Suncoast Weather Observer

Summer 2008 Issue 1, Volume 11

Inside This Issue...

Hurricane Awareness Tour 2008

By: Dan Noah

The National Oceanic and Atmospheric Administration's (NOAA) Gulf Coast Hurricane Awareness Tour in Fort Myers on April 18th was a great success. Local media promotion of the event brought 1,400 people through the gates at Fort Myers Page Field to tour the aircraft and visit with emergency responders. The tour also brought 116 middle school students to the aircraft to hear firsthand about the threat that hurricanes play in their lives.

The preparedness tour is an annual event that allows NOAA and state and local governments, schools and other preparedness organizations and the media to come out and tour the NOAA P-3 Hurricane Hunter aircraft and visit with the crew to learn about how to get prepared for the upcoming hurricane season. In addition, Bill Read, the new Director of the National Hurricane Center, was at each of the five stops of the tour that included Corpus Christi, TX, Galveston, TX, New Orleans, LA, Apalachicola, FL and Fort Myers, FL. The Fort Myers event was organized by the National Weather Service in Ruskin, FL and Lee County Emergency Management.

The hurricane awareness tour has been conducted for more than 25 years, alternating between the Gulf and Atlantic

coasts, and is followed by NOAA's hurricane hazard education campaign during national Hurricane Preparedness Week, May 25th to 31st. The Atlantic hurricane season began on June 1st.

People lined up at Page Field in Fort Myers to see the aircraft.
The lines were like this from 10 AM until 430 PM.

The Smell of Rain?

On occasion, people will say that smells are stronger just before it rains. There is actually some truth to this. It happens that odors must be dissolved in water vapor to be smelled. With the approach of weather systems that produce rain, the amount of water vapor in the air increases, allowing more odors to be dissolved and hence smelled. The next time someone says "It smells like rain", get out your umbrella!

New Graphical Forecast Products

By: Ryan Sharp

Improvements in computer software packages as well as advances in research are allowing forecasters to produce forecasts that combine a lot of information into a graphical format. On February 20th, 2008, forecasters at the National Weather Service in Ruskin began using one such tool called a Graphicast. The link to these new forecasts is right on our front webpage. Short-term (out to day 3, see Fig. 1) and long-term (days 4 through 7) forecasts are produced at least twice each day and updated more often as needed. Each image gives a graphical representation of the main weather features dominating each period. That could be cold fronts expected to move through the area, or more common in the next few months, the location of the Bermuda High and its expected effect on our daily thunderstorm activity. Also, a brief text description is added to highlight points within the graphical picture.

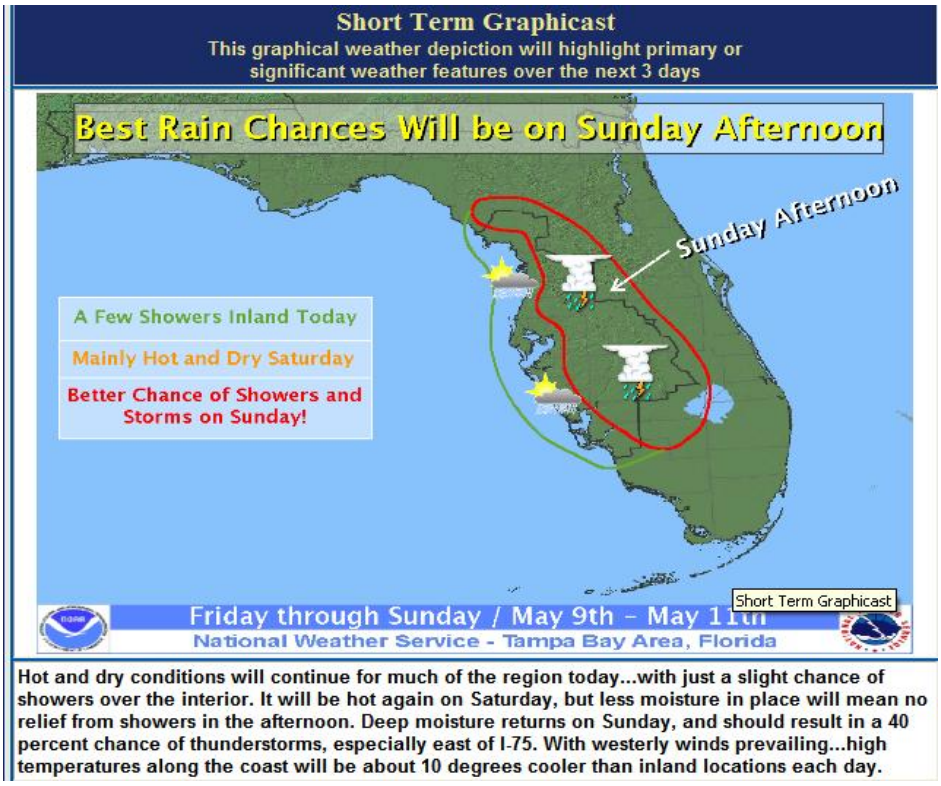


Figure 1: An example of the short-term Graphicast issued by the National Weather Service in Ruskin.

