

THE COASTAL BREEZE

Volume volume XII, Issue 12 Spring 2024



Brownsville/Rio Grande Valley

Spring is flying by! It has been a hot one so far, and that doesn't look to change anytime soon. As we press through the end of Spring into Summer our other greatest threat will be Tropical Storms and Hurricanes. With the season fast approaching and the call for an active season we felt it right to put the focus on one our our biggest threats for the Summer. We will focus on preparedness, what some of our staff have been doing to prepare for hurricane season, and look closer at Rapid Intensification of hurricanes. We also will introduce you to our two newest employees.

We want to hear from you!

Do you have suggestion for articles or weather photos you want to show off? Send them our way! For any photos make sure to include: date, time, location and name of photographer for credit!

Email us at sr-bro.awareness@noaa.gov

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Rapidly Intensifying Hurricanes: The Tropics' "Sum of All Fears"

By Barry Goldsmith

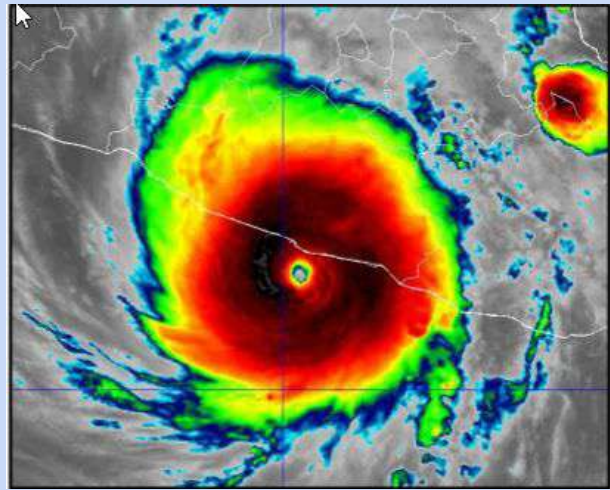
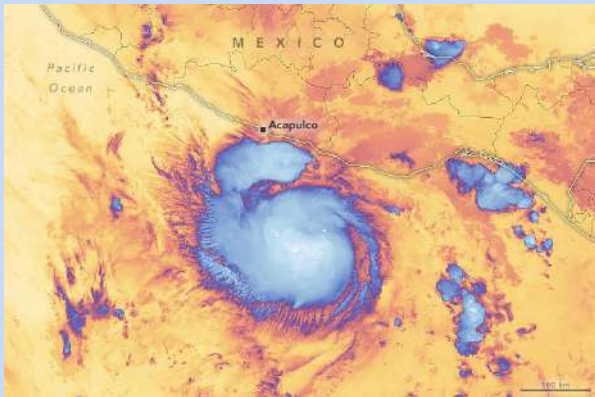


Figure 1. Tropical Storm Otis (left) at 230 AM CST (Acapulco time), October 24th . Just 20 hours later (right), Otis was a category 5 hurricane bearing down on Acapulco Bay, at 1030 PM CST, October 24th.

On Monday October 23, as people were heading to bed in Acapulco, Mexico, Tropical Storm Otis was headed toward the area - but only expected to intensify to a strong tropical storm (70 mph wind) before making landfall around sunrise Wednesday, October 25th. By sunrise Tuesday, Otis had intensified more than expected – and now expected to be a category 1 hurricane at landfall early Wednesday. Acapulco had seen over two dozen near misses and a few direct hits since the 1940s, but no major (Category 3 or greater) strikes (Figure 2). Residents had little reason to be concerned.

