed the scene across the Mid-south. Forecasters at the National Weather Service had first become concerned as early as Wednesday May 26<sup>th</sup>. Computer model data strongly indicated that a powerful storm system would affect the Midsouth over the holiday weekend with the threat of damaging winds and tornadoes. By Friday May 28<sup>th</sup>, there was enough concern at the Weather Service that a telephone conference was held with local emergency management officials and news media to discuss the potential severe weather outbreak.

On Sunday May 30<sup>th</sup>, all the ingredients came together resulting in a significant severe weather outbreak. A deep upper level disturbance pushed into the middle and lower Mississippi valleys. Meanwhile, a strong cold front accompanied the disturbance, which provided the setup for the clash of warm, moist air in place over the Midsouth with cool, dry air over the Upper Plains. The end result was a damaging line of thunderstorms that rumbled across the region during the evening hours. In addition, several supercells formed ahead of the main line. In all, there were 56 reports of severe weather along with two confirmed tornadoes.



A house in Walnut, MS is severely damaged by a F1 tornado during Memorial Day Weekend. Photos by Scott Cordero

## River Flooding Fast Facts:

- River levels during the early summer river flooding were the highest since the Mississippi River flood of 1997.
- Mississippi River flooding events in the Mid-South are most likely to occur when both the Lower Mississippi and Lower Ohio rivers are in flood at the same time.

## Winter Driving Tips:

- Winterize your car before cold weather strikes to keep it in top operating condition.
- Keep your gasoline tank as full as possible. This will minimize water in the tank and provide an advantage in case of trouble.
- Have a cellular phone or a CB radio with you for emergencies.
- Carry a winter survival kit in your car at all times (see page 2 for items to put in a survival kit).

## River Stages: What Does It Measure

By Buzz Merchlewitz  
Hydrologist

I often get questions about what the river stages really mean. This is especially true with the Mississippi River at Memphis because the stages at this particular location sometimes go below zero and also because a lot of people in the Memphis area monitor the Mississippi River stages. So, just what does the river stage at a particular point mean? Is it the depth of the water? If the stage on the Mississippi River at Memphis is -2.0 feet, can you walk across the river?

(Continued on page 5)

## Memorial Day Weekend Severe Weather Outbreak

Continued from Page 1

A F2 tornado touched down near Cherry Valley, AR in Cross County, damaging two houses, destroying two farm buildings and five large grain bins. Several trees were also uprooted by the tornadic winds. The other tornado, an F1 on the Fujita scale, occurred in Walnut, MS in Tippah County. One house suffered severe damage and the steeple was blown off of Walnut Baptist Church. Aside from the tornado damage, the National Weather Service received numerous reports of tree and power line damage as a result of straight line winds. The estimated cost of damage for the event was near \$950,000. Fortunately, there were no report of injuries.



These two pictures show damage from the Memorial Day Storms in Ashland, MS.



### Your Winter Weather Survival Kit

Although winter weather does not strike often in the Mid-South, it is still important, especially if you do wintertime traveling, to have a survival kit in your vehicle.

Some important items to have in a survival kit include:

- Mobile phone with charger and batteries
- One sleeping bag or blanket per person
- Two empty coffee cans with lids — one can be used for sanitary facilities; the other to hold candles that can be burned for heat and light
- Matches and candles
- Wool caps and mittens
- First aid kit with pocket knife
- Large box of facial tissues
- Flashlight with extra batteries
- Windshield scraper and brush
- Shovel
- Canned nuts, dried fruit, and candy
- Battery booster cables
- Transistor radio with extra batteries
- A small sack of sand or cat litter for traction
- Compass and road maps

If you use your own car's heater as a source of heat, leave a window slightly open in the car. Carbon monoxide can build up inside the car, and the colorless, odorless gas may not be detectable by you until it is too late to act.

### Winter in the Mid-South

Winter in the Mid-South brings relatively few adverse effects, compared to many other places in the United States. But when winter weather does strike here, it can be dangerous. Ice storms, crop-killing freezes, and occasional snow all have their own unique impacts.