The National Hurricane Center is also improving on its popular Graphical Tropical Weather Outlook (see Fig. 2), first featured during the 2007 Hurricane Season. This year, they will increase the number of updates to this product to 4 times a day, with the update times also being shifted from 10:30 AM/PM to 8 AM/PM and 2 AM/PM. In addition, they will be

experimentally displaying a probability for tropical storm development over the regions mentioned in the outlook. A yellow outline will go around regions where there is a low probability (less than 20 percent chance) for development. Orange will surround regions of medium probability (20-50 percent), and red areas will indicate a high potential (greater than 50 percent) for tropical storm development. This new feature will be of great public benefit, especially if these tropical disturbances develop near our coastlines, where increased lead times will give people more time to prepare.

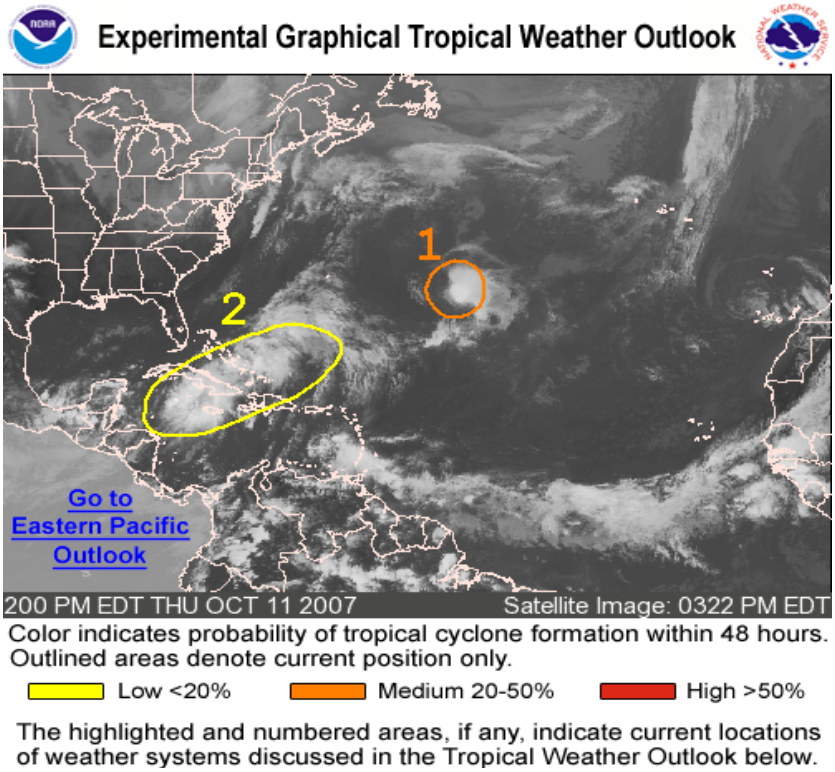


Figure 2: An example of the experimental Graphical Tropical Weather Outlook issued by the National Hurricane Center in Miami.

Severe Weather Preparedness

By: Michael Cantin

Don't Wait! Get Prepared Now For Severe Weather! Summertime is typically a very active weather period in Florida. Whether it's severe thunderstorms, flooding, excessive lightning, or hurricanes, there is never a shortage of weather to be concerned about. Each year thousands of Floridians make choices that place them in harms way. Many times they are lucky and avoid injury, but there are too many who do not make it unscathed that are injured or even killed during weather events. Here are some simple steps to take that will help you avoid the majority of weather related hazards.

1. Purchase a weather radio and program it for your county. Make sure it works properly and have extra batteries on hand.

2. When you hear thunder, get indoors immediately! Don't wait until you can see lightning. If you plan to be outside during the peak heating of the day (2-8pm), or when dark clouds threaten, plan on changing your plans! If you get caught outside, avoid standing near tall objects (like trees or poles) and squat down, standing on the balls of your feet, and cover your ears. The idea is to get as low as you can while touching as little of the ground as possible.

3. During periods of heavy rainfall, avoid standing in or near rivers, creeks, drainages, canals, or other flowing bodies of water. Intense rainfall can cause rapid rises in these areas and the powerful force of this water may just sweep you off your feet and send you downstream. **Never ever drive across a flooded roadway!** Water only 18 inches deep will float the average vehicle, and once you're floating it will be extremely difficult to exit your car. Roadways may also be washed out underneath the flowing water, and if you proceed, you could drive directly into this water created crevasse.

4. If a tornado warning has been issued for your area, do not go outside to see the tornado. Get into an interior room and wait out the storm. Place as many walls between you and the outside as you can. If you're caught outside and a tornado approaches, lie flat on the ground and cover your head to protect yourself from flying debris. If you live in a mobile home and a more sturdy structure is nearby, go into that structure as quickly as you can. If there are no stronger structures nearby, it may be safer to exit your mobile home and find a low spot, like a ditch, to lie in.

In addition to the steps listed above, another important step toward being prepared is to gather items that you would need during an emergency, especially when the power may be out for long periods of time. Think of items that are necessary for you to live healthily every day, such as medications, food, and water, then stock up on these items. The American Red Cross also recommends the following items: A 3 day supply of water (1 gallon/per person/per day), non-perishable food items, extra clothing, blankets and sleeping bags, first aid kit, NOAA weather radio and extra batteries, flashlight and batteries, extra money, and items needed for infant or elderly care.

As summer approaches do yourself and your family a favor by being prepared and treating severe weather with respect. By making safe choices, and by being prepared, you'll be sure to have a safe and exciting season.

