

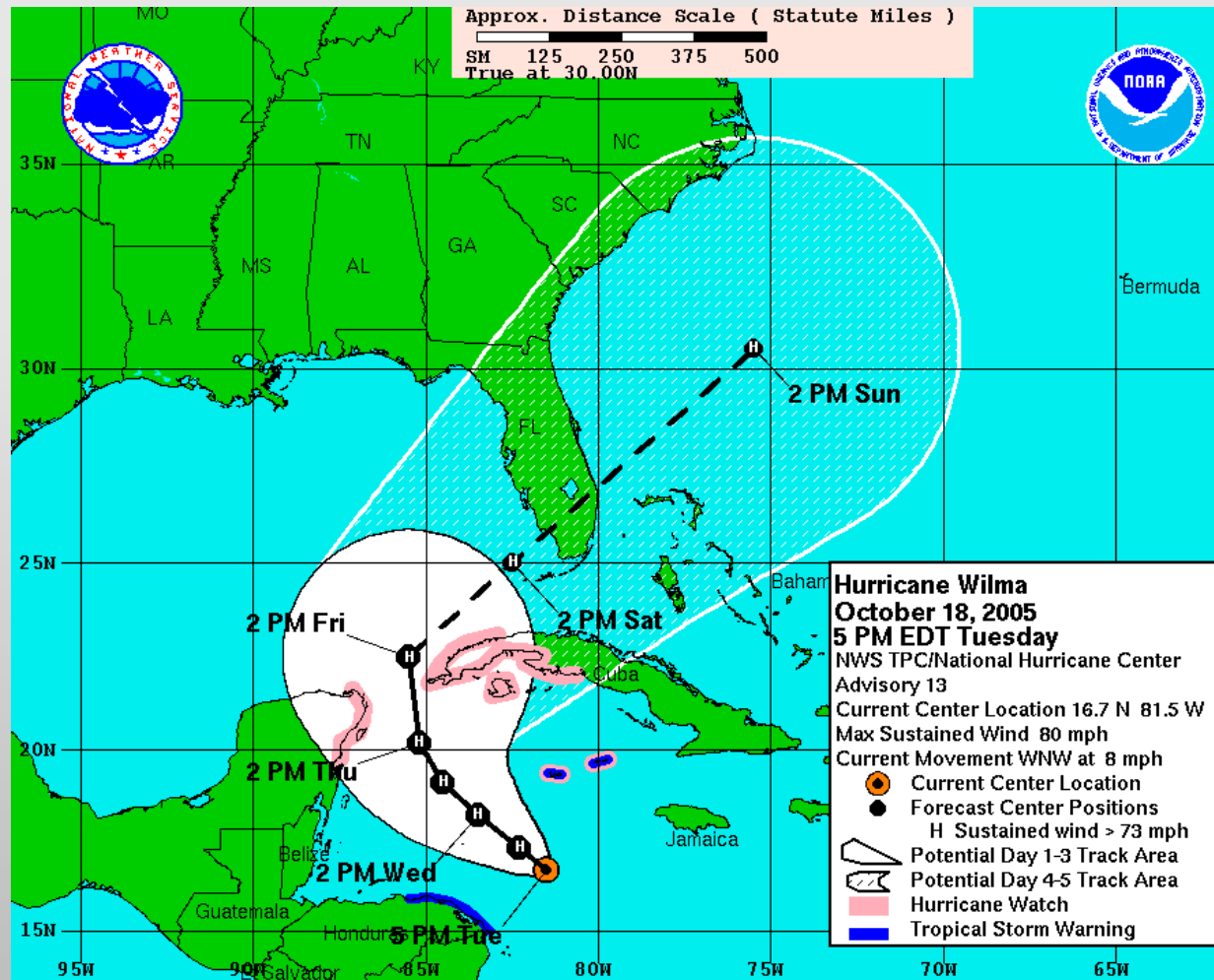
Some US Programs that Enhance Early Warning Effectiveness

**Chip Guard
Warning Coordination Meteorologist
National Weather Service Forecast Office Guam, USA**

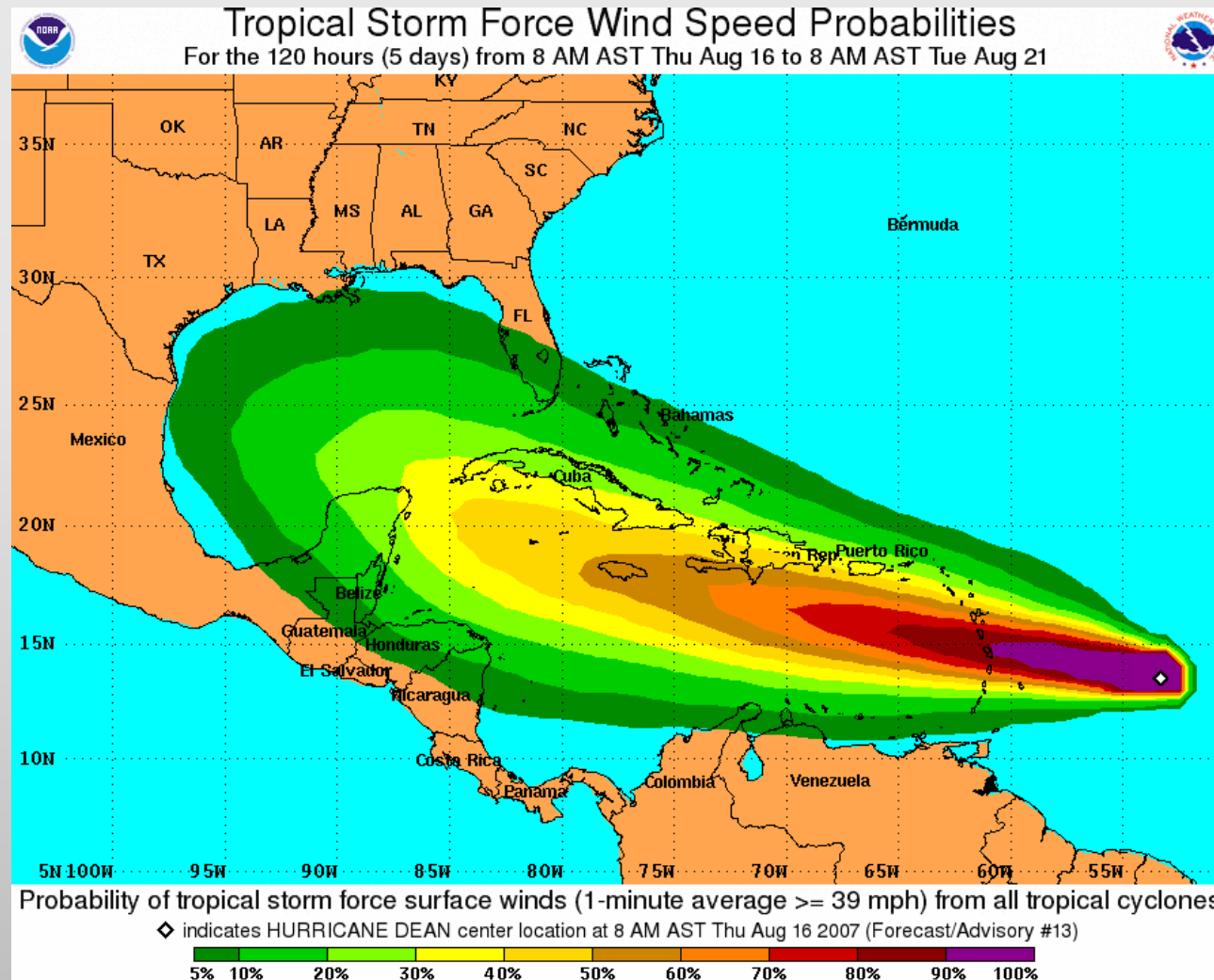
Hong Kong Observatory

3-5 November 2014

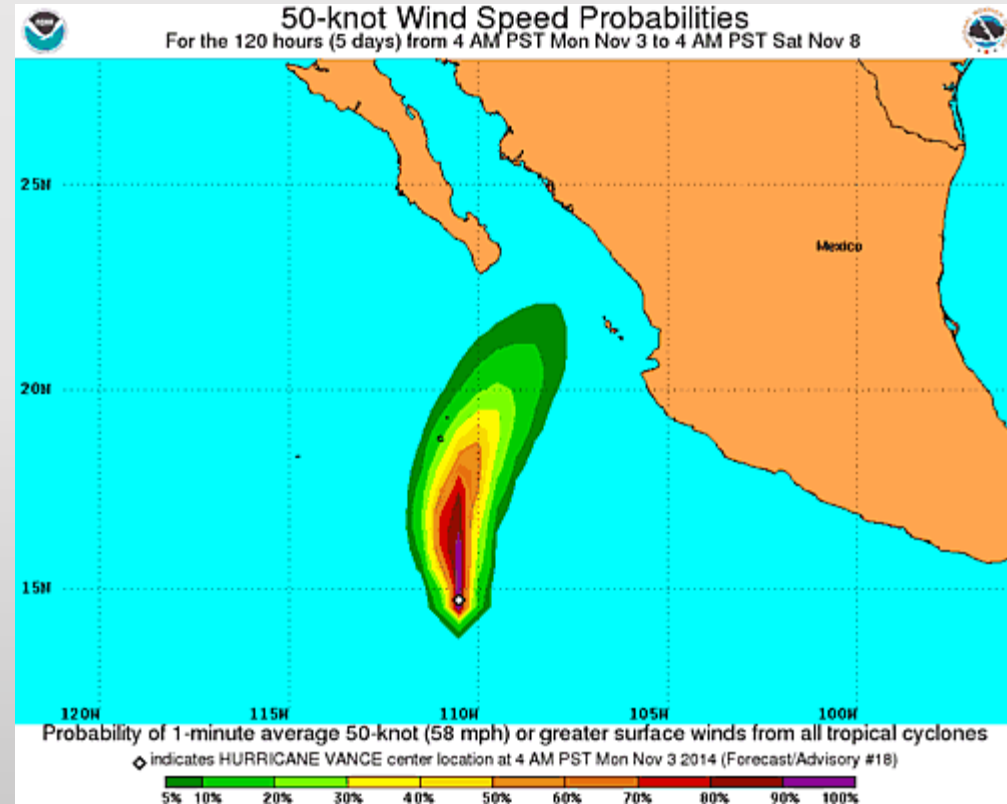
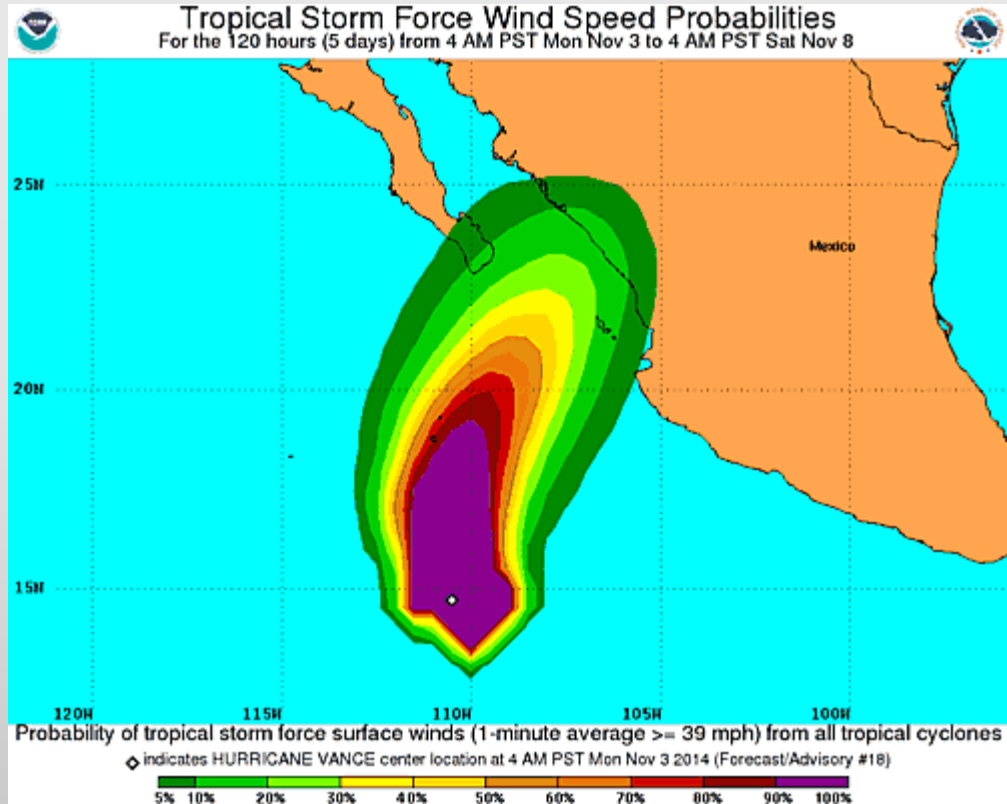
Track Forecast Graphic