In an ice storm, heavy accumulations of ice can bring down trees and topple utility poles and communication towers. Ice can disrupt communications and power for days while utility companies repair extensive damage. Even small accumulations of ice (commonly called a "glaze") can be extremely dangerous to motorists and pedestrians. Bridges and overpasses are always the first surfaces to freeze, and should be carefully navigated during any cold weather event.

Occasional snow can have much the same impact. Snowplows, commonly found in colder climates, aren't common here. Therefore, many secondary roads may remain impassible until temperatures warm or the sun helps decrease the snow cover...or both.

Crop-killing freezes often have a larger monetary impact. An early-season freeze can catch crops before they are able to be harvested, resulting in thousands of dollars in crop damage.

As you see, although we don't face the large snow accumulations and blizzards that other places do, winter weather changes should still be watched carefully!

## Severe Weather Happens Year-Round

March through May is the most active time of the year for tornadoes in the Mid-South; however, you may not be aware that November and February are also months when tornadoes often occur. During the winter season a powerful jet stream remains close; therefore, temperature contrasts of twenty to thirty degrees over 100 miles are not uncommon. It's during these weather patterns, when strong cold fronts are expected to move through the region, that we need to pay close attention to the latest forecast.

Tornadoes in the Mid-South can occur every month of the year. In fact, in 1999 deadly tornadoes tracked across the region in January, producing winds in excess of 200 mph! The Mid-South is a region at risk when it comes to tornadoes. Based on current research, nearly 600 people each year are killed and injured by tornadoes in the Southeastern United States. In Mississippi, 124 casualties occur each year due to tornadoes. In Tennessee, the number of tornado casualties is sixty, and in Arkansas, fifty-five. For every tornado that touches down in the Mid-South, four people are killed and injured! These tornado casualty rates are among the highest in the nation.

For this reason, let's review some tornado safety rules. When a tornado strikes, the safest place is inside the basement of a home or building. Mobile homes are not considered reinforced shelter, so occupants should go to another structure or to the designated tornado shelter included at many mobile home parks. If a basement is not available, go to an interior room on the lowest floor. Stay away from windows. Cover your body with pillows or cushions. If you are driving or caught in an open area, do not try to outrun the tornado. Instead, head toward a ditch or culvert and cover your body for protection.



This mobile home near Halls, TN, was destroyed during a violent tornado in January 1999. This shows that severe weather can happen any time of

## Isaac Cline Award Winners

By Jim Duke  
Meteorologist in Charge

Arguably the highest achievement to which anyone can aspire is accolades from their peers. That feat is accomplished only through persistent superior work, most often through joint effort. The Isaac Cline is such an accolade, one for which the recipients are identified by their coworkers. Though less than ten years old, the Isaac Cline Awards are highly coveted, and recipients much admired.

Isaac Monroe Cline was a pioneer, an early leader, an honored scientist, and a revered hero of U.S. weather services. His accomplishments and stature are such that it is most fitting to lend his name to one of the National Weather Service's highest honors.

Born in east Tennessee, Isaac Cline entered the weather service in 1882 after graduating from Hiwassee College. His first duty post was Little Rock where he spent his spare time earning an M.D. degree from the Arkansas Medical School. He later earned a PhD from what later became Texas Christian University.

Dr. Cline was a central figure in two of the most devastating weather disasters in U.S. history – the deadly hurricane that swept Galveston in 1900 (6000 to 8000 persons died in the storm), and the unprecedented floods that inundated the Mississippi Valley in 1927.

