NATIONAL WEATHER SERVICE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

STORM COURIER

Charleston, SC
Weather Forecast Office

Spring/Summer 2015

Inside this issue:

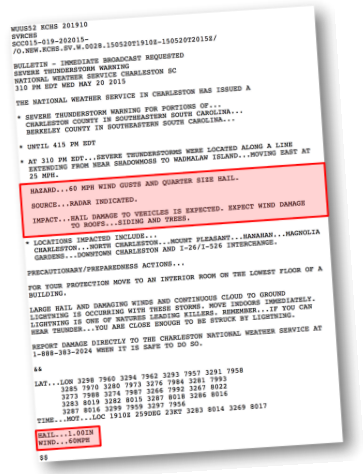
This Just In...Highlights & Updates

Impact Based Warnings Demonstration Project

by Steven Taylor — Lead Forecaster

You may have noticed that short-fused warnings for tornadoes, severe thunderstorms and flash floods that are being issued by the National Weather Service in Charleston look a bit different than previous years. This is because this office is participating in a national demonstration project that is designed to improve warning services to the American people and our local, regional and national weather partners. These new warning formats are called Impact Based Warnings (IBW) and are designed to provide additional valuable information to the media and Emergency Managers, facilitate improved public response and decision making and better meet societal needs in the most life-threatening weather events.

Impact Based Warnings will allow the user to immediately identify the expected danger a severe thunderstorm, tornado or flash flood poses. They will also give the warnings forecaster better tools to communicate the expected impacts and recommend actions and precautions for the expected level of danger that a tornado, severe thunderstorm or flash flood poses. For example, warning forecasters will be able to communicate a greater risk for danger for a severe thunderstorm that is expected to produce 80 mph winds and ping pong ball size hail compared to a severe thunderstorm that is only expected to product 60 mph winds and quarter size hail.



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BULLETIN - IMMEDIATE BROADCAST REQUESTED
SEVERE THUNDERSTORM WARNING
NATIONAL WEATHER SERVICE CHARLESTON SC
310 PM EDT WED MAY 20 2015

THE NATIONAL WEATHER SERVICE IN CHARLESTON HAS ISSUED A

* SEVERE THUNDERSTORM WARNING FOR PORTIONS OF...
CHARLESTON COUNTY IN SOUTHEASTERN SOUTH CAROLINA...
BERKELEY COUNTY IN SOUTHEASTERN SOUTH CAROLINA...

* UNTIL 415 PM EDT

* AT 310 PM EDT...SEVERE THUNDERSTORMS WERE LOCATED ALONG A LINE EXTENDING FROM NEAR SHADOWMOSS TO WADMALAW ISLAND...MOVING EAST AT 25 MPH.

HAZARD...60 MPH WIND GUSTS AND QUARTER SIZE HAIL.

SOURCE...RADAR INDICATED.

IMPACT...HAIL DAMAGE TO VEHICLES IS EXPECTED. EXPECT WIND DAMAGE TO ROOFS...SIDING AND TREES.

* LOCATIONS IMPACTED INCLUDE...
CHARLESTON...NORTH CHARLESTON...MOUNT PLEASANT...HANAHAN...MAGNOLIA GARDENS...DOWNTOWN CHARLESTON AND I-26/I-526 INTERCHANGE.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

FOR YOUR PROTECTION MOVE TO AN INTERIOR ROOM ON THE LOWEST FLOOR OF A BUILDING.

LARGE HAIL AND DAMAGING WINDS AND CONTINUOUS CLOUD TO GROUND LIGHTNING IS OCCURRING WITH THESE STORMS. MOVE INDOORS IMMEDIATELY. LIGHTNING IS ONE OF NATURES LEADING KILLERS. REMEMBER...IF YOU CAN HEAR THUNDER...YOU ARE CLOSE ENOUGH TO BE STRUCK BY LIGHTNING.

REPORT DAMAGE DIRECTLY TO THE CHARLESTON NATIONAL WEATHER SERVICE AT 1-888-303-2024 WHEN IT IS SAFE TO DO SO.