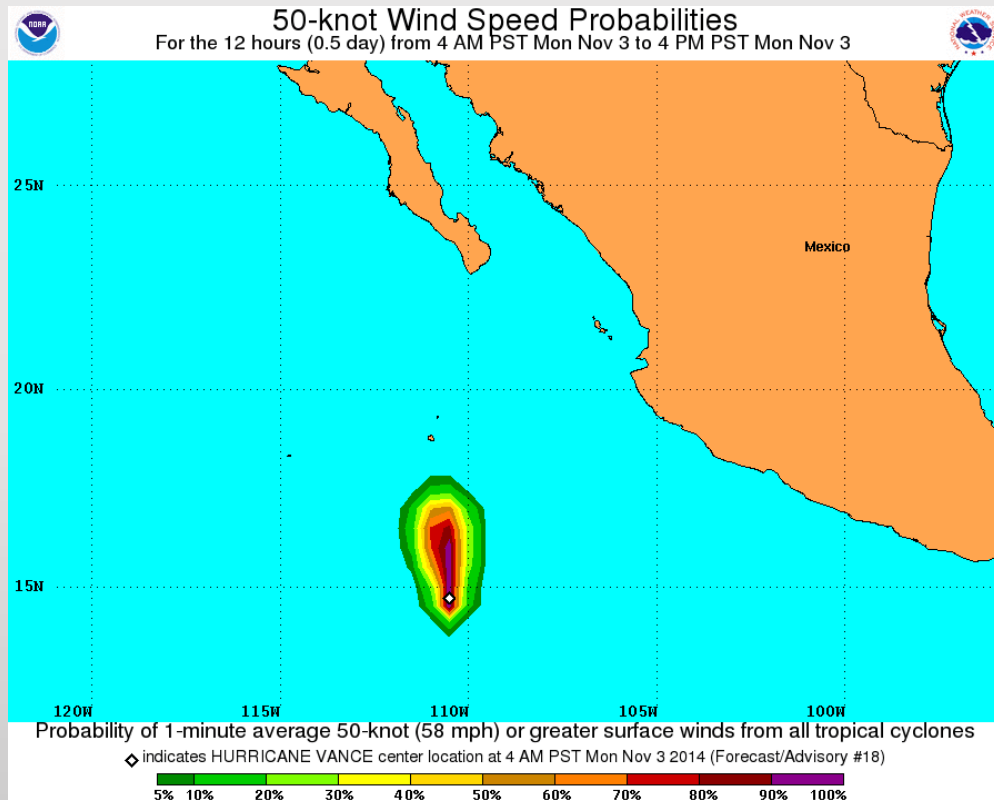
Intensity Probability Forecast Graphic



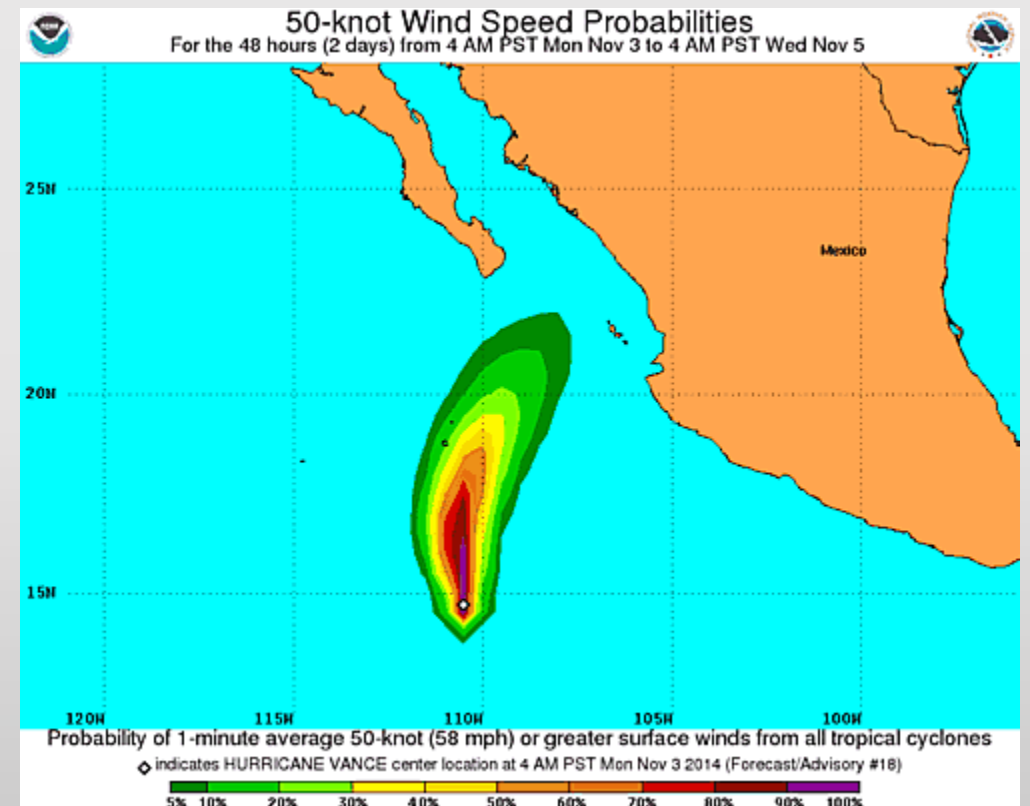
Intensity Probability Forecast Graphic



Intensity Probability Forecast Graphic

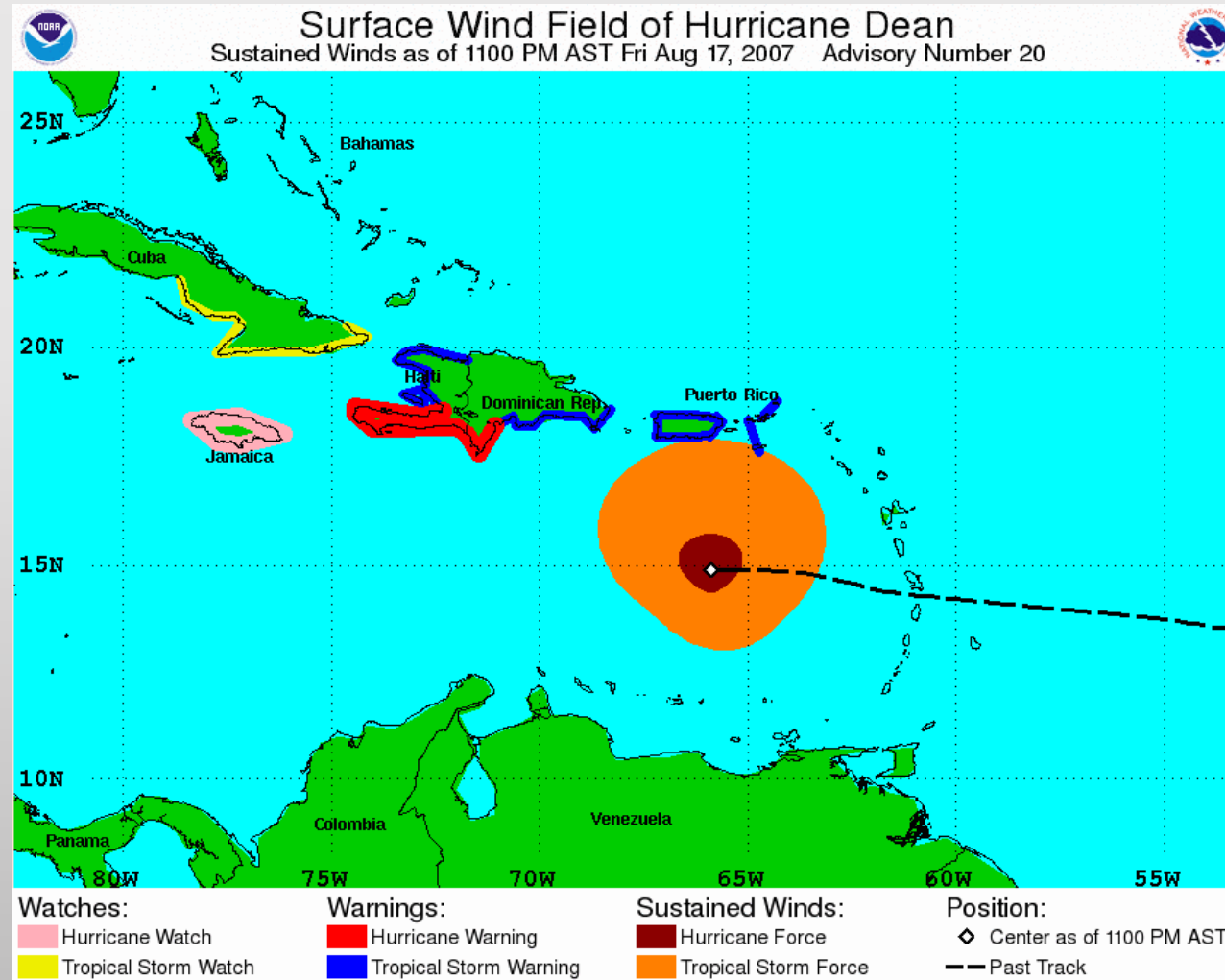


12-hour

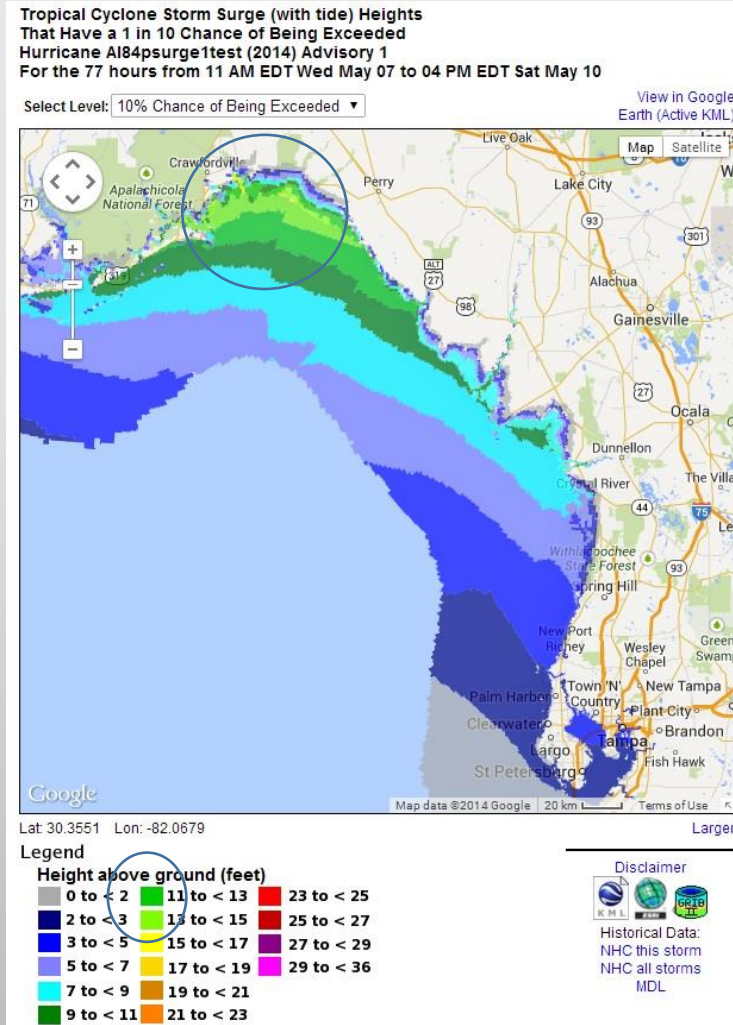


48-hour