Trying to Reason with Hurricane Season

By: Charlie Paxton

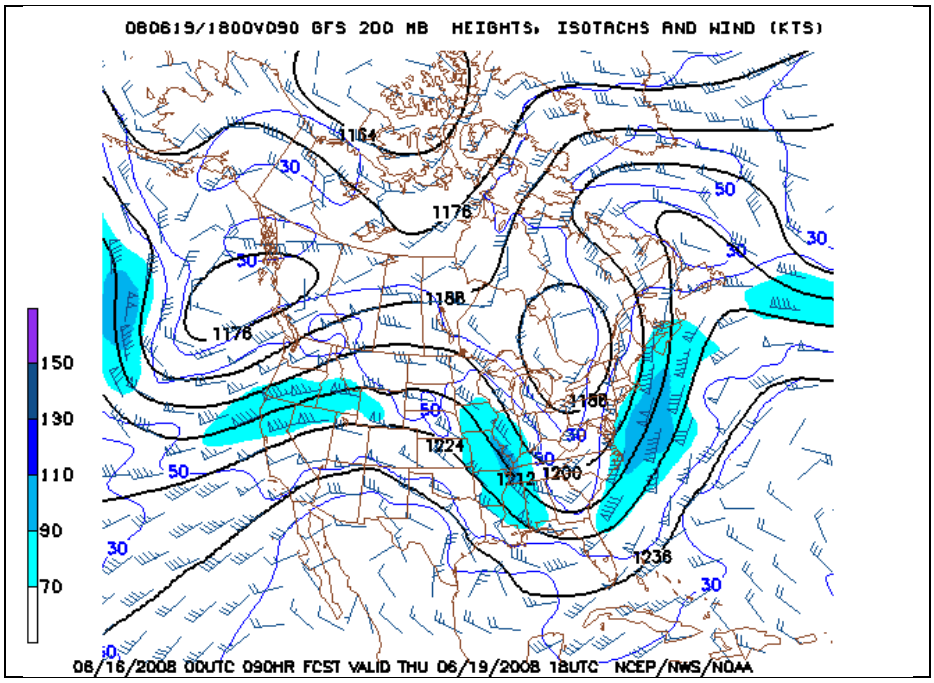
Well the wind is blowing harder now
Fifty knots or thereabouts
There's white caps on the ocean
And I'm watching for water spouts
It's time to close the shutters
It's time to go inside

Florida songwriter Jimmy Buffett and his "not a care in the world" attitude seems to prevail amongst many Floridians - especially those who haven't experienced a ferocious hurricane. It's terrifying and seemingly without end. During the storm, minutes seem like hours and hours seem like days. When it's all over – it's just the beginning and never the same as it was. What will this hurricane season behold? Only time will tell. I can tell you what the experts are forecasting. NOAA seasonal hurricane forecasters are on the same page with Bill Gray and his young understudy Phil Klotzbach. Both are forecasting an above average season.

	NOAA	Bill Gray
Named storms	12-16	15
Hurricanes	6-9	8
Major Hurricanes	2-5	4

Many different assessments and statistics are stirred into the forecasting pot but a few stand out. First, we are still in a phase with warmer Atlantic water temperatures. Heat drives hurricanes. Second, we are not in an El Niño pattern of warmer water temperatures over the tropical Pacific that creates extra wind shear across our area. Wind shear is our friend. Forecasting the El Niño/La Niña cycle though is often a humbling experience. Earlier this year, prognosticators were forecasting a strong La Niña for the summer that briefly developed and then promptly disappeared leaving us in a neutral pattern that doesn't really help like an El Niño does. Whether a storm will get us or not is often a just matter of timing of the pressure patterns across the globe.

Like the beginning of the past several hurricane seasons, a persistent trough has been over the eastern U.S. This trough can be a channel for tropical storms that develop but it's also a source of wind shear. Did I say, "Wind shear is our friend"? This is because it shears the tops off tropical systems, keeping them weak. What will happen later in the season remains to be seen.



200mb Wind and Heights

All it takes is one, though, as our straight shooting Craig Fugate, Director, Florida Division of Emergency Management reminds us.

- Don't focus on the seasonal forecasts, focus on the fact you live in Florida and we have hurricanes.
- We hope the year is quiet, but the reality is Florida has hurricanes.
- If you live in Florida you get ready for hurricane season -It's not a seasonal forecast it's a seasonal activity.
- If you live in Florida you have a hurricane problem - the way to deal with it is you get ready for hurricane season.

How Do Hurricanes Form?

By: Dan Noah

Hurricanes are intense tropical storms with a well defined circulation and sustained winds of 74 mph or higher. These are the ingredients necessary for a hurricane to form.

1. Warm ocean waters are needed to fuel the heat engine of the hurricane. The ocean waters must reach 80º Fahrenheit throughout a depth of at least 150 feet.

2. The atmosphere over the ocean waters must be unstable. This will allow thunderstorms to form which will transfer the heat from the ocean into the atmosphere.

3. Hurricanes can not form if they are too close to the equator. A minimum distance of at least 300 miles from the equator is needed to allow the Coriolis force to help the hurricane maintain a central low pressure and the low level circulation around a storm.

4. Hurricanes cannot be generated spontaneously. To develop, they require a weakly organized weather system with sizable spin and low level inflow.

5. Vertical wind shear is the change of winds with height (speed and/or direction) and is the enemy of hurricanes. For a hurricane to form, the difference in wind speed between the surface and the upper troposphere (about 50,000 ft) must be 23 mph or less.

6. Finally, hurricanes need plentiful moisture in the atmosphere from the surface to about 15,000 feet. Dry air aloft is not helpful for allowing the continuing development of widespread thunderstorm activity.