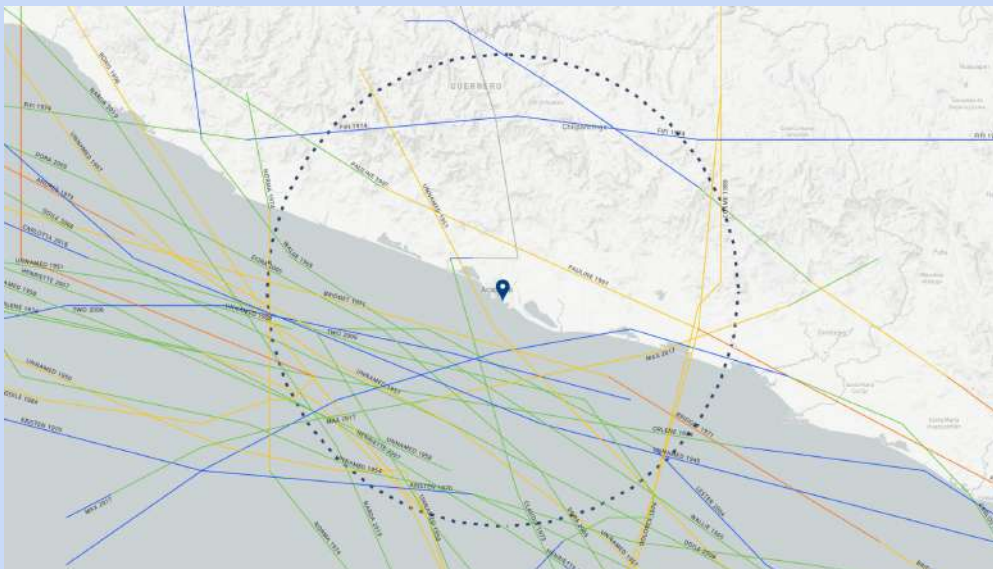


Figure 2: Historical tropical storm and hurricane tracks within a 70 mile radius of Acapulco, Mexico, 1945-2022. Courtesy of <https://coast.noaa.gov/hurricanes>.

Dramatic changes occurred on Tuesday as Otis underwent rapid intensification (RI), while on a track for Acapulco Bay. In just 12 hours, Otis exploded from a low-end category 1 (74 mph) hurricane to an extremely dangerous high-end category 4 (150 mph) hurricane by sunset! Otis intensified to its peak (category 5, 167 mph) at 10 PM (Figure 1) The rapid intensification gave residents and tourists precious little time to prepare – or evacuate. When the devastating hurricane was through with Acapulco, it left behind 52 persons dead, 32 missing persons, and estimated damage between \$12 and \$16 billion. Water, from storm surge and rainfall-producing landslides, resulted in the majority of the known dead. The inflation-adjusted damage was the highest for a landfalling event in Mexico.



Above: Hollowed-out high rise hotels and condos at Acapulco Beach. Photo courtesy of AFP/Getty Images

What Causes RI?

RI is defined as a ≥ 35 mph increase in sustained winds in 24 hours or less. RI requires the same ingredients that all tropical cyclones need: An area of disturbed weather - the “seed” for the system to grow; sufficient moisture throughout the depth of the atmosphere (defined as atmospheric relative humidity), low wind shear, which allows the cyclone to maintain vertical continuity and equilibrium, and high sea surface temperatures (SST). The difference between a slower-developing tropical cyclone and one with RI is dependent on how the ingredients “mix”, and where they mix. Research by Majumdar et. al (2023) indicated that wind shear and SST were the most critical ingredients in the Yucatan/western Caribbean region, followed by the southern North Atlantic Ocean. Atmospheric relative humidity can also be a critical ingredient, but its connection was less clear. For the Gulf of Mexico, there was less correlation between SST and RI.

Connection to Global Warming

The same research indicated a 36 percent increase in RI events across the entire Atlantic Basin during the 2000-2021 period when compared with the 1980-2000 period. While there were some indications that Anthropogenic Global Warming had a relationship, the amount of correlation remained unclear. That said, the number of recent landfalling RI events in the western Atlantic, Caribbean, Gulf of Mexico - as well as the west coast of Mexico from RI events in the eastern tropical Pacific - is concerning. Since 2017 alone, Harvey (Texas), Michael (2018, Florida Panhandle), Dorian (2019, Bahamas), Laura (2020, Louisiana), Ida (2021, Louisiana), and Ian (2022, Florida Suncoast) have had one or more windows of RI. Hurricanes Patricia (2015) and Otis (2023) in the eastern tropical Pacific were among the fastest RI events on record.