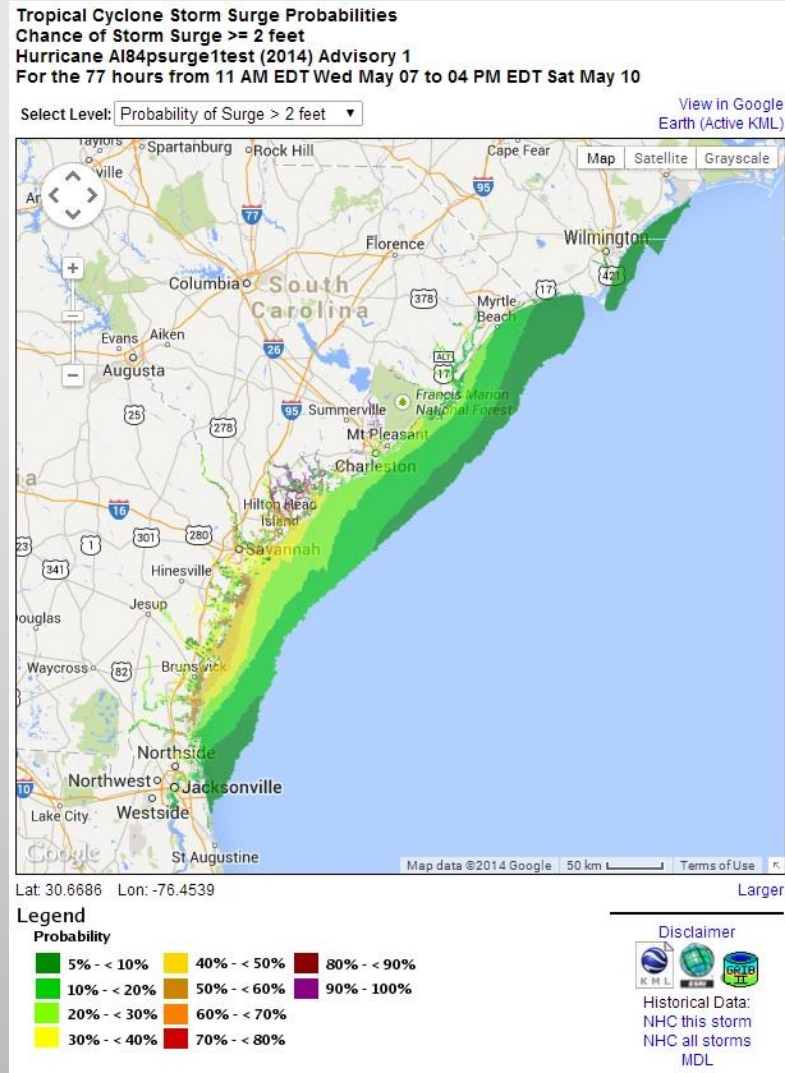
Surface Wind Field and Watch and Warning Areas



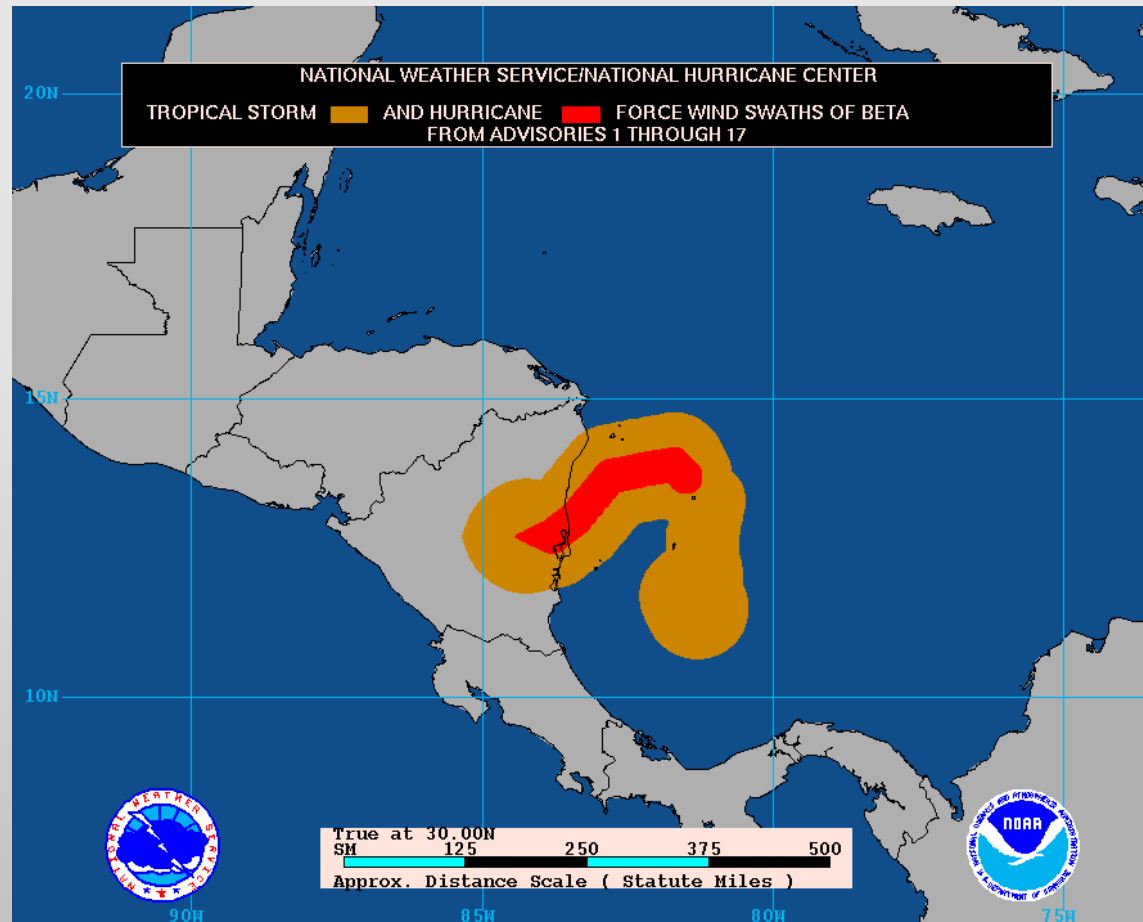
Storm Surge Heights That Have a 1 in 10 Chance of Being Exceeded



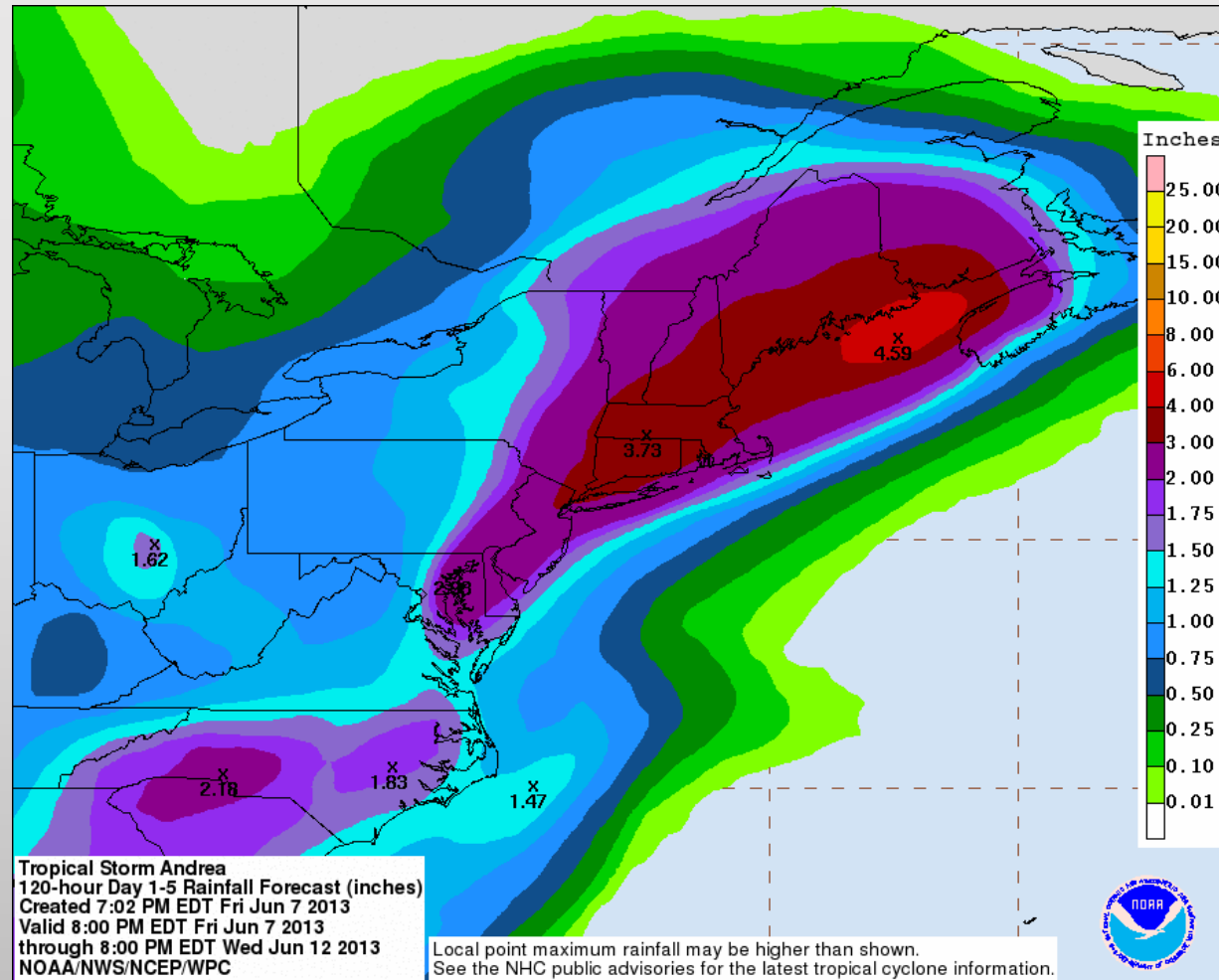
Tropical Cyclone Storm Surge Probabilities Chance of a Storm Surge ≥ 2 feet