Having these conditions met is necessary, but not sufficient as many disturbances that appear to have favorable conditions do not develop into a hurricane. Hurricanes are still not completely understood by atmospheric scientists. If you are interested in more information regarding hurricanes, visit the National Weather Service on the internet at www.weather.gov/tampabay, or the National Hurricane Center at www.nhc.noaa.gov.

Busy Outreach Season

By: Jennifer Colson and Charlie Paxton

Forecasting isn't the only thing the meteorologists do here at the National Weather Service. A big part of our job also includes outreach to our area communities. This outreach includes providing talks for local schools and community groups, working hurricane and preparedness expos, giving tours of our office, and presenting SKYWARN™ spotter trainings. Most of these activities are suspended during hurricane season, so December 1st through June 1st is considered our outreach season. This year, the Ruskin office participated in more than 100 events during this time, including 30 office tours and nearly 30 SKYWARN™ trainings.

Science and Operations Officer Charlie Paxton spoke at the 2008 Hernando County Hurricane Expo at Weeki Wachee with Congresswoman Ginny Brown-Waite. Weeki Wachee is the home of live mermaids. Charlie spoke to the audience, including mermaids, on how NOAA Weather Radio the keeps residents attuned to the lightning, tornado, and hurricane hazards that confront the area.

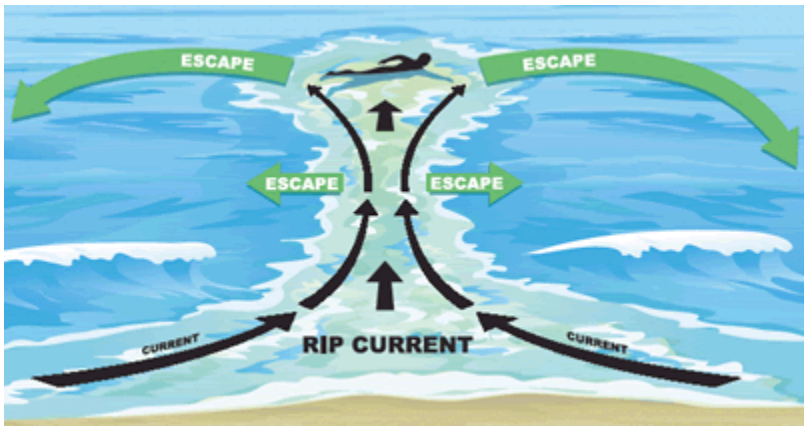
Rip Currents: Don't Get Caught

By: Jennifer Colson

Rip currents, also incorrectly known as rip tides or undertow, are powerful, channeled currents of water flowing away from shore. They typically extend from the shoreline, through the surf zone, and past the line of breaking waves. Rip currents most typically form at low spots or

breaks in sandbars, and also near structures such as groins, jetties and piers. Rip currents can be very narrow or extend in widths to hundreds of yards. The seaward pull of rip currents varies: sometimes the rip current ends just beyond the line of breaking waves, but sometimes rip currents continue to push hundreds of yards offshore. They form when waves create an underwater sandbar close to shore, and waves push more and more water in between the sandbar and the shore. Eventually, a section of this sandbar collapses allowing the water to rush back toward the sea through the narrow gap.

Rip currents can be killers and they are the leading surf hazard for all beachgoers. They are particularly dangerous for weak or non-swimmers. In Florida since 2000, there have been a reported 142 deaths and 88 injuries from people caught in a rip current. There can be some visual clues to indicate the presence of a rip current. Look for a channel of churning, choppy water, an area having a notable difference in water color, a line of foam, seaweed or debris moving steadily seaward, or a break in the incoming wave pattern.



Some helpful tips to avoid and survive rip currents are:

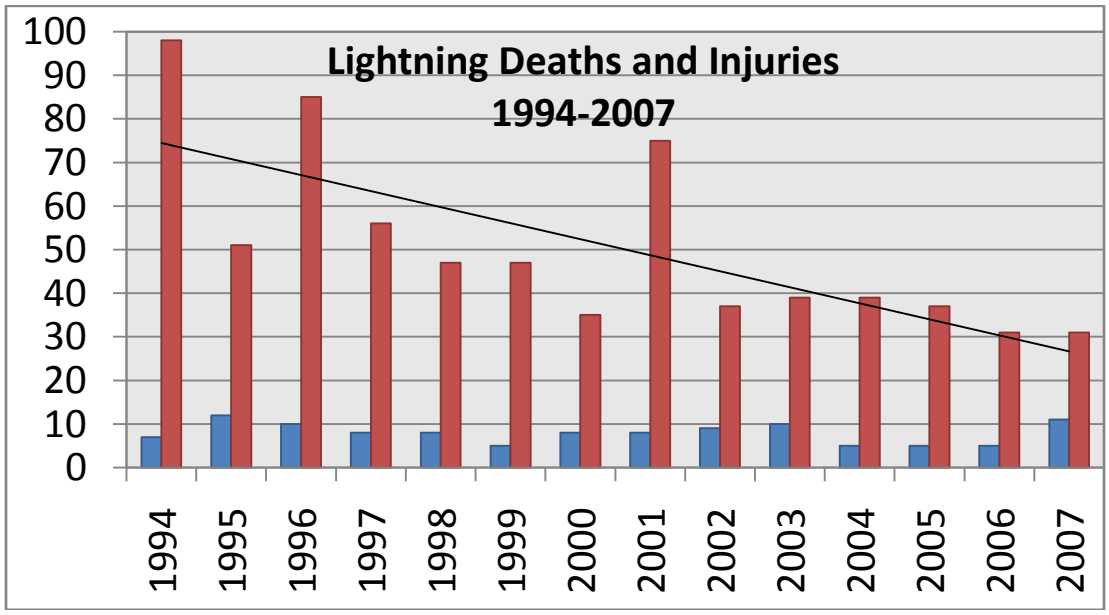
- KNOW HOW TO SWIM!
- Never swim alone and use a flotation device.
- Whenever possible, swim at a lifeguard protected beach.
- Obey all instructions and orders from lifeguards.
- Stay at least 100 feet away from piers and jetties.
- If caught in a rip current, remain calm to conserve energy and think clearly.
- **Don't fight the current.** Swim out of the current in a direction following the shoreline. When out of the current, swim towards shore.
- If you are unable to swim out of the rip current, float or calmly tread water. When out of the current, swim towards shore.
- If you are still unable to reach shore, draw attention to yourself: face the shore, wave your arms, and yell for help.
- If you see someone in trouble, get help from a lifeguard. If a lifeguard is not available, have someone call 9-1-1. Throw the rip current victim something that floats and yell instructions on how to escape. **Remember, many people drown while trying to save someone else from a rip current.**