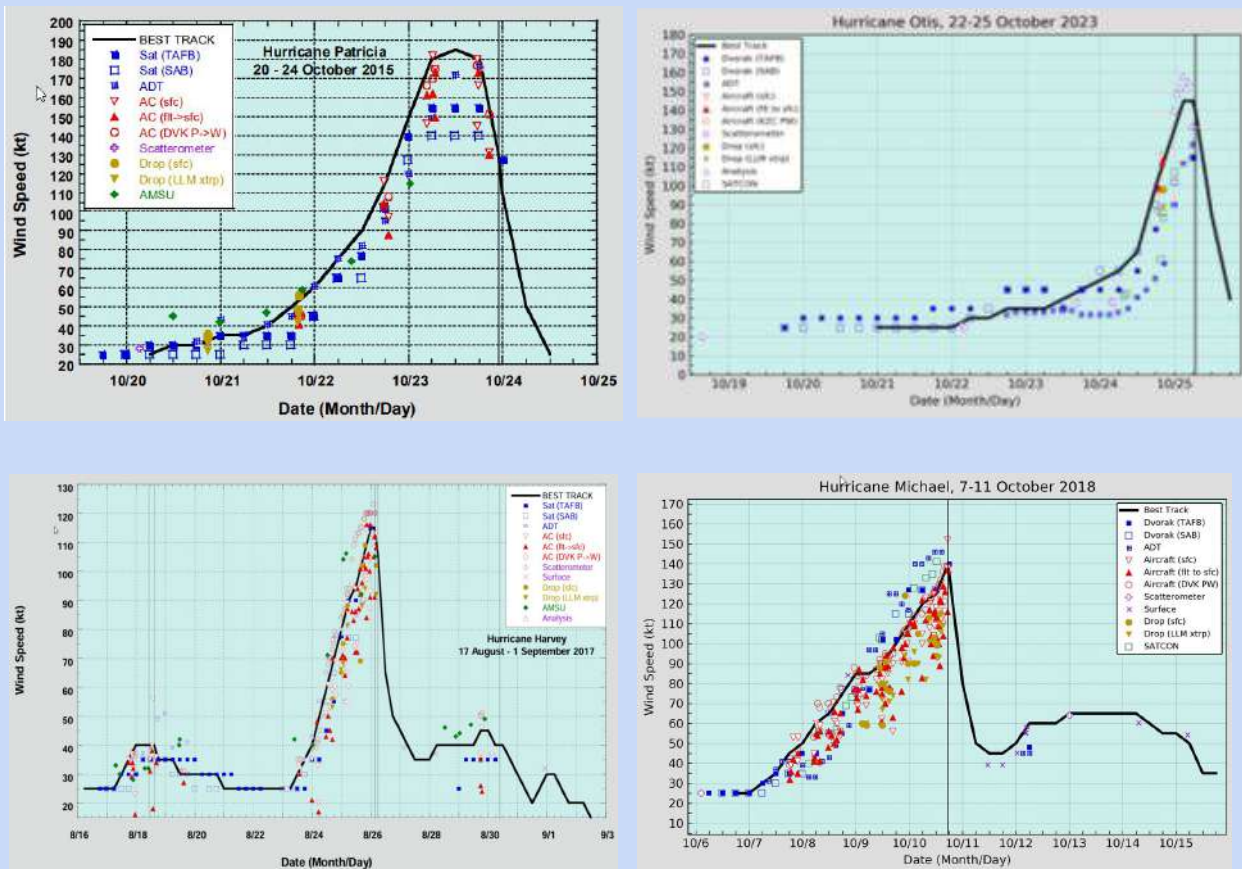


Figure 3: Four cases of RI forecasts and observations since 2015: Clockwise, from top left: Eastern Pacific Hurricane Patricia (2015), Eastern Pacific Hurricane Otis (2023), Atlantic (eastern Gulf) Hurricane Michael (2018), Atlantic (western Gulf) Hurricane Harvey (2017). Note the sharp intensity increase as each storm neared landfall, followed by the sharp drop after landfall and losing the oceanic fuel source.

RI and Forecasting

RI remains the most vexing challenges in hurricane forecasting - from the pure connection between observed and forecast parameters of SST (and depth of such), wind shear, and atmospheric moisture - and the ability to communicate the potential and

probability of occurrence with sufficient time for people and communities to prepare. Otis was the most recent example of the challenge. However, modeling of the meso (or fine) scale processes that help drive RI continues to improve with the fusing of increasing computing power and scientific understanding of the processes that determine RI. Recent successes of improved RI, forecasting included Harvey (2017), Michael (2018), Ida (2021), and Ian (2022) (Figure 4, Harvey and Michael shown). While more work needs to be done, the signs are pointing upward.