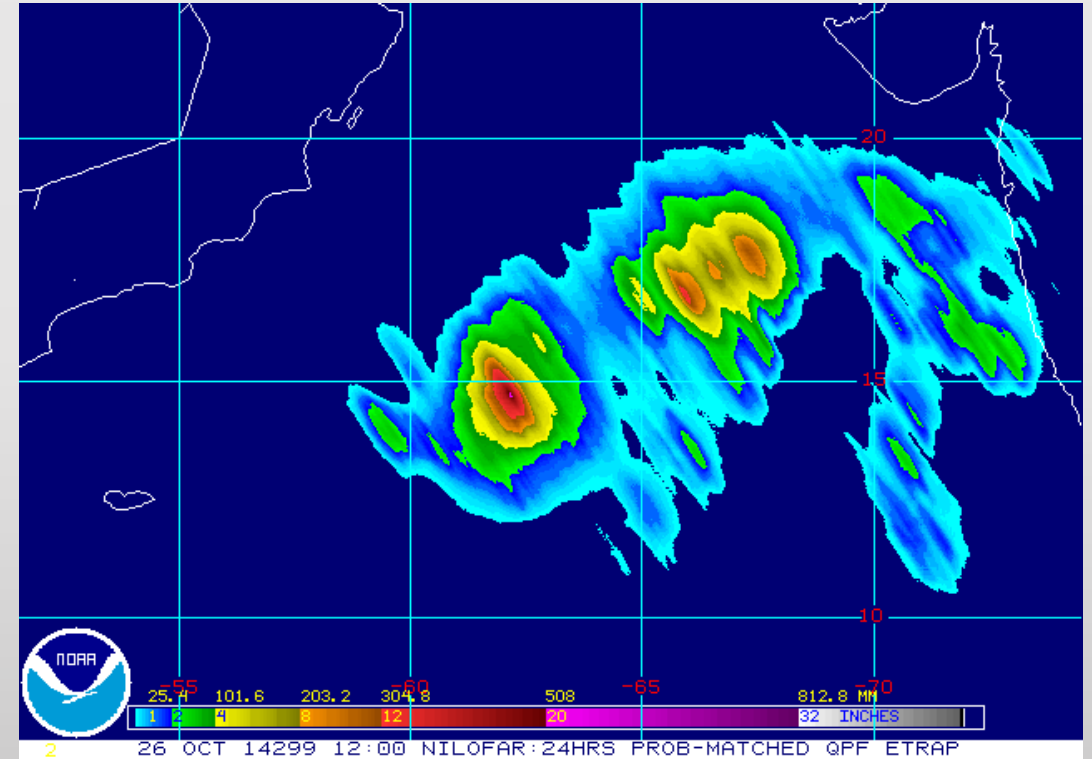
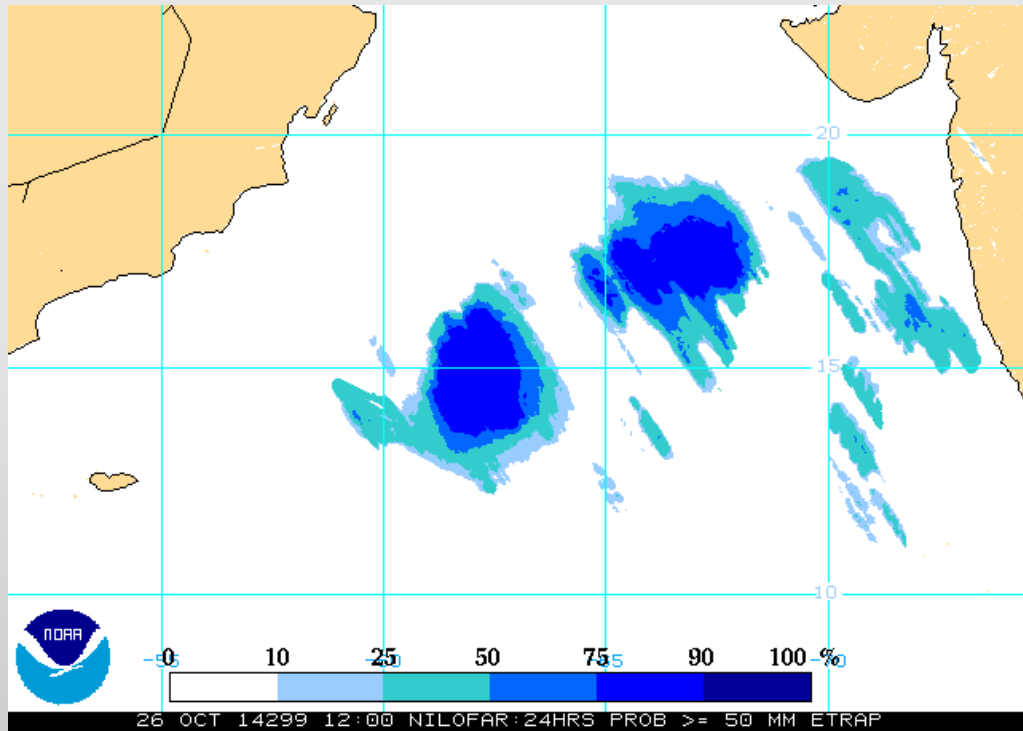
Tropical Storm and Hurricane Wind Swath from Advisories 1 through 17



120-Hour Rainfall Predictions



eTRaP 6-hour Rainfall Probabilities

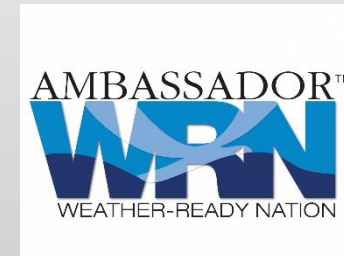
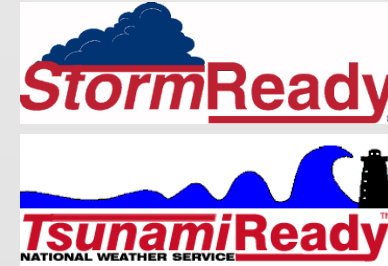


Recent New Items for eTRaP

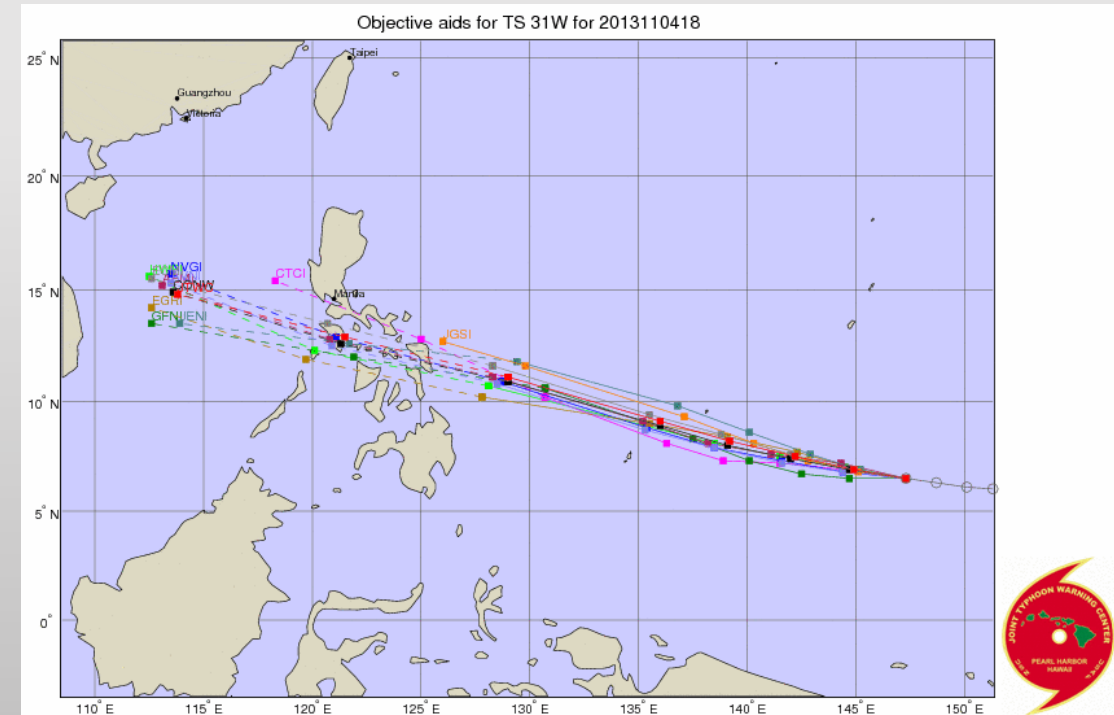
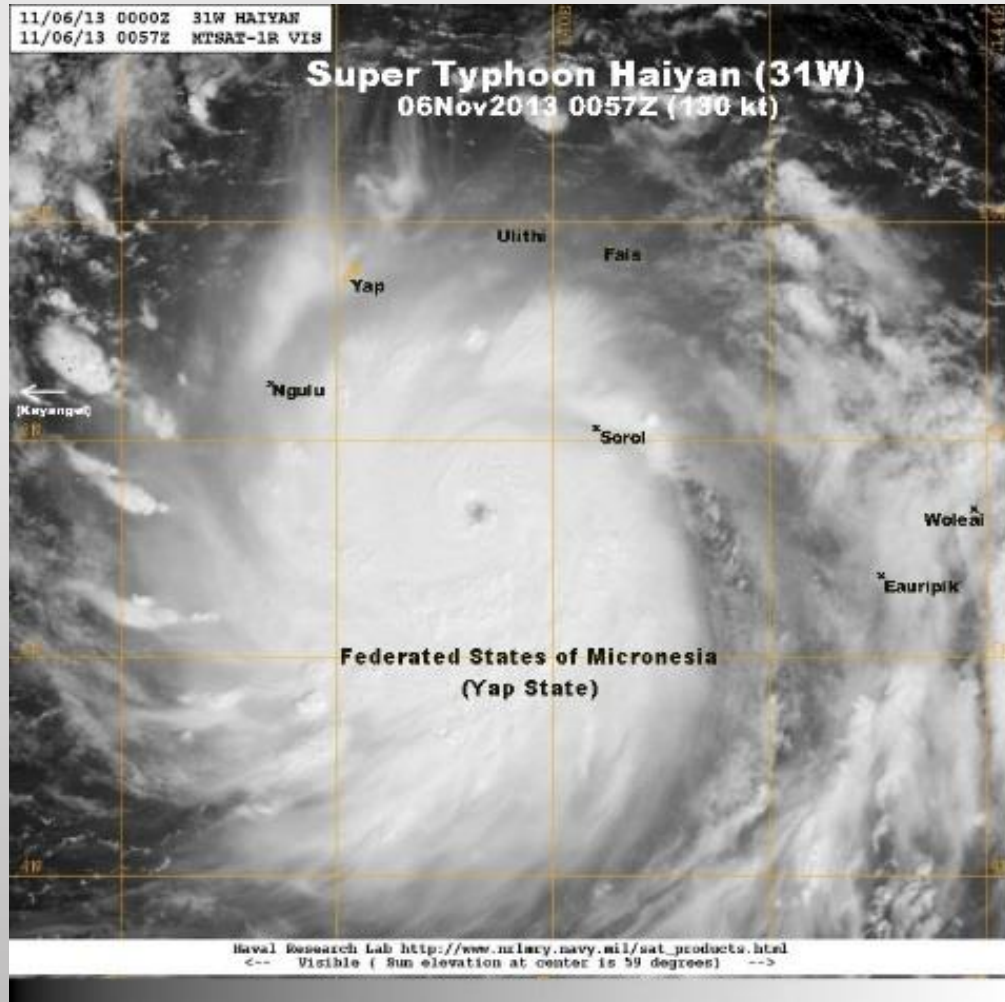
- NESDIS is adding geostationary IR rain estimates so the eTRaP can go out to 24hrs
- improved probability forecasts are on the way
- adding climatology and orographics in the future

