

## Frequently Asked Questions during URI/NHC/AOC hurricane preparedness webinars:

***Q: What is the average length of the eye of the hurricane? How big is the eye of a hurricane?***

A: The average size of an eye is about 20 to 30 miles across; we have seen few that have very small eyes and sometimes those storms are very strong. We can have eyes that are as small as 5 to 10 miles across and sometimes as big as 40 to 50 miles across but on average they are about 20 to 30 miles across.

***Q: How long can a hurricane last?***

A: Hurricane typically last from several days to a week or so. Hurricane life cycles may run their course in as little as a day or last as long as a month. On occasion, they can last as long as a couple or even several weeks. The longest-lived hurricane was Hurricane Ginger in 1971 that lasted an entire month. The longest-lasting tropical cyclone ever observed was Hurricane/Typhoon John, which existed for 31 days as it traveled a 13,000 km (8,100 mi) path from the eastern Pacific to the western Pacific and back to the central Pacific. There have also been many tropical cyclones that remained at hurricane intensity for 12 hours or less, including the Atlantic hurricane, Ernesto, in 2006.

HSS links: <http://www.hurricanescience.org/science/science/hurricanelifecycle/>

***Q: What was the strongest hurricane in history?***

A: The strongest hurricane in the Atlantic basin was Hurricane Wilma in 2005. It had peak winds of 185 mph and the pressure was an exceedingly low 882 millibars (26.05" of mercury).

***Q: How big can a hurricane get? What was the largest hurricane?***

A: The size of a hurricane's wind field is usually a few hundred miles across, although the size of the hurricane-force wind field (with wind speed > 117.5 km/h [73 mph]) is typically much smaller, averaging about 161 km (100 miles) across. The area over which tropical storm-force winds occur is greater, ranging as far out as almost 500km (300 miles) from the eye of a large hurricane.

The eye at a hurricane's center is a relatively calm, clear area approximately 20-40 miles across. The eyewall surrounding the eye is composed of dense clouds that contain the highest winds in the storm. The storm's outer rainbands (often with hurricane or tropical storm-force winds) are made up of dense bands of thunderstorms ranging from a few miles to tens of miles wide and 50 to 300 miles long

One of the largest tropical cyclones ever measured was Typhoon Tip (Northwest Pacific Ocean, October 12, 1979), which at one point had a diameter of about 2100 km (~1350 miles). One of the smallest tropical cyclones ever measured was Cyclone Tracy (Darwin, Australia, December 24, 1974), which had a wind field of only 60 miles (~ 100 km) across at landfall.

**Q: Which hurricane caused the most damage?**

A: The largest damage caused by a tropical cyclone as estimated by monetary amounts has been Hurricane Katrina (2005) as it struck the Bahamas, Florida, Louisiana, Mississippi, and Alabama: US \$40.6 Billion in insured losses, and an estimated \$81 billion in total losses. However, if one normalizes hurricane damage by inflation, wealth changes and coastal county population increases, then Katrina is only the third worst, after the 1926 Great Miami Hurricane and the lethal 1900 Galveston Hurricane. If the 1926 storm hit in 2005, it is estimated that it would cause over \$140 billion in damages, and the 1900 storm about \$92 billion.

**Q: How does water give energy to the hurricane?**

A: Development of a tropical depression into a mature hurricane requires heat energy from the ocean surface. Heat is transferred from the ocean to the atmosphere when water at the ocean's surface evaporates to become water vapor. Think of water in a teapot- as you heat it up on the stove, steam [water vapor] comes out of the teapot. The air inside a hurricane becomes saturated with this water vapor, the air parcels rise and spiral inward, carrying the heat energy obtained from the ocean deep into the developing hurricane. The added heat from the ocean actually causes the air rising in the hurricane's eyewall to be warmer than the surrounding environment. As long as the air can rise in the eyewall and then spiral outward (away from the storm's center) faster than the air spiraling inward towards the eyewall, a vacuum will eventually be created, and air will spiral inward even faster to fill the void. This causes maximum wind speeds to increase, and the hurricane increases in intensity.

HSS links: <http://www.hurricanescience.org/science/science/development/>

**Q: Why/how do they name hurricanes?**

A: Tropical storms and hurricanes are named to provide ease of communication between forecasters and the general public regarding forecasts, watches, and warnings. Since the storms can often last a week or longer and that more than one can be occurring in the same basin at the same time, names can reduce the confusion about what storm is being described.

The names are carved out for 6 years. The names can be retired if they deliver significant impacts or cause wide spread property damage or loss of life such as Sandy, Ike and Katrina. We also have a name replacement system to replace those names that have been retired. The system is a very strict process that goes through the World Meteorological Organization so it is not just one person picking the names, it is a thorough process that it taking place.