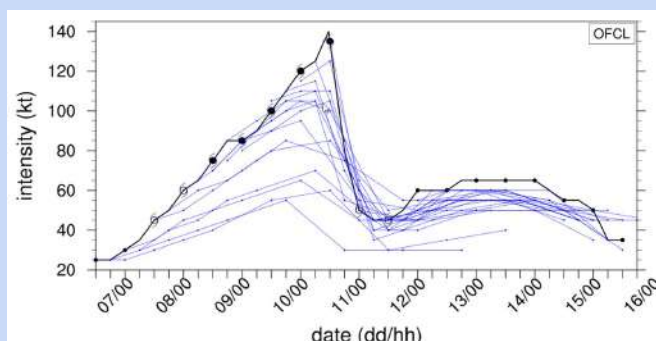
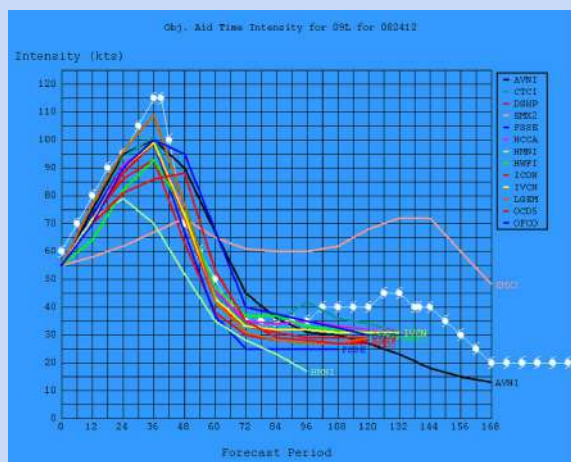


Figure 4: Selected forecasts, overlaid with “best track”, for Hurricane Harvey (left) and Michael (right). For Harvey, the official forecast is overlaid with best track and many of the key models used by NHC forecasters to help predict intensity, based on 9 AM local time on August 24, 2017 - more than 36 hours out from landfall. For Michael, only the official forecasts are shown at different start times.

RI and Readiness

As landfalling RI events have become an annual occurrence in both the Atlantic and eastern tropical Pacific basins, it is imperative that coastal residents take considerable time to prepare - well in advance of the first signs of a potential case. Time should be taken in May and June this year - and any year - to do the following three things:

- **Check Resilience.** Nobody wants to return to - much less experience - destruction from major hurricane winds. Take the time to fortify your home - and if your home is sufficiently fortified, to check to ensure everything is still #hurricanestrong. Check roofs, walls, doors, foundation connections, and anchors (if a modular or manufactured home) to ensure there are no loose links or damages/leaks. Ensure all window and door coverings still fit and are ready to install.

- **Check Your Plan.** If you must evacuate, ensure that your plan for multi-week out of area residency is still valid. This includes whether your destination location has room for children and pets, and can do so for at least two weeks in a reasonable worst-case scenario.
- **Build Your Kit.** If you plan to stay, reserve a space in your home for non-perishable foods, flashlights, batteries, first aid kits, medicine, etc. Buy a few of these items each week when shopping and start to fill up that space. By the peak of the season (August-September), you should have enough for yourself, family, and pets to last at least ten days. Consider purchasing a generator and learn how to use it, then test it safety.
- **Be Informed.** Check your insurance policies and upgrade them if necessary. For the Rio Grande Valley, it is imperative to carry three policies: Homeowner's, which covers theft and fire; windstorm (if not included in homeowners) to cover wind and wind-driven rain, and flood, to cover inundation flooding that rises up from the ground during and after torrential rain.

Preparing well in advance will provide peace of mind and confidence to weather the storm - and most importantly, not panic when there may be precious time to do last-minute preparations or evacuate. Ounces of prevention well before the first Watch or Warning is issued will provide pounds of cure (readiness).