**(Continued on page 4)**



## Rare Landspout Events Affect Parts of the Midsouth During June 2004

By Jonathan L. Howell  
Intern Meteorologist

A couple of unusual weather events impacted parts of northeast Arkansas and the Missouri Bootheel during June 2004. Several reports of funnel clouds and tornadoes were received by the National Weather Service office in Memphis during the afternoons of June 2nd and June 22nd. On both of these days, only weak radar echoes were observed on weather service radar and conditions were unfavorable for the development of tornado producing supercell thunderstorms. Although storm spotters were reporting what appeared to be funnel clouds and tornadoes, what they actually were observing were hybrid forms of tornadoes known as landspouts. These events are rare across this part of the country and are more common across the Central High Plains. Landspouts are considered to be the land equivalent of a waterspout and often form in environments that lack large storm scale rotation. Landspouts generally form under rain showers and are not associated with wall clouds or mesocyclones. In fact, during these landspout events, no thunderstorms were observed by weather service radar and there were no indications of storm rotation with any of these landspout producing showers.

Landspouts, although uncommon, do occasionally develop over the Midsouth, primarily in the summer months. This is because landspouts often develop in moist environments that exhibit large amounts of instability and weak amounts of environmental wind shear. They often develop in proximity to weak surface boundaries, such as weak fronts or old thunderstorm outflows. Landspouts often move very slowly or remain stationary due to the weak environmental steering winds. These weak hybrid tornadoes generally produce wind speeds that range from 35 to 70 mph and result in F0 damage. On rare occasions, landspouts have been known to produce more significant damage.

The most noticeable landspout that was observed in the Memphis National Weather Service's County Warning Area (CWA) during these landspout events occurred in northeast Arkansas on the evening of June 2, 2004. A light rain shower developed over northwest Mississippi county, Arkansas, and began producing a nearly stationary landspout just north of Leachville. This landspout lasted for several minutes and produced minimal damage to farm crops. A storm survey team from the National Weather Service office in Memphis was dispatched to the area to survey damage. The storm survey team rated the damage produced by the landspout as F0 on the Fujita tornado intensity scale. Although these landspout events produced large amounts of public concern, they only resulted in minimal damage across areas affected by these rather uncommon features. Dr. Cline's forecasts and warnings were cited as saving thousands of lives in both instances, and his work was

## Isaac Cline Award Winners

Continued from Page 3

lauded by newspapers, the head of the Weather Service, governors, and the President of the United States.

Isaac Cline Awards are presented for accomplishments in seven categories, from Electronic Maintenance, to Hydrometeorology. The following members of the WFO Memphis staff were honored as recipients of the Isaac Cline Award in 2004:

Virginia F. Johnson – Support Services

Steven W. Cromer - Meteorology

Douglas S. Vogelsang – Hydrology

Jonathan L. Howell – Hydrometeorology

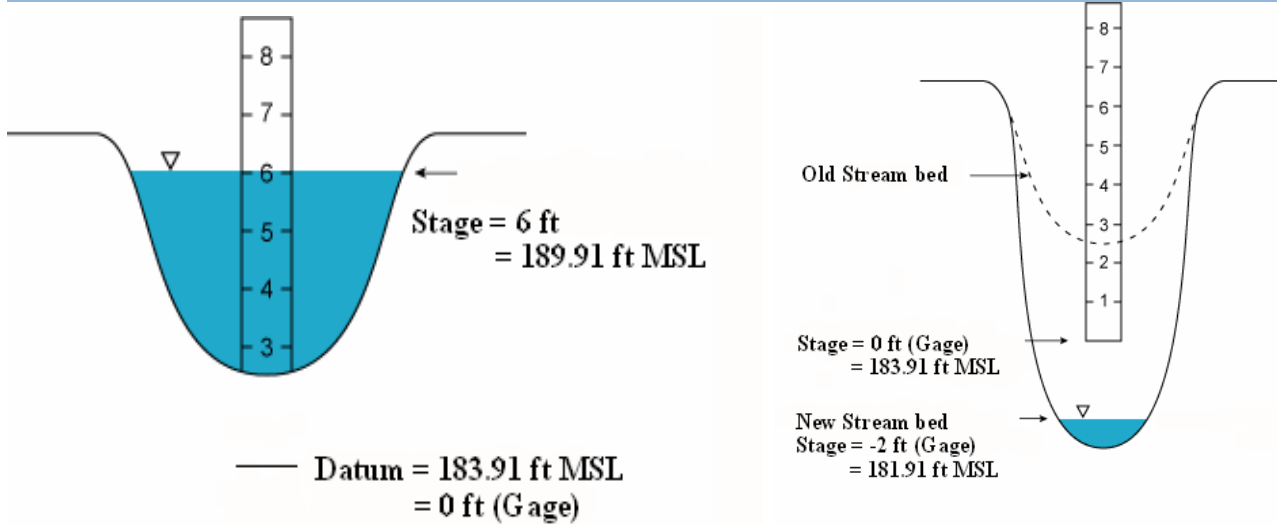
Joseph C. Lowery – Program Management

Robert A. Johnson – Electronics

Scott J. McNeil & Margaret R. Trippany –  
Leadership

## River Stages: What Does It Measure?

Continued from Page 1



*River stage* is the elevation above, or below, some arbitrary zero datum of the *water surface* at a gaging station. You will hear it called *gage zero*, or *gage datum*, or *zero datum*, but it all means the same. The *zero* of the gage is a precisely surveyed elevation at or above some standard datum. For simplicity, we'll call this standard datum *mean sea level* (MSL). Most of the lake and reservoir levels are given in relation to MSL, but for many of our gaged rivers and streams the gage zero is at a level slightly below the point of zero flow in the stream. It's important to remember that we are measuring the elevation of the water surface, not necessarily the depth of the water. The U.S. Geological Survey and U.S. Army Corps of Engineers are the government agencies in the mid-south region who usually install the river and stream gages and they try to choose a gage zero for each gage such that there will not be negative stages. It doesn't always work out that way, however. The gage datum for the Mississippi River at Memphis is 183.91 ft MSL and was established sometime before November 10, 1871. Using this for our example, below left, the stage shows 6 feet which is 189.91 feet MSL. Back in 1871, the river bed was probably below the zero on the gage as the example illustrates, or at least they thought the river stage would not go low enough to read below zero. However, after 130 years, the river bed has changed so that there is a new, lower river bed, as shown in the example on the right. The gage zero has not changed so the river bed is now below the zero foot mark on the gage. When the stage is reported as -2 feet, it does not mean the river is dry. You, therefore, cannot easily walk across the river. What it does mean is that the water surface elevation is 2 feet below the zero datum of 183.91 feet MSL. We do not like to change the gage zero, or the datum for that matter, of a river gaging station. It does happen, but not often. We try to keep it the same for record keeping purposes and for the fact that people who are affected by the river generally get familiar with the river impacts at various stages.

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## A Guide For High School Students Planning Meteorology Careers With The National Weather Service

By Jonathan L. Howell  
Intern Meteorologist

Are you a high school junior or senior planning for a future career in meteorology? If so, you may want to consider a position as a forecaster with the National Weather Service (NWS). If you have an interest in the weather and often find yourself interested in determining what tomorrow's weather will bring, then you will be the right person for the job. There are three key elements that you will need to focus on if you plan to become a meteorologist with the NWS. These elements include a strong interest in the weather and its causes, the ambition to accomplish the mandatory educational requirements established for the NWS meteorologist position, and knowledge of how to best prepare yourself for a NWS meteorology career.

If you have an interest in the weather and would eventually like to work for the NWS, then you will need to begin applying to colleges and universities that offer accredited meteorology programs. The following weblink provides a list of all of the available colleges and universities:

<http://www.nssl.noaa.gov/edu/schools.html>

As you can see, there are several schools out there that offer degrees in meteorology. The key to choosing the best meteorology program is to ensure that the courses offered meet established NWS meteorologist position requirements. These job requirements can be found at:

<http://www.ametsoc.org/AMS/policy/bachelor99.html#AppendixB>.