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LAT...LON 3298 7960 3294 7962 3293 7957 3291 7958
3285 7970 3280 7973 3276 7984 3281 7993
3273 7988 3274 7987 3266 7992 3267 8022
3283 8019 3282 8015 3287 8018 3286 8016
3287 8016 3299 7959 3297 7956
TIME...MOT...LOC 1910Z 259DEG 23KT 3283 8014 3269 8017

HAIL...1.00IN
WIND...60MPH

$$

IBW Example
Click for larger image

IBW Project Details:

The IBW Demonstration Project for 2015 includes about one-third of all National Weather Service (NWS) offices and will likely be expanded to include all NWS offices in 2016, assuming positive feedback is received. Information on the IBW Demonstration Project can be found online at: www.weather.gov/impacts

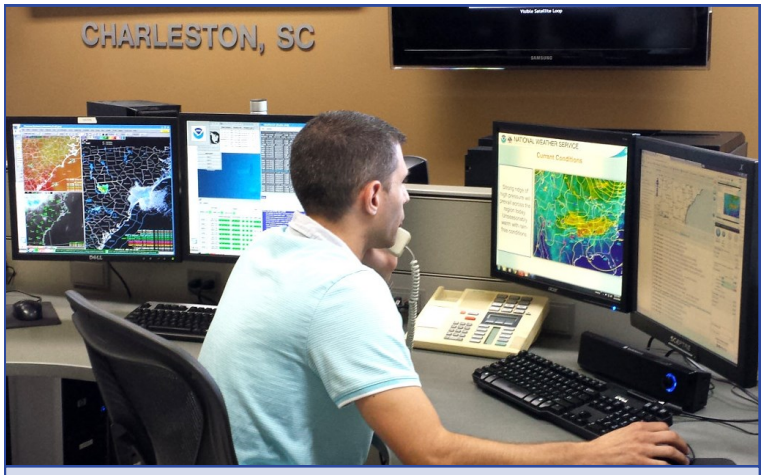
This Just In…Highlights & Operational Updates

Providing Critical Weather Support for Outdoor Events

by Ron Morales - Warning Coordination Meteorologist

Over the past few years, our partners have been increasingly asking us to provide critical weather support for large outdoor events. The National Weather Service calls such support "Decision Support Services" or DSS. The National Weather Service can provide DSS for events when emergency management or other government officials request our help to protect the safety of the public. Both public and private sector meteorologists may be present at an event, helping to provide a full spectrum of weather support. For example: The National Weather Service/public sector can provide warnings and weather information directly to emergency managers for the protection of life and property, while the private weather agency partners typically provide detailed forecasts for an event.

There are several different forms of DSS that our office can provide. The most basic and common form is when a customer calls/emails us for weather information to support their mission to protect life and/or property. The next level might be a request for us to provide a more formal briefing via a conference call, email, or webinar/video. Finally, the highest level of support is when we are asked to send a meteorologist "onsite" at the incident or event, such as at an emergency operations center (EOC), command center, etc.



Meteorologist John Quagliariello providing a briefing webinar to emergency managers

Some recent examples of large outdoor events where our staff provided DSS either from the office or onsite include: The Charleston Bridge Run in Charleston, SC, the Family Circle Cup tennis tournament in Charleston, SC, the Heritage Golf Tournament on Hilton Head Island, SC, Saint Patrick's Day events in Savannah, GA, and the Flowertown Festival in Summerville, SC.

2015 Heritage Golf Tournament

For the past two years, our office provided three meteorologists to help staff the multi-agency command center for the three days encompassing the Charleston Bridge Run activities. Our latest onsite support was for the four days covering the Heritage Golf Tournament events on Hilton Head Island. This was the first year our office provided support for this event, and the first time in the history of the tournament that weather support was available specifically for the protection of the public, first responders, and emergency staff.

Meteorologists Ron Morales (left) and John Quagliariello (right) staffing the command center for the 2015 Heritage Golf Tournament

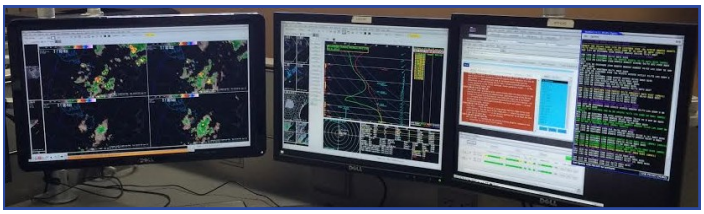
This Just In...Highlights & Operational Updates

Large Software Upgrade - AWIPS 2

by Jonathan Lamb — General Forecaster

In late January 2015 our office received a large software upgrade. AWIPS, which stands for Advanced Weather Interactive Processing System, is the computer platform we use to create all of our forecasts, warnings, and data products. The upgrade to AWIPS 2 required about 12 hours of downtime during which all of our products and services were seamlessly provided by our primary backup office in Wilmington, NC.