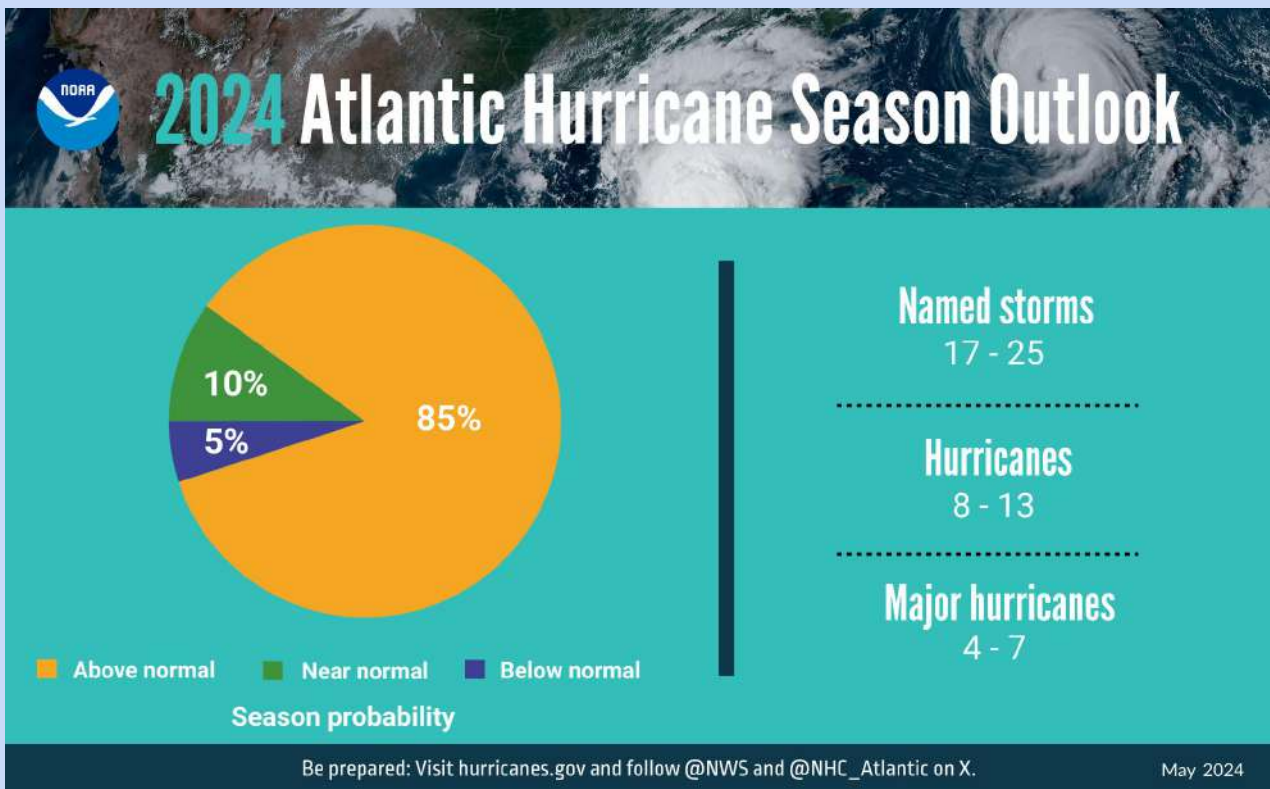
Majumdar, S. et. al: *North Atlantic Tropical Cyclone Intensification: Regional Drivers and Trends*. Geophysical Research Letters, 50, e2023GL104803

Hurricane Preparedness

By Amber McGinnis

Hurricane season is fast approaching, what can we expect and how do we prepare?

The official NOAA forecast for the 2024 Tropical Season has been released, and all indications point to an above average active season. Why could this season be very active? We have a few reasons, actually. One, the current sea surface temperatures over the central and eastern Atlantic are at record high levels. This water holds the energy that feeds tropical systems which aids in the development and the intensity of these storms. Second, though we are currently in a weak El Niño pattern, it is forecasted that a La Niña pattern will develop in time for the peak of hurricane season. El Niño patterns create strong upper-level winds. These winds tend to shear these storms apart. Conversely, La Niña patterns have much weaker upper-level winds, thus creating a more favorable environment for tropical cyclones to develop.







While we cannot say exactly how many storms will form, or how many will become Hurricanes or major Hurricanes or even if they will impact Deep South Texas. However, it is always wise to have a plan in place in the event of a Tropical Storm or Hurricane. After all, it only takes one. Here are just a few tips as we head into Hurricane season.