The educational requirements for the NWS meteorologist position focus on a strong background in the core subjects of meteorology, mathematics, physics, and computer science. When deciding upon the appropriate college or university meteorology program, make sure that the program you choose focuses heavily on these core subjects. This will help to prepare you properly for the meteorologist position.

Another training opportunity that is available to college or university meteorology students that will assist in the preparation process for a meteorology career with the NWS, is the Student Career Employment Program (SCEP). This program offers fulltime college or university students the opportunity to work part-time at a NWS forecast office, gaining valuable work experience for a future meteorology career with the NWS. The SCEP student is a paid part-time employee, that upon completion of both the SCEP program and meteorology degree program, may become automatically eligible for full-time employment as a meteorologist with the NWS. There are specific academic, security, and citizenship requirements that must be met before becoming eligible for these SCEP positions. Additional information concerning the SCEP program can be found at:

<http://www.weather.gov/eo/StudentResearchOpportunities.htm>

The meteorology SCEP program is an invaluable opportunity that should not be overlooked by any students interested in a meteorology career with the NWS. **(Continued on page 8)**

Hopefully, this article provides some early guidance to prospective high school students that are interested in

## Word Search

### Instructions:

Find the words across, down, or diagonally.

F	N	O	I	C	E	P	G	A	H	L	N	T	O	R
U	L	S	W	D	B	T	C	O	U	H	N	I	W	A
N	K	O	U	T	W	F	O	G	R	U	M	T	E	I
N	H	L	O	W	A	T	I	W	S	R	S	O	A	N
E	D	A	B	D	L	F	O	A	H	R	K	A	T	W
L	O	T	I	S	L	M	B	R	E	I	C	P	H	D
C	W	S	A	L	C	R	H	N	N	C	O	P	E	A
L	N	C	T	E	L	S	O	I	M	A	L	T	R	B
O	B	E	R	E	O	L	L	N	E	N	D	P	S	Y
U	U	D	S	T	U	S	P	G	F	E	B	O	E	O
D	R	I	N	M	D	N	T	H	U	N	D	E	R	L
L	S	T	O	R	M	S	P	O	T	T	E	R	V	H
U	T	H	W	E	A	T	H	E	R	R	A	D	I	O
C	I	R	R	S	N	P	E	W	A	T	C	H	C	E
E	D	O	P	P	L	E	R	R	A	D	A	R	E	E

COLD  
FLOOD  
HAIL  
RAIN  
STORM SPOTTER  
WALL CLOUD  
WEATHER RADIO

DOPPLER RADAR  
FOG  
HURRICANE  
SLEET  
THUNDER  
WARNING  
WEATHER SERVICE

DOWNBURST  
FUNNEL CLOUD  
ICE  
SNOW  
TORNADO  
WATCH

## Latest Snow Ever

### Meteorologist

The spring of 2004 may be remembered as the latest that measurable snow fell over portions of southwest Tennessee. On April 13<sup>th</sup>, between 2 and 4 inches of snow fell east of the Memphis metropolitan area. The latest measurable snowfall in Jackson, TN previous to this event was on April 5<sup>th</sup>, 1971.

The sudden snowfall was due to an abnormally cold low pressure system tracking over the area. The precipitation initially began as rain over the area during the wee hours of the morning. Since precipitation is a cooling process, the air will continue to cool until it reaches the dew point which initially was well above freezing. However, the system began to pull dry air into the region from the east. As a result, the dew point lowered suddenly and drastically to the freezing point. By dawn, the temperature plummeted and the rain changed over to a heavy snow. The snow made for slick driving for the morning commute. There were reports of scattered power outages because the weight of the snow brought power lines down. Many schools and businesses were forced to closed.



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## **A Guide For High School Students Meteorology Careers**

*Continued from page 6*

Hopefully, this article provides some early guidance to prospective high school students that are interested in becoming NWS meteorologists. I hope this information will assist high school students interested in meteorology. Parents if your children are interested in weather, please encourage them to pursue a degree in meteorology.

Below: These two pictures show damage from the Memorial Day Storms in Walnut, MS.





(Continued on page 2)