Some Value Added Administrative Programs

- StormReady
- TsunamiReady
- Weather Ready Nation Ambassador
- 2-day workshops at the various islands
 - Workshop
 - Seminars
 - Training sessions
- Micronesian Managers' Meeting on Guam



Typhoon Haiyan in Micronesia



WORKSHOP TOPICS

- Day 1

- Tropical Cyclone Characteristics, behavior,
- NWS Tropical Cyclone Program, Products, Timing
- What Causes the Weather on Guam?
- Other Weather and Ocean Hazards
- Rip Currents, Tides, Tsunamis and Volcanoes
- Basics of Plotting/Exercises

- Day 2

- Climate, Climate Change and El Nino
- Scale That Relates Wind Speed to Damage
- Drought and Hydrology Products for the Marianas
- Tropical Cyclone Risk and Vulnerability for Guam
- Tropical Cyclone Decision Making
- NOAA Weather Radio and the NWS Web Site

Saffir-Simpson Tropical Cyclone Scale (STiCkS)

The Wind-Damage Scale

- Relates maximum wind speed to potential damage, and coastal wave action and inundation
- Is specifically adapted for hurricane/ typhoon/ cyclone-prone tropical locations
- Consists of 2 tropical storm categories and 5 typhoon categories
- Based on hundreds of cyclones and thousands of observations, photos, interviews, and damage reports
- A similar scale has been used in the Atlantic for 30 years, but does not work well in tropical regions

Saffir-Simpson Tropical Cyclone Scale (STiCkS)

This Scale Considers

- Tropical building materials
- Tropical building styles and practices
- Tropical agriculture and vegetation
- Effects of termites, wood rot, salt spray
- Effects of the reef on storm surge heights
- Sub-hurricane-force winds

Saffir-Simpson Tropical Cyclone Scale (STiCkS)

This Scale Provides

- Maximum sustained wind and wind gust values
- Storm Category values that correspond to a range of winds and a range of storm surge heights
- A description of the damage to structures, infrastructure, and vegetation
- A description of coastal wave action and expected inundation

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Saffir-Simpson Tropical Cyclone Scale (STiCkS) Tropical Storm Summary

Tropical Storm Scales

Category	TS A	TS B
Sustained Wind (mph)	30-49	50-73
Wind Gusts (mph)	40-64	65-94
Description of Damage Level	Weak TS	Severe TS
Inundation for Reefs 250'-500' wide	<1	1
Inundation for Reefs <250' wide	<1	1-2

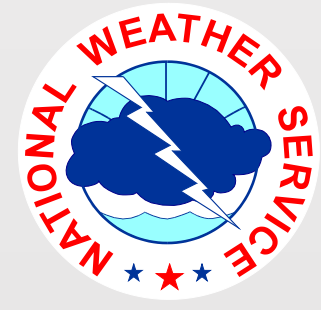
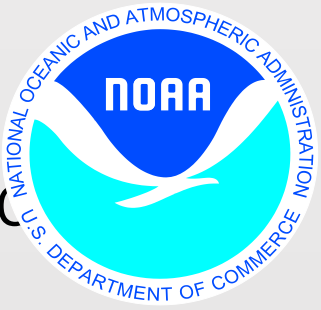
Saffir-Simpson Tropical Cyclone Scale Typhoon Summary

Typhoon Scales

Category	TY 1	TY 2	TY 3	TY 4	TY 5
Sustained Wind (mph)	74-95	96-110	111-130	131-155	156-194
Wind Gusts (mph)	95-120	121-139	140-167	168-197	198-246
Description of Damage Level	Minimal	Moderate	Extensive	Extreme	Catastrophic
Inundation for Reefs 250'-500'	2-3	3-5	5-8	8-12	12-20+
Inundation for Reefs <250'	2-4	4-6	6-10	10-15	15-30+

Red depicts TY Category 3, 4, 5 or MAJOR typhoons/hurricanes; major is relative and depends on vulnerability of a location. For GUAM, we consider Categories 3, 4 & 5 to be major typhoons.

Broc



Don't fight the current. Swim out of the current, then to shore.

Sediment flowing out of the river mouth of Pago Bay shows the extent of the rip current.

Rip Current

What are rip currents?

- Rip currents are currents of water flowing away from shore.
- Rip currents are quite common and can be found in reef channels, along the reef flats and at river mouths.
- Rip currents can form near man-made structures such as jetties and piers.

Why are rip currents dangerous?

- Rip currents can pull people away from shore and out past the reef line.
- Rip current speeds can vary from moment to moment and can quickly increase to become dangerous to anyone entering the surf.
- Rip currents can sweep even the strongest swimmer out to sea.
- Rip currents can feel stronger below the surface of the water, knocking you off your feet.

Rip currents form near man-made structures like the jetty at Agana Boat Basin.

Rip Current

Rip currents flow faster than an Olympic swimmer!

Rip currents are often difficult to see, but here are some clues of their presence:

- A channel in the reef.
- A channel of churning, choppy water.
- A difference in water color.
- A line of sea foam, sea grass or other debris such as coconuts, palm fronds or trash moving seaward.
- If the surf is big, there are most likely dangerous rip currents.

Churning choppy water, found in a strong rip current at Maileso Channel.

Reef Flat

Where can I get more information about rip currents?

- Check the latest National Weather Service forecast for beach conditions. This forecast is in the Surf Zone Forecast and available by dialing 2-1-1, or at the following website: <http://www.nws.noaa.gov/ohm>
- Ask on-duty lifeguards about rip currents and any other hazards that may be present.
- More general information about rip currents can be found at the following web sites: <http://www.noaa.gov>

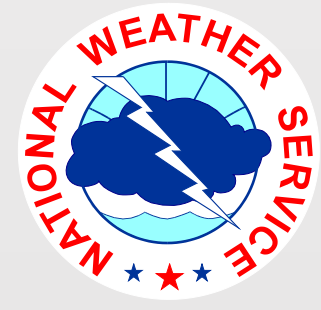
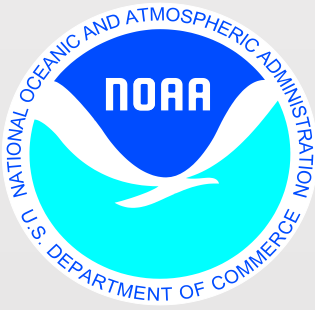
Contributors:

- NOAA's National Weather Service
- University of Guam, Sea Grant Program
- Guam Visitors Bureau
- Department of Parks & Recreation

ESCAPE THE GRIP OF THE RIP TO AVOID THE GRIEF OF THE REEF!

An Informative Brochure about the Dangers of Rip Currents on Guam

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 Chip Guard [Chip.Guard@noaa.gov] Tel: (671) 472-0946
 University of Guam, Sea Grant
 Ted Iyechad [tiyechad@uog.edu] Tel: (671) 735-2046
 Guam Visitors Bureau Tel: (671) 646-5278/9



Rip currents account for 80% of rescues performed by beach lifeguards.

What if I'm caught in a rip current?

- Stay calm. Don't fight the current; you will lose all your strength.
- Escape the current by swimming in a direction that follows the coastline. When over the shallow reef flat, walk or swim to shore.
- If unable to escape by swimming, float or tread water. When the current weakens, swim toward the reef flat where the water is shallow.
- If at any time you feel you will be unable to reach shore, draw attention to yourself: face the shore, call or wave for help.

How do I help someone else?

- Don't become a victim while trying to help someone else!** Many people have died in efforts to rescue rip current victims.
- Get help from a lifeguard. If a lifeguard is not present, yell instructions to the swimmer on how to escape.
- If possible, throw the rip current victim something that floats or a rope.
- Call 9-1-1 for further assistance. Always remember exactly where you were when you last saw the victim.

Gun Beach in Tumon Bay:
This shows how rip currents are found in small reef channels.

Safety tips:

- Know how to swim and never swim alone!
- For maximum safety, swim near a lifeguard.
- Obey instructions and orders from lifeguards.
- Always swim with a flotation device. Wear reef walking shoes so you can walk over the reef out of harm's way.
- Be cautious at all times: If in doubt, don't go out!
- Swim out of the rip current before you are pulled out past the reef line.
- Always tell someone of your next water adventure: where you're going, when you'll be back, and who you're with.

Look for Safety Flags and Signs at Beaches

Swimming Allowed

Swim with Caution

No Swimming

Hazardous Marine Life in Waters

Facts about rip currents;

- Rip current speeds vary. Average speeds are 1-2 feet per second, but they have been measured as fast as 8 feet per second—faster than an Olympic swimmer!
- Rip currents are usually anchored in reef channels and in river mouths.
- Usually rip currents end just beyond the line of breaking waves; however, they may continue to pull hundreds of yards offshore.
- Rip currents do not pull people under water—they pull people away from shore.
- Rip currents are not "undertows" or "riptides". These improper terms should not be used to describe them.
- Rip currents are strengthened when the tide is going out.

Look for Safety Flags and Signs at Beaches

Swimming Allowed

Swim with Caution

No Swimming

Hazardous Marine Life in Waters

If caught in a rip current, don't fight it. Stay calm, and swim parallel to shore until you escape the current.

Created March 21, 2006 by Sarah Piser, NOAA & Pierre Wong, UOG

NOAA Weather Radio (NWR) is a nationwide network of radio stations Broadcasting continuous weather information direct from a nearby National Weather Service Office. NWR broadcasts National Weather Service warnings, watches, forecasts and other hazard information 24 hours a day.