Know your risk before you hit the beach. A daily rip current outlook is included in the Surf Zone Forecast issued every morning by 6 AM from the National Weather Service offices in Ruskin, Melbourne, Miami, Jacksonville, and Tallahassee, as well as other coastal offices throughout the nation. A three-tiered structure of Low, Moderate, and High Risk is used to describe the rip current risk. Also, ask a lifeguard about the conditions before you enter the water. If in doubt, don't go out!

Florida Lightning Study

By: Nicole Carlisle

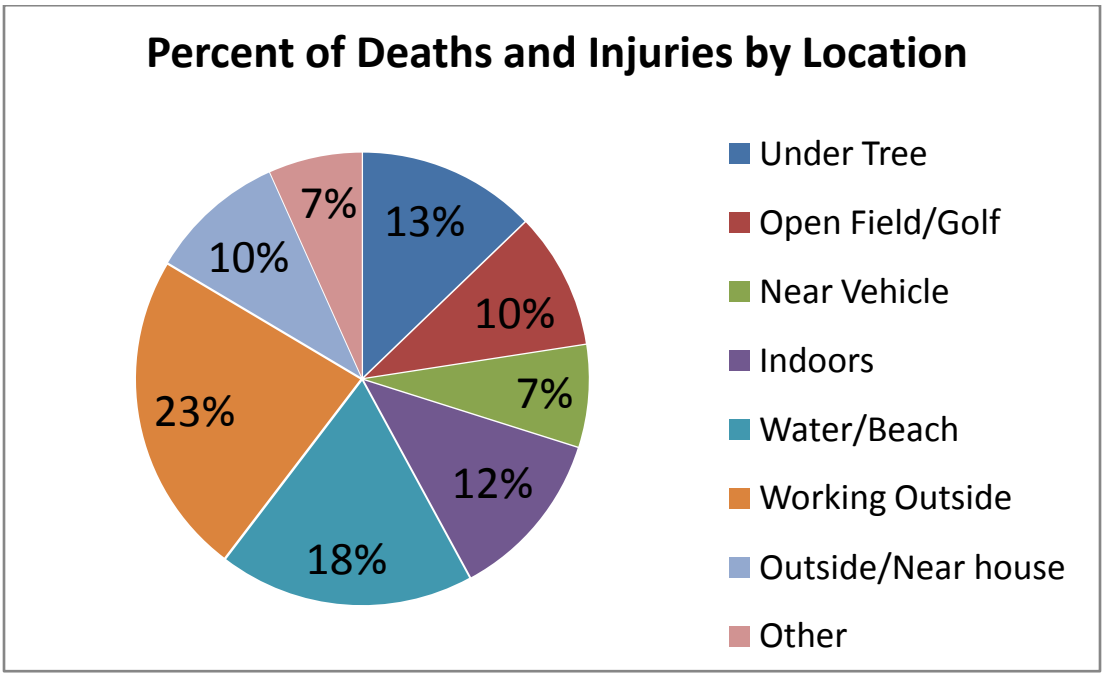
Florida is the most lightning-prone state in the U.S. It is also one of the fastest growing states, increasing from a population of 13 million people in 1990 to 18 million people in 2006. As the population continues to grow, the number of people struck by lightning could climb higher. But more lightning awareness is leading to fewer lightning deaths and injuries.



Lightning deaths (blue) and injuries (red) have generally decreased from 1994-2007.

While death is absolute, injuries from lightning strikes can vary considerably: from debilitating effects such as being completely paralyzed to minimal effects, like slight burns. The greatest number of lightning strikes per year in the nation occurs over west-central Florida, making the Tampa Bay area "The Lightning Capitol of the U.S.". The greatest number of deaths and injuries occurred in July and August between 12 pm and 5 pm, when there are generally afternoon showers and thunderstorms present over the Florida peninsula. About 88 percent of the total victims between 2004 and 2007 were outside when they were struck, with 23 percent working

outside, and 18 percent in or near water. About 10 percent of the people struck were standing under a tree, and 13 percent were out in an open field or golf course.