Other regions also have naming conventions for tracking tropical cyclones. In the Central North Pacific region, four lists of Hawaiian names are selected and used in sequential order without regard to year. In the Northwest Pacific region, since 2000, tropical cyclones have been assigned Asian names by RSMC Tokyo; these Asian names are contributed by all nations and territories that are members of the WMO Typhoon Committee. The Australian Bureau of Meteorology used to maintain three lists of names, one each for the Western, Northern, and Eastern Australian regions, but at the start of the 2008-2009 season, the lists were merged into a single list to be used within the entire Australian Region.

HSS links: <http://www.hurricanescience.org/science/forecast/forecasting/hurricanenaming/>

**Q: What is the difference between a hurricane and a "twister?"**

A: There are many differences between tornadoes ("twisters") and hurricanes. The largest tornado ever observed was 4 km (2.5 mi) wide, and most tornadoes are < 0.8 km (0.5 mi) wide. Hurricanes, however, are typically much larger, ranging from about 160 km(100) mi to 1600 km (1000 mi) wide. A tornado's lifetime is short, ranging from a few seconds to a few hours. By contrast, a hurricane's lifecycle can last from days to weeks. Also, strong tornadoes usually occur over land, while hurricanes almost always form over the ocean. Finally, the strongest tornadoes can have wind speeds over 483 kph (300 mph), but even the strongest hurricanes rarely produce wind speeds over 322 kph(200 mph).

HSS links: <http://www.hurricanescience.org/society/impacts/tornadoes/>

**Q: Has anyone ever died being a storm hunter? Has a plane ever not made it through?**

A (AOC Group): We have an excellent safety record with our planes. We have not lost anybody during any flights. We take safety very seriously and analyze the risk of all the missions we do.

We have never had a plane go down throughout NOAA's history of flying through storms On September 26, 1955, a Navy P2V-3W Neptune aircraft was lost in the Caribbean flying into Category 5 Hurricane Janet (with 9 crewmembers and two journalists onboard). However, this was a military aircraft. Again, no NOAA crewmembers or aircraft have ever been lost in a hurricane.

There have been 5 planes lost flying into typhoons in the Western Pacific:

**October 1, 1945:** Navy PB4Y-2 was lost in a Category 1 typhoon over the South China Sea

**October 26, 1952:** Air Force WB-29 was lost in Category 5 Typhoon Wilma east of the Philippines

**December 16, 1953:** A Navy PB4Y-2S was lost in Category 2 Typhoon Doris near Guam

**January 15, 1958:** An Air Force WB-50 was lost in Category 4 Typhoon Ophelia near Guam

**October 12, 1974:** An Air Force WC-130H was lost in Category 1 Typhoon Bess in the South China Sea

**Q: Is it scary up there, in the planes?**

A (AOC Group): It can test your nerves at times! But we have a lot of confidence in our pilots and aircraft to get us through safely. Some storms are no big deal and on the other hand, some storms really bounce us around.

**Q: How long does is the flying into the storm process take? How long does a flight into the hurricane typically last?**

A (AOC Group): Flights into hurricanes typically last about 8-9 hours.

**Q: How can the aircraft fly through the hurricane without breaking apart?**

A (AOC Group): The P-3 is a very rugged aircraft that was designed for the Navy to withstand a lot of turbulence. We also try to pick and choose a safe way into the eye to avoid the worst of the hurricane.

**Q: What is the life span of the planes used by Hurricane Hunters?**

A (AOC Group): Both of NOAA's WP-3D Orion aircraft are over 35 years old and still going strong. The aircraft are well maintained by AOC's maintenance group consisting of flight engineers and mechanics. There are no current plans to replace these aircraft.

The GulfStream IV-SP jet is 17 years old and has yearly maintenance performed on it.

**Q: How many people can fly in the plane at one time?**

A: Up to 19 people (a mix of AOC personnel, military personnel, scientists, etc.) can fly in the P-3 plane. The WC-30J uses a minimum of 5 crew for a hurricane mission.

**Q: How many years of education do you need to perform these jobs?**

A (AOC Group): Many of us on board the aircraft have a 4-year college degree in meteorology or engineering. But for many of the researchers that fly on board, they may have a Masters or PhD.

(NHC Group): For the scientists that fly on the hurricane mission, we all have degrees in meteorology, some of us went to Florida State University, and others went to other universities around the country. I think the one thing we all have in common is that we all love science, I know when I was in 5<sup>th</sup> grade science was my favorite subject. Work really hard in high school in science and math; try to get into a good school a good university that has a meteorology program. That is a good way to become a hurricane hunter scientist. Most of our pilots got their training from being in the military. We have folks that come from the US navy that flew P3's in the navy. It takes a lot of training to fly into the storms.

**Q: What is the most important thing that a family can do to be prepared for a hurricane?**

A: Have a preparedness plan, and know when to execute it. Have supplies like bottled water, canned foods, batteries stocked for several days.