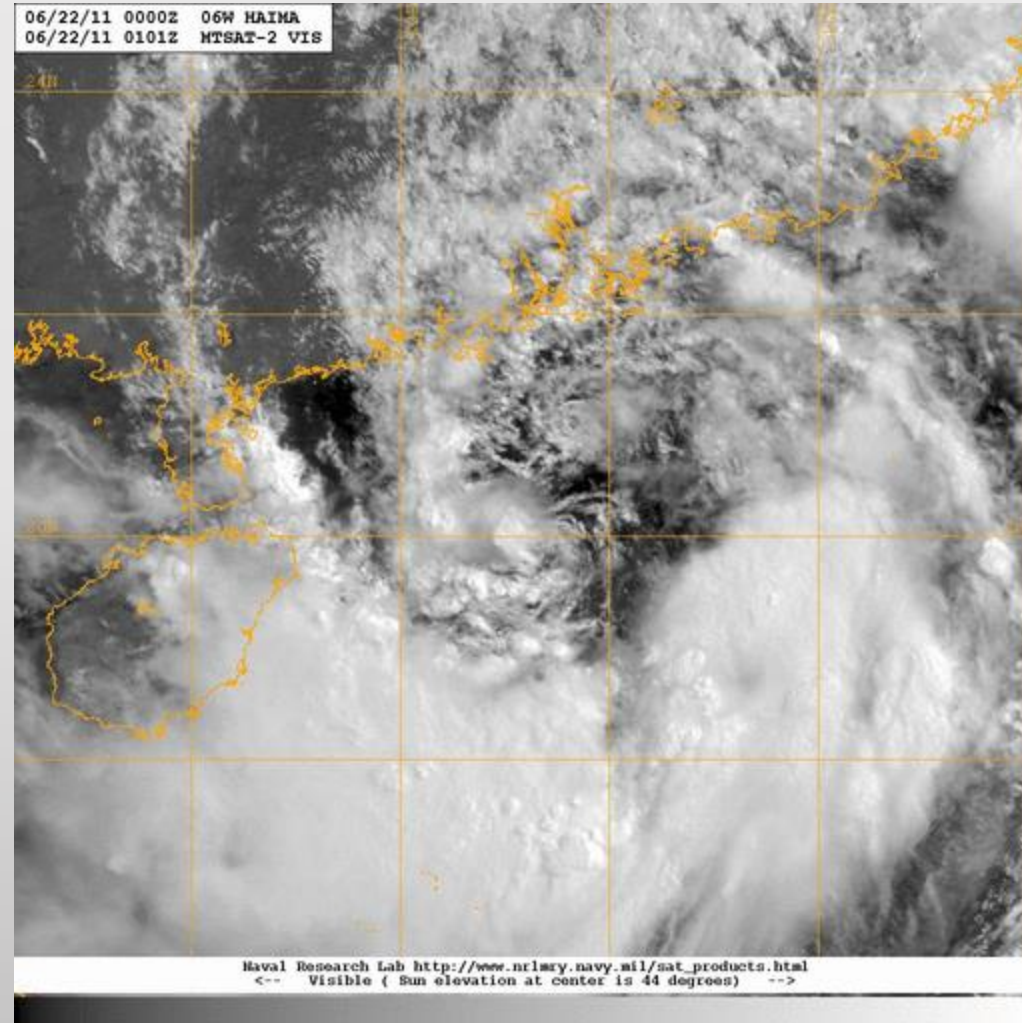
Monitoring the Weather with Satellites

- **Geosynchronous**

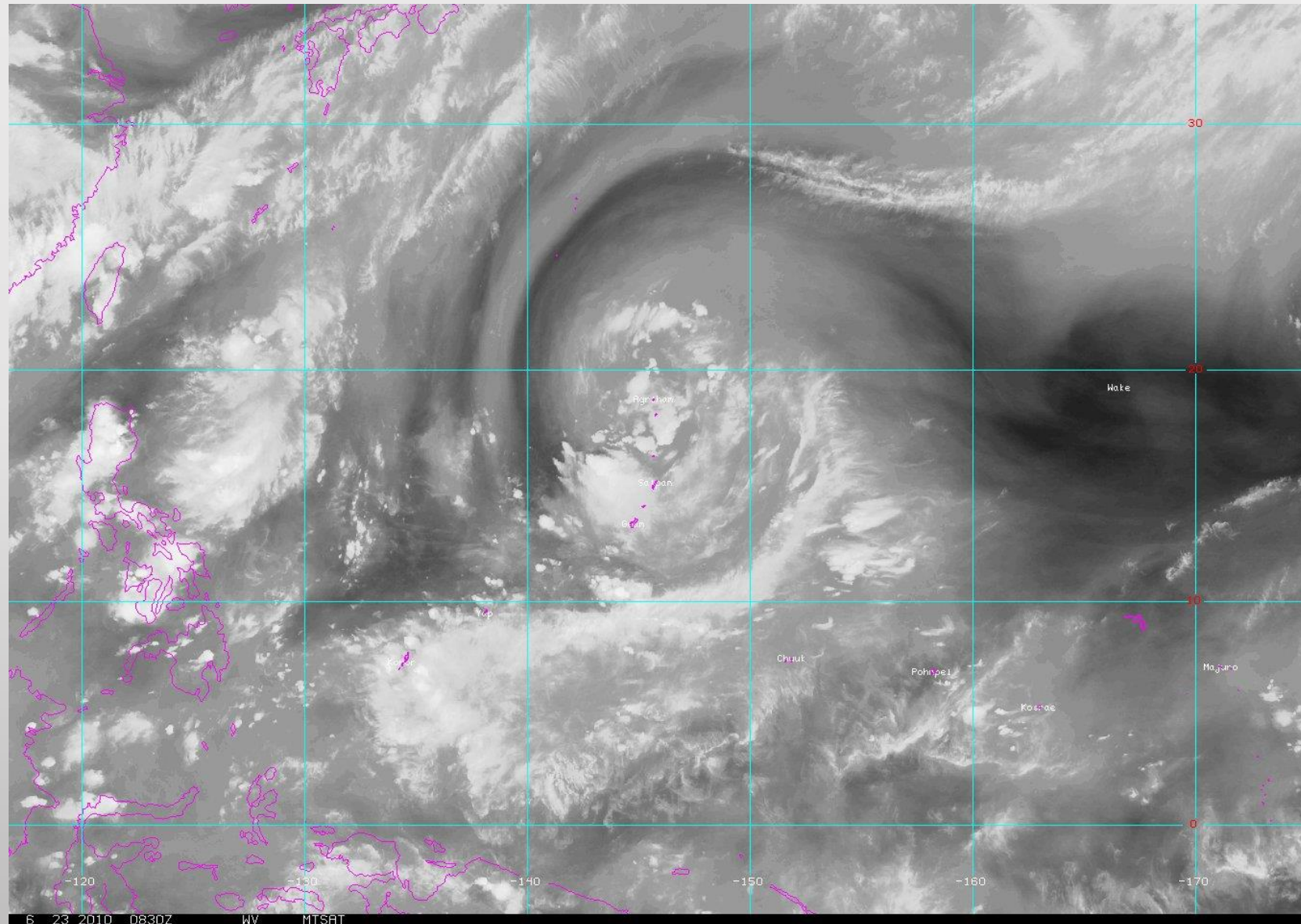
- 23,000 miles over the Equator
- Rotates with earth and points at same location
- Provides pictures at least hourly; thus, we can animate the images