Prepare Before Hurricane Season

-  Develop an evacuation plan
-  Assemble disaster supplies: food, water, batteries, charger, radio, cash
-  Get an insurance checkup and document your possessions
-  Create a communication plan with a hand-written list of contacts
-  Strengthen your home







Know Your Risk: Water & Wind

-  Consider your threats: storm surge, flooding from heavy rain, strong winds, tornadoes, rip currents
-  Determine if you live in a flood-prone area
-  Find out if you live in an evacuation zone
-  Identify your home's structural risks (mobile homes & basements can be especially vulnerable)



Understand Forecast Information

-  Rely on forecasts from the National Hurricane Center & your local NWS office
-  Know your alerts & the difference between a Watch and Warning
-  Focus on potential impacts, regardless of storm size or category
-  Know that deadly hazards occur well outside of the Forecast Cone



Get Moving When a Storm Threatens



Protect your home: cover windows, secure doors & loose items



Determine sheltering options and consider your pets



Ready your go-bag, meds & supplies, charge phone, fill up/charge vehicle



Help your neighbors, especially the elderly & other vulnerable people



Follow evacuation orders if given



Stay Protected During Storms



Stay in your safe places from water & wind



Have a way to get weather alerts and forecast updates



Keep in mind that impacts can be felt far from the coast



Listen to local officials & avoid travel unless ordered to evacuate



For more information, please see our Hurricane Guides available at

[weather.gov/media/bro/tropical/guide/2024/English.pdf](https://www.weather.gov/media/bro/tropical/guide/2024/English.pdf)

<https://www.weather.gov/media/bro/tropical/guide/2024/Espanol.pdf>



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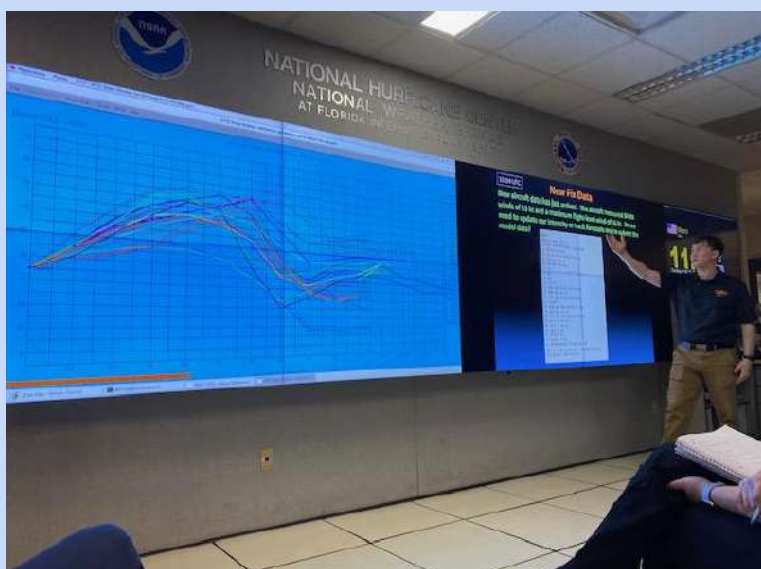
IDSS Tropical Bootcamp

By Amber McGinnis

Every year the National Weather Service works with the National Hurricane Center to provide Decision Support Service Training to National Weather Service Personnel. This training helps these individuals master their skills in preparing for media interviews and providing decision support services to local, regional and national emergency managers and other partners before, during, and after a tropical event.

This year I was selected to take part in this training from April 22-26th at The National Hurricane Center in Miami, Florida. As part of the training, I was given a behind-the-scenes look at National Hurricane Center operations and one-on-one time with the Hurricane and storm surge specialists. They showed our class how they analyze and forecast tropical cyclone tracks, as well as what products they provide and the partners they coordinate with (outside of our local weather service offices).

As part of the course, I participated in numerous exercises and provided decision support services to a myriad of partners for a landfalling tropical event. The exercises and simulations helped me gain a better understanding of partner needs, the importance of clear and concise communication during various phases of tropical events, and real-world timelines of events as they unfold. The experience gained from this intense training will allow me to work closely with partners across Deep South Texas to provide the best possible service when it comes to decision-making ahead of, during, and following a tropical event in our region.



Hurricane Specialist, Philippe Papin walking the class through the process of creating a storm track.

Annual Partner Workshops Round Up!