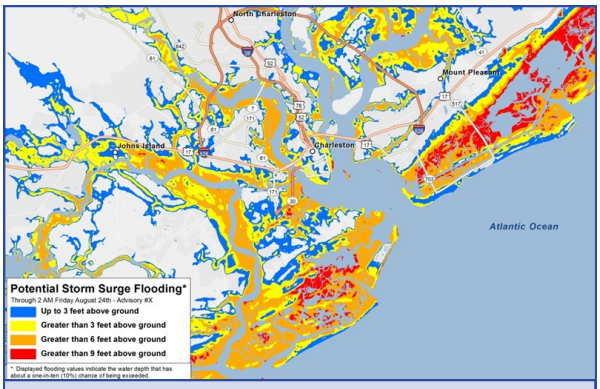
AWIPS was first installed at NWS offices in the late 1990's. During that time we have seen huge changes in the type and amount of weather data coming into local offices. In addition, the scope of the NWS's forecast and warning services has changed substantially, now with a greater focus on near-term, high-resolution forecasts. Rather than continuing to build on the existing platform, AWIPS 2 brings a redesigned structure that is better suited to adding new data streams. It also offers forecasters better ways to visualize different types of data within the same display. All NWS offices will receive the upgrade by the end of August 2015.



Hurricane Storm Surge Threat and New 2015 Products

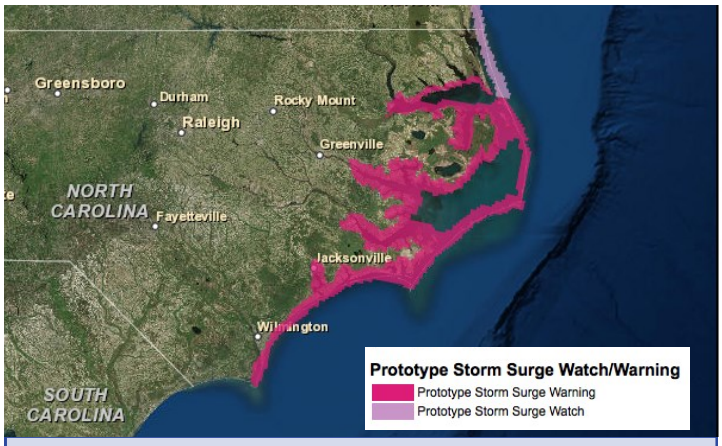
by Robert Bright — General Forecaster

The National Weather Service has recognized the tremendous dangers to lives and property posed by storm surge from hurricanes and even strong tropical storms. Thus, steps have recently been taken to improve the communication of this hazard to the public. Many folks are not aware of the threat that exists from storm surge, especially across southeast South Carolina and Georgia. Given the low elevation of the region and the numerous waterways that extend inland, storm surge can affect areas well away from the immediate coastline.



Potential Storm Surge Flooding Graphic
Click for larger image

There is a new experimental graphic that will be issued for the 2015 hurricane season that will indicate areas in danger from a life-threatening storm surge (example below). Another graphic (example above) will show reasonable worst-case water heights above ground. Keep in mind that this map will indicate water heights that people should prepare for given the uncertainties in the forecast.



Experimental Storm Surge Watch/Warning Graphic

Note that official Storm Surge Watches and Warnings will not begin until 2017.

For more information about storm surge, check out the National Hurricane Center (NHC)'s website. You can find changes to the NHC's products and services for 2015 here and be sure to check out our local hurricane guide to help determine your vulnerability to surge.

In Touch, In Tune - Outreach & Community

NWS Charleston Supports Hurricane Awareness Tour in Myrtle Beach, SC

by Emily Timte— Meteorologist

Hurricane hunter planes: NOAA G-IV (left) & USAF WC130J (right)

Every year for the past 30 years, NOAA conducts a hurricane awareness tour, alternating between the Atlantic and Gulf coasts. During this week, National Hurricane Center hurricane experts, National Weather Service staff, emergency management, and various other agencies come together to help bring awareness to the hazards and threats hurricanes bring and also the danger of being caught without a preparedness plan.

The tour stopped in 5 U.S. cities this year - Atlantic City, New Jersey; Norfolk, Virginia; Myrtle Beach, South Carolina; St. Augustine, Florida; and Marathon, Florida. Four staff members from our office traveled to Myrtle Beach to help our sister office in Wilmington run the event. We ran two booths explaining what the National Weather Service does as well as demonstrating and describing some of the observational tools and equipment we use to acquire data.