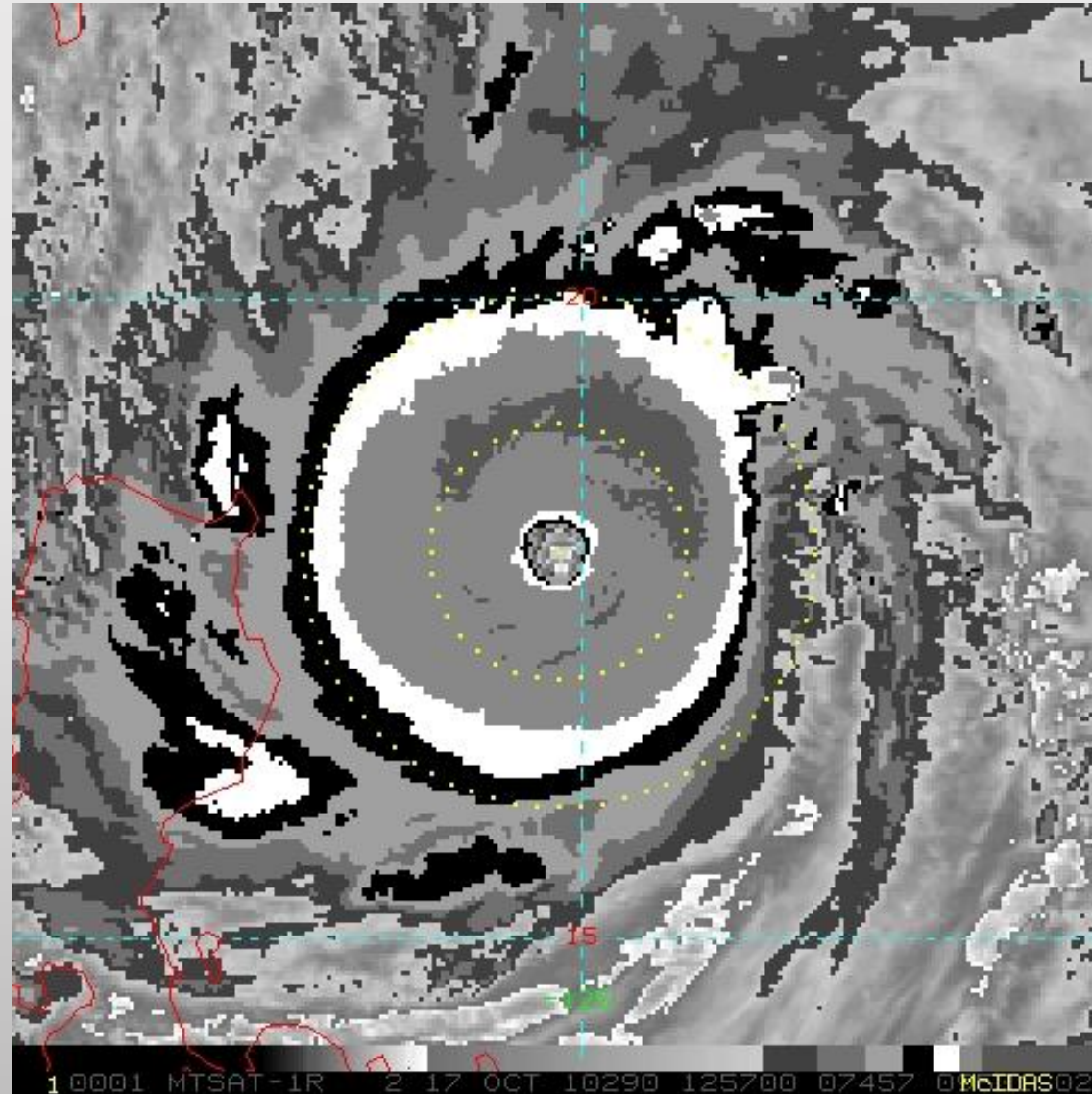
Animated Visible Imagery



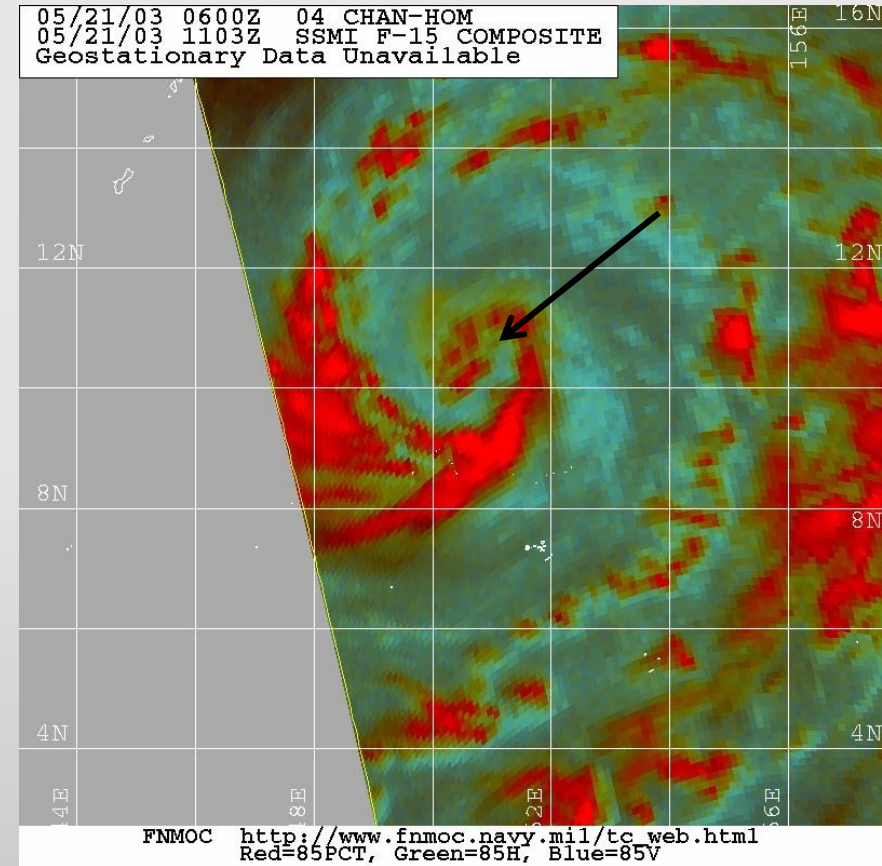
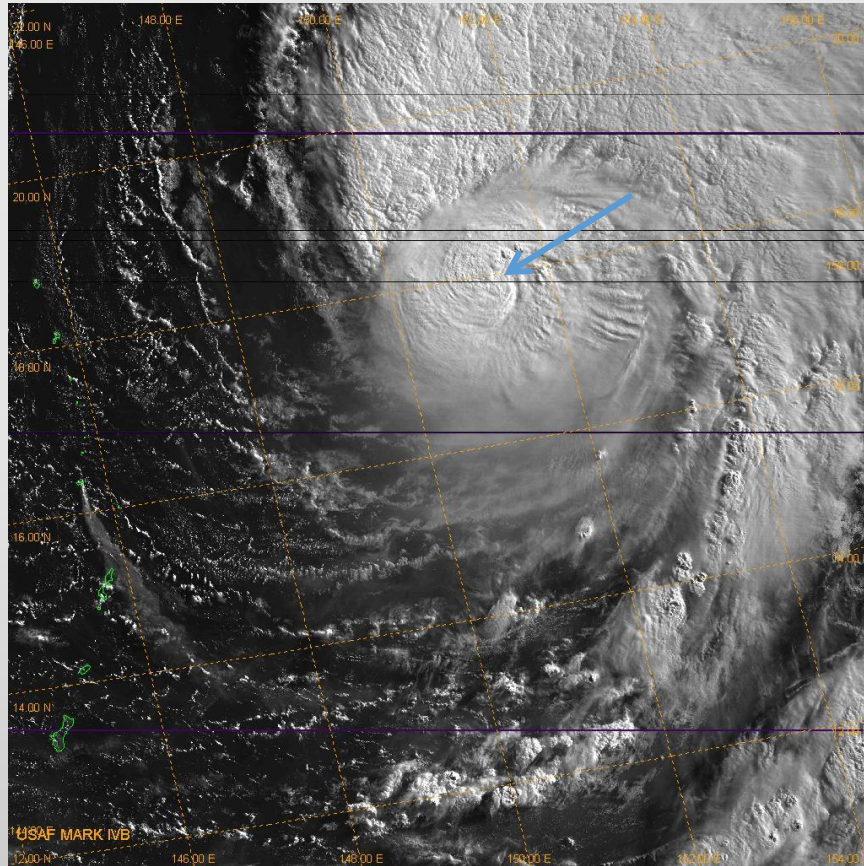
Water Vapor Imagery TUTT Cell