Locations of Lightning Strike Victims from 2004-2007

Many of the strikes occurring outside resulted in casualties, but not one person died when they were struck by lightning while inside! So the bottom line is: when thunder roars, go indoors!

To lower your chances of being struck by lightning, follow a few simple rules:

- Watch for developing thunderstorms. If a storm approaches, go indoors! Lightning can strike up to 10 miles away from where it's raining.
- Once indoors, stay away from corded phones, computers and other electrical equipment that puts you in direct contact with electricity. Also, stay away from water and plumbing.
- If caught outside during a storm, stay away from trees and tall objects and **do not** take shelter under a partially enclosed building, such as a pavilion, car port, baseball dugout or shed. Crouch down, stand on the balls of your feet and protect your head with your hands.
- If caught in your vehicle, make sure all windows and doors are shut and do not touch any metal surfaces. Only hard-topped vehicles are considered safe.
- Stay inside for an additional 30 minutes after you hear the last rumble of thunder.

SKYWARN™ and Amateur Radio

By: Nick Petro

Americans live in the most severe weather-prone country on Earth. Each year, Americans cope with an average of 10,000 thunderstorms, 2,500 floods, 1,000 tornadoes, as well as an average of 6 deadly hurricanes. Some 90% of all presidentially declared disasters are weather related, leading to around 500 deaths per year and nearly $14 billion in damage.

What can you do to help protect yourself, your family, and neighbors? Consider becoming a trained SKYWARN™ Spotter. SKYWARN™ is a program sponsored by your National Weather Service (NWS) consisting of trained weather spotters who provide reports of hazardous weather to help in the warning process. SKYWARN™ spotter reports provide vital "ground truth" to the NWS. The reports serve the NWS mission of protecting life and property in 3 ways: assist in present and future warning decisions, confirm hazardous weather detected by NWS radar, and provide verification information which can be used for future research efforts. SKYWARN™ is a volunteer public service for those 18 years or older. Each year our spotters donate their time and/or equipment to help the NWS issue severe weather warnings.

To become a SKYWARN™ spotter, one must take a training course offered by the NWS. Training is offered at least once a year in every county we serve, and is available on the internet. There are two levels of training - Basic and Advanced. The Basic training will focus on weather safety, thunderstorm formation, severe weather cloud identification, and reporting. The Advanced training will feature a discussion on sea breeze fronts, lightning patterns, visualizing instability, and hurricanes.

To learn more about upcoming spotter training classes in your area, or to take the online spotter training course, visit the NWS Tampa Bay Area web page at http://www.weather.gov/tampa. Then click on the SKYWARN™ link on the left column of the web page.

Amateur Radio and SKYWARN™

"Providing life saving information when all other forms of communication are down"

A primary responsibility of the Amateur Radio Service, as established by the Federal Communications Commission, is the rendering of public service communications for the general public, particularly in times of emergency. This responsibility dovetails perfectly with the NWS SKYWARN™ program because when all usual forms of communication are down, amateur radio operators are still able to communicate life-saving storm reports and information with the NWS via portable and base station radio equipment operating on battery and generator backup power.

During severe weather events, many amateur radio repeater systems host SKYWARN™ spotter nets. Each SKYWARN™ net has a radio traffic director who is known as the net control station (NCS). The NCS collects information from spotters then passes it along to the NWS. The NCS also broadcasts pertinent and real time hazardous weather information to the spotters monitoring the net.

Like most NWS offices, the NWS Ruskin has an amateur radio base station, WX4TOR, to communicate with SKYWARN™ spotters. WX4TOR is equipped with HF, VHF, and UHF radios for short and long range communication. Operating modes such as

voice, packet, and APRS are used to collect real-time spotter reports and weather observations. WX4TOR is utilized during major weather events or disasters such as tropical cyclones or other natural disasters which cover most of the Ruskin county warning area (CWA). When WX4TOR is activated, a local amateur radio volunteer will operate the station and communicate with the SKYWARN™ net control and spotters who are on the net frequency.

The Ruskin office utilizes two methods of operating SKYWARN™ amateur radio nets. They consist of local county-based SKYWARN™ nets, and a regional SKYWARN™ net. Both support the Ruskin office in local early weather warning and emergency communications functions, and assist with SKYWARN™ severe weather spotter operations. To learn more about the Amateur Radio Service, including information on how to become a licensed amateur radio operator, visit the American Radio Relay League at http://www.arrl.org.

Local County-based Nets

Many of the 15 counties in the Ruskin CWA operate their own SKYWARN™ amateur radio nets during severe weather events. Some of the counties operate SKYWARN™ nets under the support or direction of county emergency management, ARRL ARES, or ACS affiliation, while others are volunteer groups or clubs with no particular affiliations.

County Nets will be responsible for SKYWARN™ activation and will be recognized as the official SKYWARN™ nets for routine or day-to-day severe weather events. This includes warm season sea breeze thunderstorm activity, as well as convective watches (tornado and severe thunderstorm watches). County nets will activate upon request from the Ruskin office or will self-activate as needed (typically, county nets self activate most of the time). County nets will relay severe weather reports and communicate directly with the Ruskin WFO via phone or instant messaging. Since the aforementioned weather events typically affect only small groups of counties at any one time, net activation and duration will be dependent on the timing of the weather event itself, and will be determined by the net control. When it appears that the severe weather is about to enter a given county, that county's net control will establish and activate a directed net. When the severe weather threat has exited an activated county, the net control may close the net at their discretion.