NHC (National Hurricane Center), NWS Charleston, and NWS Wilmington staff members with Eastern Region Director, Jason Tuell

Two hurricane hunter planes were also there for the public and media to tour – U.S. Air Force Reserve WC130J and the NOAA G-IV. The WC130J flies directly into the core of tropical cyclones, while the G-IV flies at high altitudes around and ahead of the system. Both aircrafts release dropsondes that measure temperature, pressure, wind, and humidity data from plane altitude to the ground. All of the data collected will be input into the forecast models to help us predict the intensity and landfall of tropical systems.

It was quite a successful and fun event with nearly 3000 people in attendance, including school groups, media, and the public. Even if you were unable to attend, we hope you are prepared for the upcoming tropical season! Be sure to review hazard and safety information so you don't fall victim to these dangerous storms.

For More Details...

Check out NWS Wilmington's newsletter, The Wilmington Wave, to read more about the 2015 East Coast Hurricane Awareness Tour in Myrtle Beach, SC.

In Touch, In Tune - Outreach & Community

NWS Charleston Tours Charleston Branch Pilots Association

by Carl Barnes— Meteorologist

When it comes to marine weather, observations are limited. This is due in large part to the difficulty and expense of placing and maintaining observing systems near and on the water and the volatility of marine weather. NWS Charleston serves two of the largest ports in the southeastern United States, Charleston, SC and Savannah, GA. The pilot boat offices at both locations have proven to be an important asset for our marine program. This partnership allows us to gather routine, reliable weather reports from experienced mariners, as well as provide decision support when high impact weather events, such as sea fog and tropical cyclones, impact our marine community. To protect mariners, harbors will close during particularly dangerous conditions, but the economic impacts of these closings make accurate forecasts critical to operations in both our harbors and coastal waters.

To support this relationship, Whit Smith, President of the Charleston Branch Pilots' Association, was generous enough to give a presentation on the history of the harbor pilots in Charleston and show the NWS Charleston staff around their facilities. This first hand exposure to their operations improved our meteorologists' understanding of how weather affects the pilots and what aspects of our forecast are most important to them.

NWS Charleston collects routine observations from both the Savannah and Charleston pilot boat operators as often as 3 times per day, and these observations are available on our website.

Additionally, we are able to provide the pilot boat operators with updated fog forecasts, which can be both challenging and critical in the spring when sea fog is a common threat, and we solicit frequent fog reports from them to assist our forecast process.

A strong partnership with the Savannah and Charleston Branch Pilot Associations is essential for the NWS Charleston to improve marine forecast processes and accuracy. We look forward to building these relationships to ensure the safety of mariners and to provide the weather support necessary to allow both ports to thrive.

How did the Charleston Branch Pilots Association form?

Pilots began assisting large ships in navigating the hazardous waters of Charleston Harbor around 1890, with the goals of protecting the mariners, their ships, and the environment. They later unified to form an association and are now a complete operation with crews underway 100 to 120 hours per week. Basic operations include a dispatcher, overnight quarters, and the ability to have a Pilot Boat ready for an arriving ship with just three hours advanced notice. The Charleston Branch Pilot's Association has four primary vessels that they use for their daily operations: two 75-foot boats that are primarily equipped for getting the Pilots to the ships, boarding the ships, and assisting with guiding the ships into the harbor, one 65 foot boat that is flexible in the tasks that it can perform, and a 40 foot boat equipped with firefighting capabilities that can quickly be dispatched to a location to help transport people and goods.

In Touch, In Tune - Outreach & Community

Weather in the Classroom

by Julie Packett - Administrative Support Assistant

The National Weather Service's mission is to protect life and property, and educating youth plays a vital role in achieving this mission. As much as NWS meteorologists would love to visit every classroom, this is just not feasible. Therefore, an additional goal is to direct educators to weather-related resources so they can incorporate meteorological elements into their lesson plans. Knowing where to look is crucial due to the boundless information available on the internet.

Therefore, NWS Charleston has created an educational webpage for anyone interested in weather science and safety. From the water cycle to hurricanes, from kindergarten to high school, this webpage highlights various types of weather-related resources for all learning levels. Below is a snippet of some of the references available on our webpage.

CoCoRaHS for Schools

CoCoRaHS is a unique, non-profit, community-based network of volunteers working together to measure and map precipitation. By taking daily rainfall observations and comparing them to surrounding sites, students use their math, science, and social skills.