By Jeremy Katz

This year, the Tropical Team of NWS Brownsville presented our annual tropical briefings to our emergency management partners at the 14th Annual RGV EM Partners Hurricane Workshop and media partners at the 11th Annual Rio Grande Valley Media Partners Hurricane Workshop. For each day, the team and I briefed the partners on the upcoming changes that will be implemented this hurricane season, went over some reminders about the products that will be issued, discussed messaging practices including social media dos and don'ts, and wrapped up the briefings by talking about future changes.

After the presentation briefings, we then moved into a mock exercise briefing with our partners to give them a scenario in which a made up hurricane called Herve was moving towards South Padre Island. Each briefing came with a situation overview that included details about the storm's intensity, expected track, and hazards that were expected at the time of the scenario. While we knew what the storm would do, our partners did not. During the first briefing, we indicated that there was a reasonable worst case where Herve could undergo rapid intensification (RI). During the EM Partners Hurricane Workshop, we went from table to table to talk with the different groups to see what their plans were and what concerns they had about the storm. While at the Media Partners Hurricane Workshop, we had a big discussion together. When we gave the second briefing and told our partners about Herve undergoing RI, there seemed to be a bit of shock with our partner. However, they were quickly able to rebound and adjust to what needed to be done. Both the emergency managers and media partners were able to make some adjustments to their plans to what needed to be done. The third and final briefing depicted Herve as it was moving through the region, the status of the storm, and what damage had been done. While many of our emergency management partners were already discussing post storm recovery plans after the second briefing, there were certainly more talks about the post storm recovery now in the hunker down phase of the situation. Overall, we learned a lot from the perspective of what our emergency management and media partners have to take into account and plan for before, during, and after a hurricane landfall.



Brownsville WFO Staff and local media partners

New Employee Spotlight

Hello! My name is Holley, and I'm from Wisconsin. I received my B.S. in Earth Science at Minnesota State University Mankato in 2022, and just this year received my M.S. in Professional Meteorology at Mississippi State University.

I first became interested in weather during an aviation meteorology course where I was introduced to the services provided by the National Weather Service. My journey with the NWS started at the WFO in Green Bay, Wisconsin, where I volunteered in the summer of 2022. The following summer, I was a pathways intern at the Office of Observations in Silver Spring, MD.

Outside of weather, I love traveling, trying new food, hiking, and art. When I'm not working, you can find me trying new recipes, painting nails, or exploring the local area. I had never been to Texas before, but I look forward to no snow shoveling!



New Employee Spotlight

Hello! My name is Garrett Irish and I am the newest meteorologist at the National Weather Service (NWS) Weather Forecast Office (WFO) in Brownsville, TX. I am in my second year with NWS and it has already been a grand adventure halfway across the globe and halfway back to my hometown in Williamsburg, Virginia. Growing up in the mid-Atlantic East Coast, I would say one of my hobbies was watching The Weather Channel, especially when significant weather was approaching. There is something about the way that storms bring a change of scenery to your front door that fascinates me; sort of like bringing an adventure to your city beginning with the forecasting and excitement while tracking a system and the system itself. Fast forward to graduating with a Master's in Applied Meteorology from Plymouth State University in Plymouth, New Hampshire in December 2021, I took my first position in the NWS at the Weather Service Office (WSO) in Pago Pago, American Samoa. Eager to start my professional meteorology career, I felt it would be an opportunity of a lifetime to take on forecasting on a whole different level, tropical meteorology, on a faraway exotic island destination in the South Pacific. From the time I deboarded the plane in American Samoa, I certainly was in for an unforgettable experience that left me filled with new skills and perspectives on meteorology and of the world. Although there are beautiful landscapes and scenery on the island of Tutuila, I wished to return to the U.S. mainland, but still wanted to remain in a warm climate within close proximity of a beach. Since beginning WFO Brownsville, I have been very satisfied with the office location as well as with the team of meteorologists and staff at this office; people are pleasant, nice and friendly within, and even outside, of the office and I am happy I chose to come here. I look forward to the many adventures waiting to happen and all the new people I will meet along the way.



**THE NATIONAL WEATHER SERVICE BROWNSVILLE/RIO GRANDE
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**PROVIDE WEATHER, WATER, AND CLIMATE DATA,
FORECASTS AND WARNINGS FOR THE PROTECTION
OF LIFE AND PROPERTY AND ENHANCEMENT OF
THE NATIONAL ECONOMY**

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