For a list of county-based SKWARN™ net frequencies in the Ruskin CWA, visit our SKYWARN™ web page at http://www.weather.gov/tampa.

Regional Nets

During large scale natural disasters or weather events (such as tropical cyclones) in which the majority of Ruskin's CWA is affected at the same time, the West Central Florida Group, Inc (WCFG) NI4CE repeater system will be utilized for NWS Ruskin amateur radio SKYWARN™ nets. This is known as a *regional net activation*. During regional net activations, net control will be done remotely by well-trained and dedicated radio traffic operators (trained and directed by WCFG Inc members). At the same time, an NWS-designated volunteer will serve as a liaison station at the Ruskin office and will operate station WX4TOR to receive and disseminate information to the net and to interact with NWS staff.

For more information about the NI4CE repeater system and net frequencies, visit the NI4CE web site at http://www.ni4ce.org.

WX4TOR is equipped with HF, VHF, and UHF radios for short and long range communication. Operating modes such as voice, packet, and APRS are used to collect real-time spotter reports and weather observations.

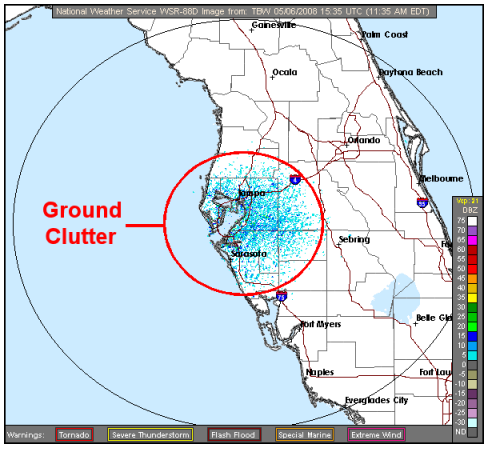
What Is That On The Radar?

By: Paul Close

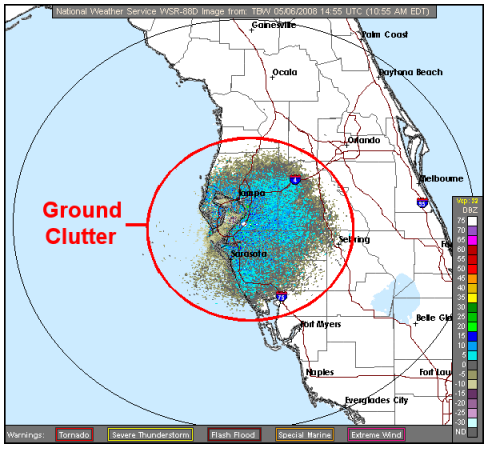
Weather surveillance radars such as the WSR-88D can detect most precipitation within approximately 140 nm. However, light rain, light snow, or drizzle from shallow cloud weather systems are not necessarily detected.

Echoes from surface targets appear in almost all radar reflectivity images. These false reflectivity echoes, known as Anomalous Propagation (AP), are unpredictable and can be very difficult to differentiate from real echoes. There are two main types of anomalous propagation or false echos seen on radar. The first and most common which is usually seen in every radar image is Ground Clutter. When atmospheric conditions are such where there are low-level inversions (air temperature increasing with height instead of the typical decreasing with height) ground clutter can be very pronounced.

Ground clutter is the easiest false echo to recognize since it does not move in any organized fashion, it has no kind of structure to it that is similar to real precipitation, and it is usually close to the radar. The ground clutter in clear air mode is often more prevalent than precipitation mode. This is because the radar is in its most sensitive operation thereby "seeing" smaller objects such as dirt, dust and bugs.

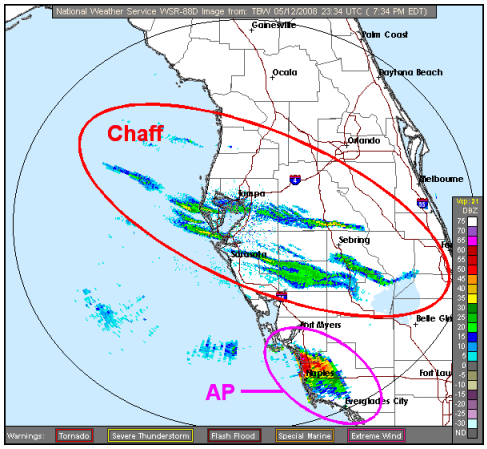


Ground Clutter in Precipitation Mode

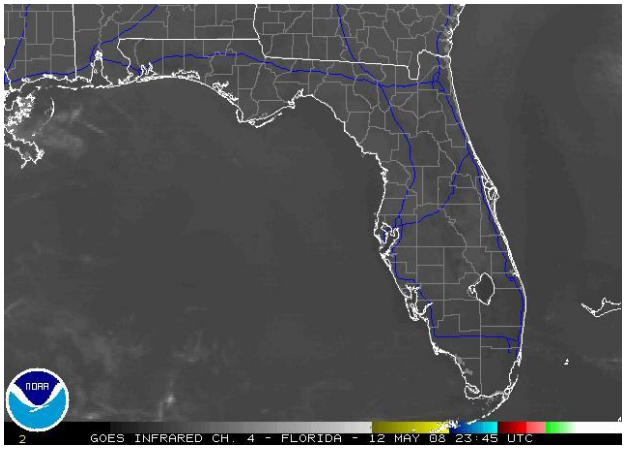


Ground Clutter in Clear Air Mode

The second type of anomalous propagation is Superrefraction. This is when the radar beam is bent greater than normal back toward the earth. Under highly stable atmospheric conditions (typically on calm, clear nights) the radar beam can be refracted almost directly into the ground at some distance from the radar, resulting in an area of intense-looking echoes. This anomalous propagation phenomenon is less common than ground clutter. One such example is shown below labeled AP. Here you will notice that the intense-looking echoes are not moving much and appear to be real, but satellite confirms that these echoes are not real.