Owlie Skywarn

Introduce your elementary students to Owlie Skywarn Weather-Ready Kids Page! Read Owlie's journal and so much more on this interactive site.

Young Meteorologist Program

PLAN!T NOW's Young Meteorologist Program is an interactive online game that takes kids on a severe weather preparedness adventure. They encounter lightning, hurricanes, tornadoes, floods and winter storms – all while learning about severe weather science and safety.

FEMA Kids

Are you prepared for a disaster? This site teaches kids how they can help make a plan, build a kit, and get involved.

NOAA Educational Resources

From sea turtles to tornadoes, this webpage is a NOAA-wide educational reference for educators and students. Their Facebook page is a great place for formal and informal educators to stay connected with NOAA resources and professional development opportunities.

SciJinks

SciJinks is a joint NOAA/NASA weather website for kids and educators. On this site, you will find weather trivia, puzzles, classroom activities and other weather-related materials.

JetStream Weather School

JetStream, the National Weather Service Online Weather School, is designed to help educators, emergency managers, or anyone interested in learning about weather and weather safety.

MetEd

Are you a student looking for a new geoscience topic? MetEd is a free collection of training resources for the geoscience community.

Local Studies - Past and Present

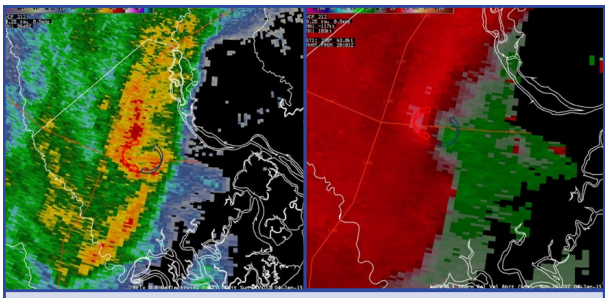
Tornadoes and Damaging Straight-Line Winds: A Comparison

by Steve Rowley—Lead Forecaster

On Sunday, January 4, 2015, an EF-1 tornado briefly touched down in Chatham County, GA, just over 8 miles from downtown Savannah. During the evening of Saturday, April 25, 2015, thunderstorms produced a significant, damaging straight-line wind event across the Savannah area. In order to demonstrate the danger of severe thunderstorms as compared with weak, short-lived tornadoes, we will briefly compare and contrast these events to demonstrate that, under certain circumstances, severe thunderstorms can present greater danger to life and property than tornadoes.

Chatham County Tornado Event:

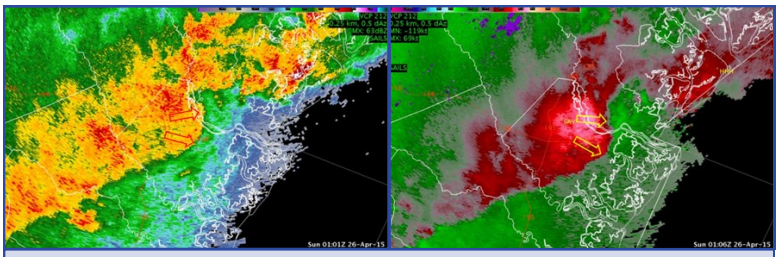
The tornado of January 4, 2015, intermittently touched down for about 2 minutes along a 3 mile long path and up to one-quarter of a mile wide in the Stonebridge neighborhood WSW of downtown Savannah. This tornado briefly produced winds as high as 85-95 mph which damaged trees, houses and fences. This brief touchdown earned a rating of EF-1, the second lowest rating on the Enhanced Fujita tornado damage scale. Also, this tornado was embedded within a wider swath of strong, straight-line winds, which produce sporadic damage to the Savannah River.



January 4, 2015 - reflectivity (left) & storm relative motion radar for 303 pm EST as an EF-1 tornado touched down

Chatham County Straight-Line Winds Event:

During the evening of April 25, 2015, damaging winds rushed from a line of severe thunderstorms, producing a classic "bow echo" that rushed through the Savannah area with straight-line winds that attained hurricane force. Dangerous winds gusted to 81 mph at the Savannah Airport, damaging some aircraft, and a port terminal crane registered a gust to 91 mph. These straight-line winds mangled and blew down many trees, some of which fell on roads, vehicles, houses and power lines. Empty shipping containers at the port terminal were tossed like toys. Thousands were left without power. These severe thunderstorms, which had earlier produced wind damage across Bulloch and Effingham Counties, blasted through the Sea Islands and continued to endanger mariners across coastal waters.