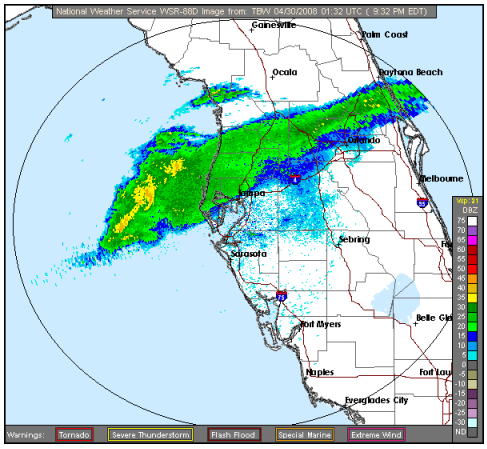


Superrefraction (AP) and Chaff

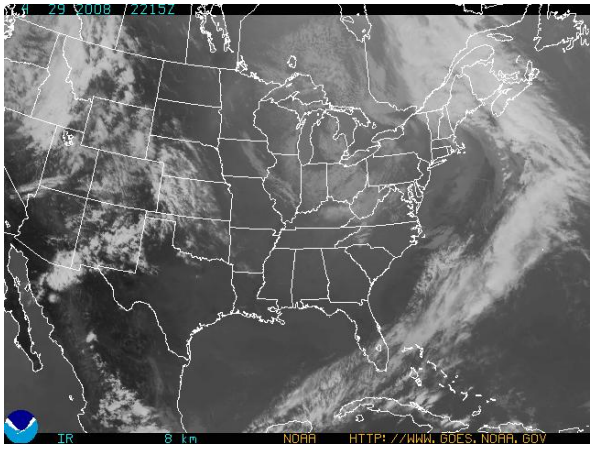


Infrared Satellite image from the same time as the radar image (left)

On other occasions the radar shows what looks like rain moving across your area, however you look out the window and there isn't a cloud in the sky. As you can see in the images below and above, the radar image on the left is indicating an area of rain moving southeast across the eastern Gulf of Mexico and the Florida peninsula, but the satellite pictures on the right tell a different story. In this case what the radar is seeing is what is known as chaff. Chaff is a radar countermeasure used by military aircraft consisting of very small pieces of metal such as aluminum. It can appear initially as narrow bands of reflectivity on the radar since they are dispersed by planes flying at high speeds along a path, but then spread out as they move away from the dispersion area. Sometimes these chaff echoes can stretch for hundreds of miles. The bands tend to be very shallow and are usually seen on only one tilt of the radar, though this depends on the range from the radar and the amount of diffusion time. As chaff drifts closer to the radar site and further from the dispersion site, it may be seen on several tilts making it more difficult to distinguish from actual weather.

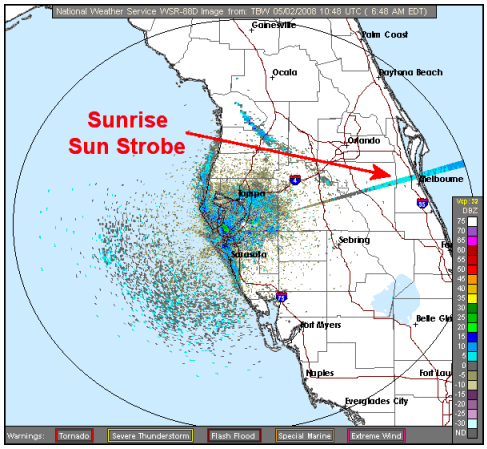


Chaff on NWS Tampa Bay Doppler radar

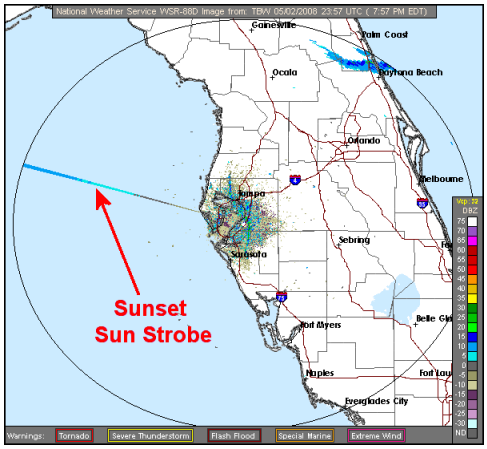


Infrared Satellite image from the same time as the radar image (left)

You may also see what looks like a spike or beam on the reflectivity images as shown in the pictures below. These spikes are called different things from a "sunburst" to a "sun spur" to "sun strobe". No matter what you call them, they appear when the radar is pointed directly at the sun and the sun's radiation hits the receiver directly. Since the sun emits radiation of virtually all wavelengths the radar is essentially blinded (just as we are) when we look directly at it. These spikes or beams occur each day around the times of sunrise and sunset, but the position changes daily through the year as the path of the sun changes.



Sunrise on NWS Tampa Bay Doppler radar



Sunset on NWS Tampa Bay Doppler radar

Thank You to all!

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