April 25, 2015 - radar reflectivity (left) & base velocity showing a bow echo & associated damaging winds

This dramatic event includes one footnote: there were no tornadoes. The widespread damage was produced solely by straight-line winds. While the January 4 tornado certainly produced significant damage in the Stonebridge neighborhood, the April 25 event produced much greater damage over a wider area.

Understandably, tornadoes dominate media coverage and spark the public imagination. Indeed, no one can deny the breathtaking violence of long-track tornadoes, which kill and injure, produce incredible damage and dominate the news for days on end. Violent tornadoes produce the most devastating weather on our planet. However, the public perception of severe thunderstorms, which can produce dangerous, damaging straight-line winds, often takes a back seat to the fear of tornadoes, even to the weak and short-lived twisters that are most common in our region. Thus arises a common conclusion: *if the winds produced that much damage, that must have been a tornado.* As a result of this assumption, the public reaction to a Severe Thunderstorm Warning can lack urgency as compared with the response to a Tornado Warning.

The primary lesson from the unwelcome, damaging weather events across the Savannah area this year is that straight-line winds produced by severe thunderstorms can produce damage that far exceeds damage produced by a short-lived, weak tornado. Always take Tornado Warnings seriously and take action to protect your life – but don't forget to accord severe thunderstorms an appropriate level of respect.

Local Studies - Past and Present

Dr. John Lining - Colonial American Physician, Scientific Researcher & Weather Observer

by Pete Mohlin — Lead Forecaster

You may have passed by the house many times on the northwest corner of the intersection of Broad and King Streets in downtown Charleston. But did you know that the historic Dr. John Lining House at 106 Broad Street was owned by a contemporary and friend of Benjamin Franklin who studied the link between epidemics and the weather?

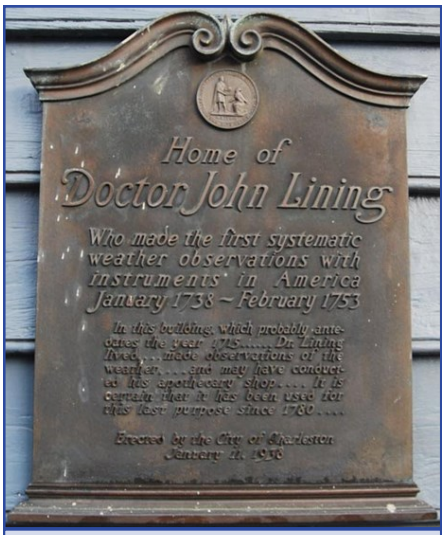
Dr. John Lining was born in Scotland in 1708 and arrived in Charles Town around 1728 to 1730. Although he was primarily a general practitioner, he seriously studied medical science and by doing so would discount some of the typical medical practices of the time. This included letting light, sunshine and fresh air into the rooms of sick patients, instead of the common practice that was darkness and stale air.

Like his friend Benjamin Franklin, with whom they both shared many correspondences, Lining attempted to determine how weather affected people. In fact he would realize that epidemics would coincide with the seasons. He would vigorously study weather conditions, and as a result he was the first in America to maintain systematic weather observations with scientific instruments; some that he himself invented. He started these observations in 1738 and continued them until around 1753. This included noting the atmospheric conditions taken with a barometer, a Fahrenheit thermometer and hydroscope. He would record relative humidity, cloud cover, rainfall, atmospheric pressure and force of the wind.

In September 1746 he wrote a letter to Dr. Cromwell Mortimer at the Royal Society in London concerning his observations. He wrote, "In summer the heat of the shaded air about 2 or 3 in the afternoon is frequently between 90 and 95 degrees, and the 14th, 15th and 16th of June 1738 at 3 pm it was 98 degrees, a heat equal to the greatest heat of the human body in health." (quote reference found here)

He would later write "A Description of the American Yellow Fever" (also known as "History of Yellow Fever"). It was an accurate account of the progress of the disease and its relationship with weather conditions. In that same year he would also write an article for "Gentleman's Magazine" describing his duplications of Ben Franklin's electrical experiments of flying a kite during a thunderstorm. As a result he would urge the people of Charles Town to adopt the idea of lightning rods for protection from thunderstorms.

Dr. John Lining, a prominent physician and distinguished scientist died in South Carolina in 1760.



Plaque on the home of Dr. John Lining, Charleston, SC
Photo courtesy: Michael Sean Nix, Feb 13, 2010

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