Dvorak Intensity Technique

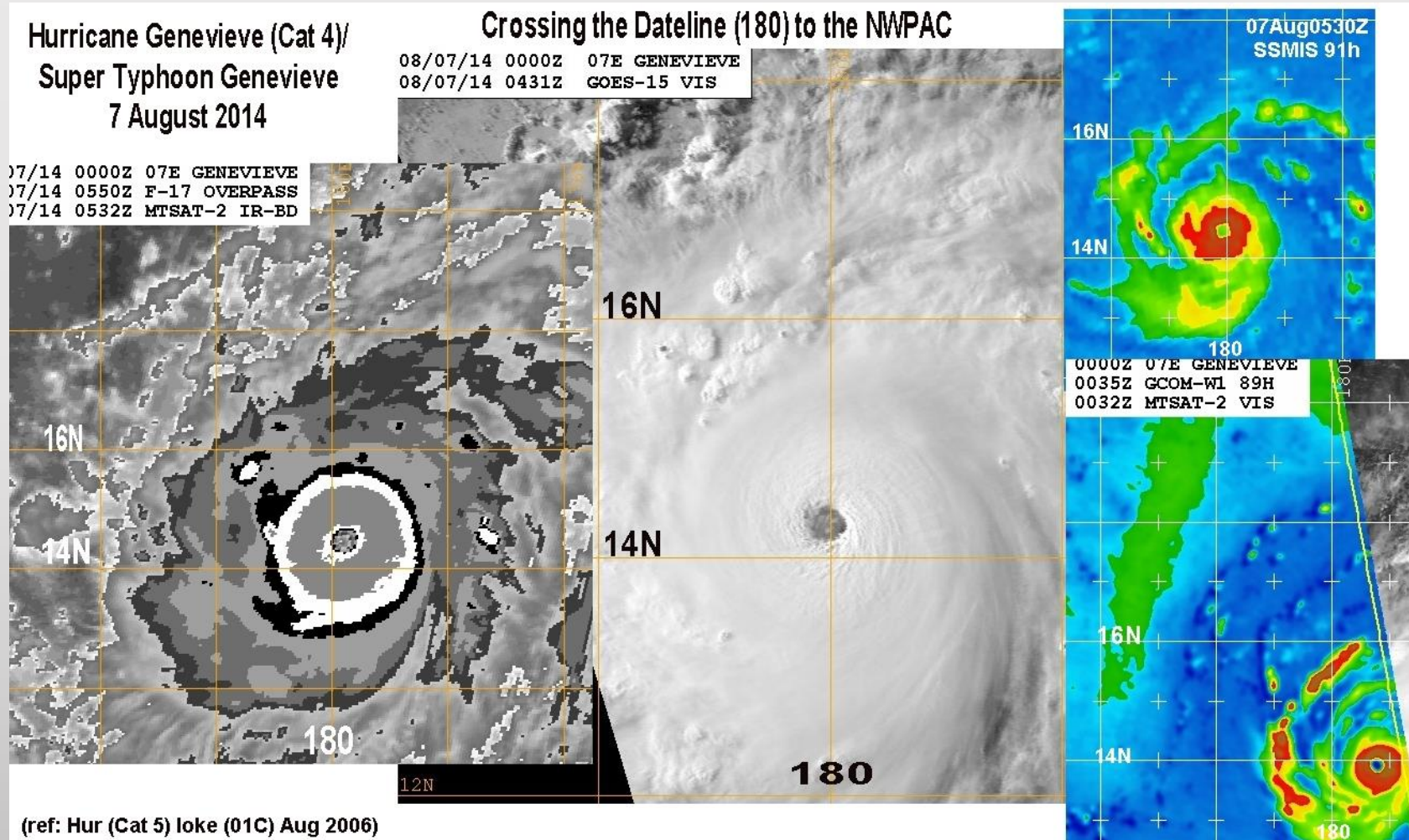


The Value of Microwave Imagery

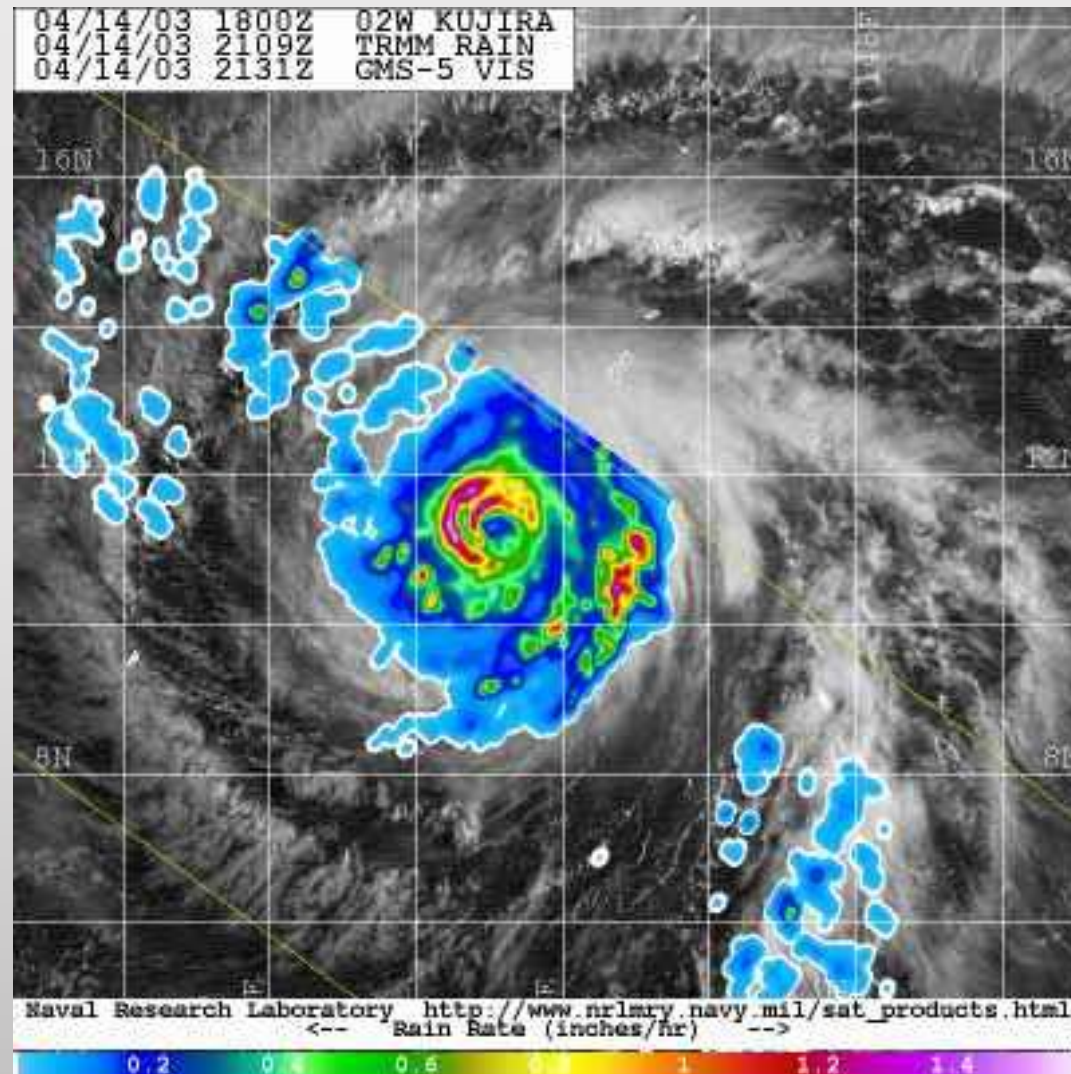


It is a typhoon; the center of the eye is near 10.8N 151.2E

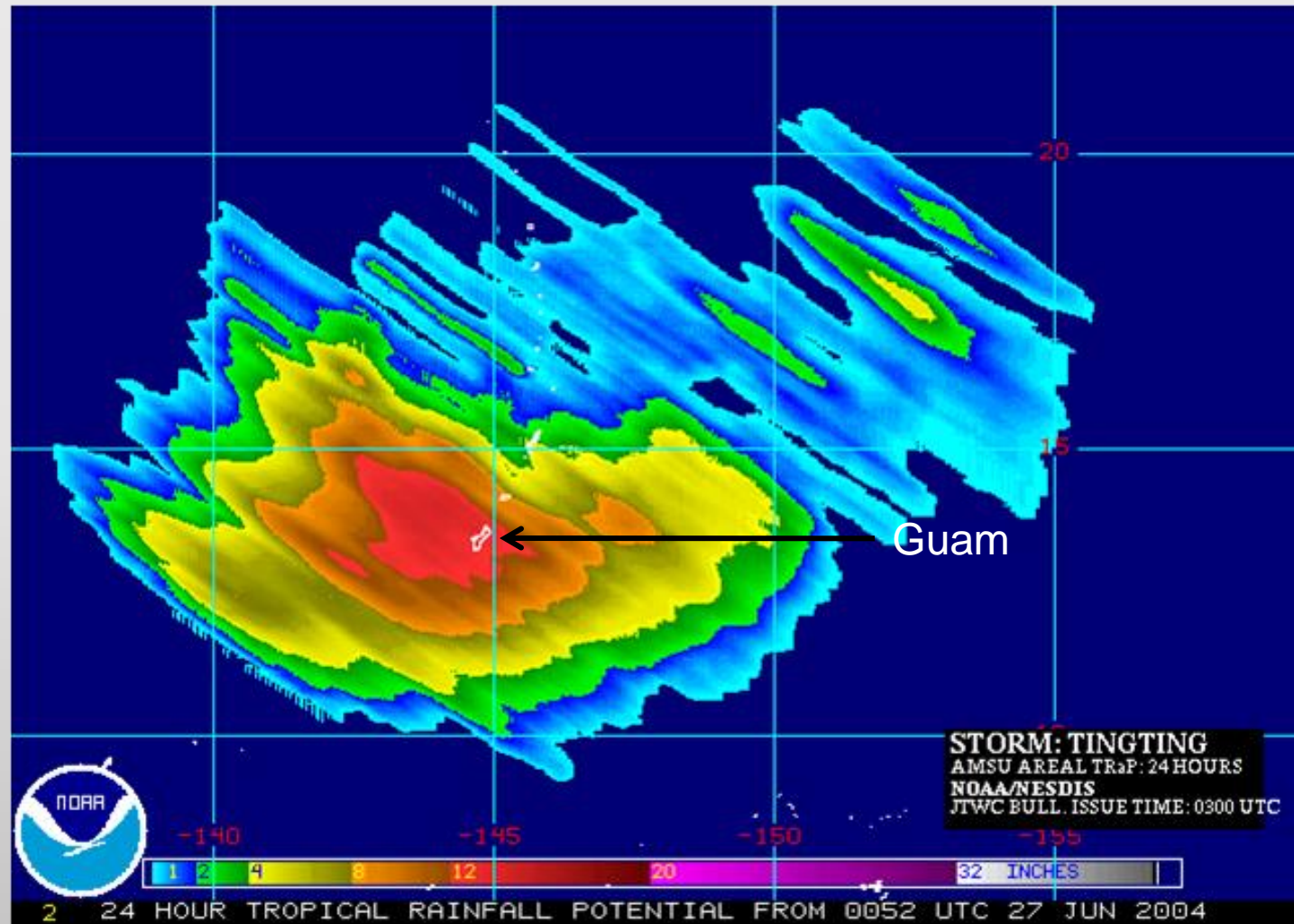
Microwave Intensity Imagery



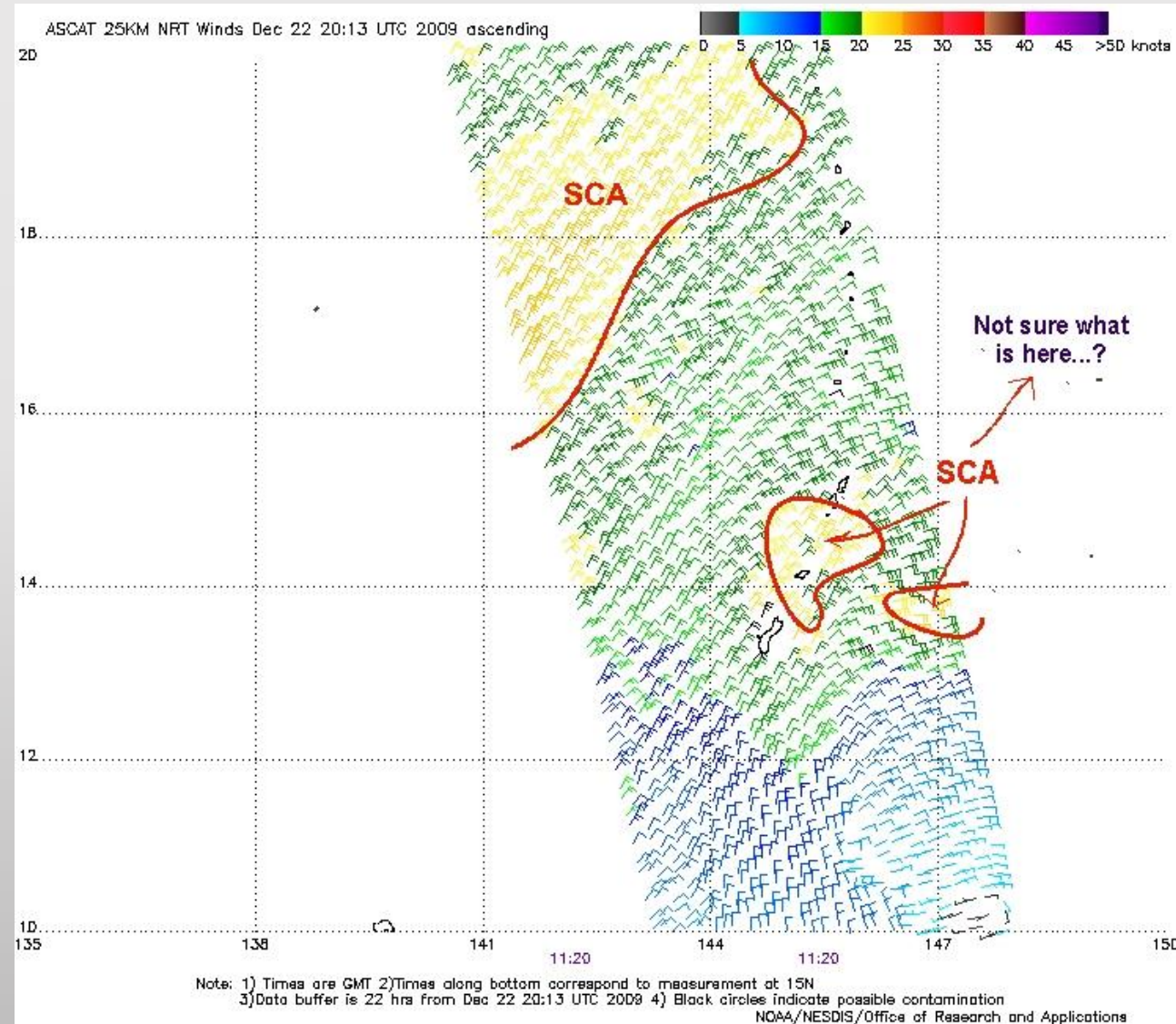
Microwave Rainfall Rate Imagery



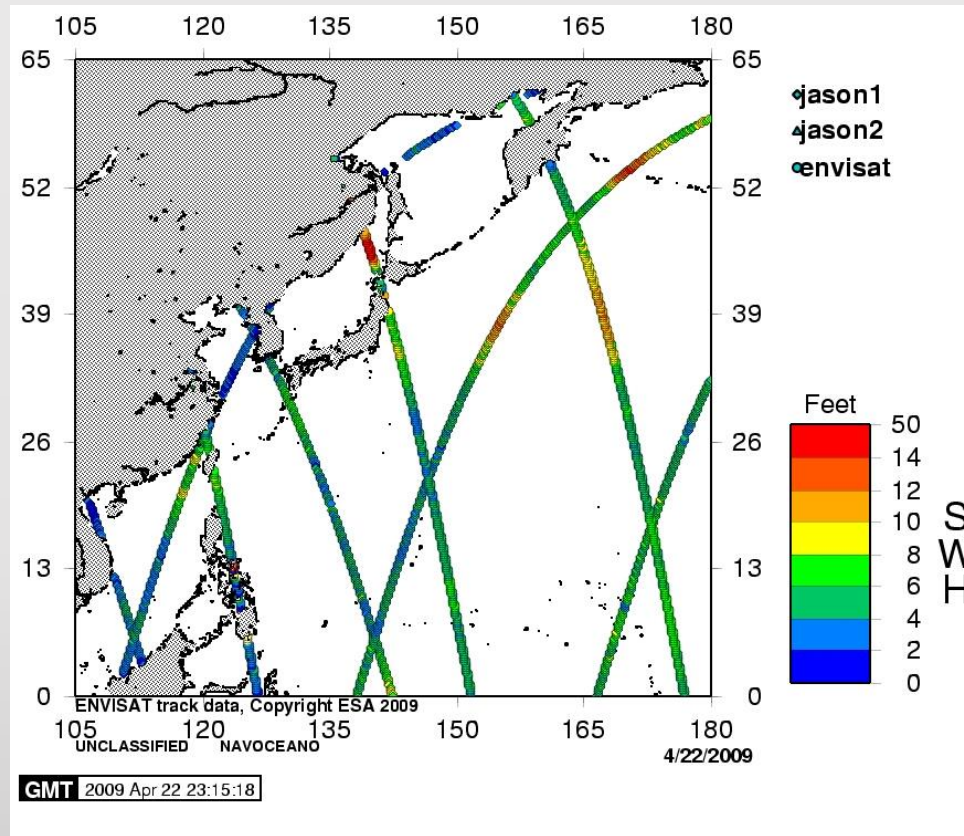
Rain Rate and Typhoon Track



Scatterometer is Gone— ASCAT is Here

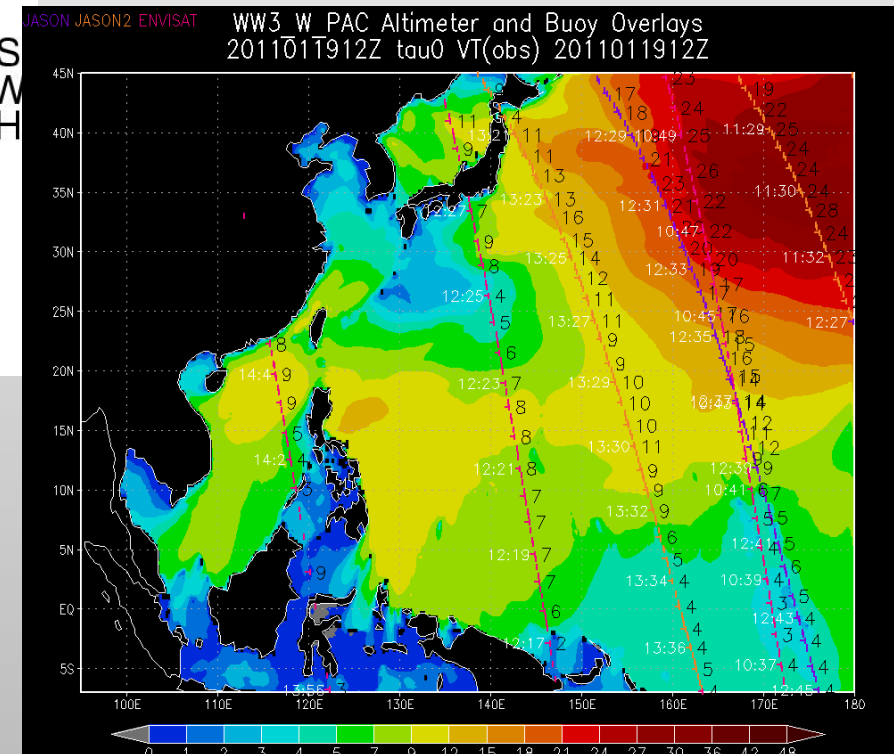


RADAR WAVE HEIGHT

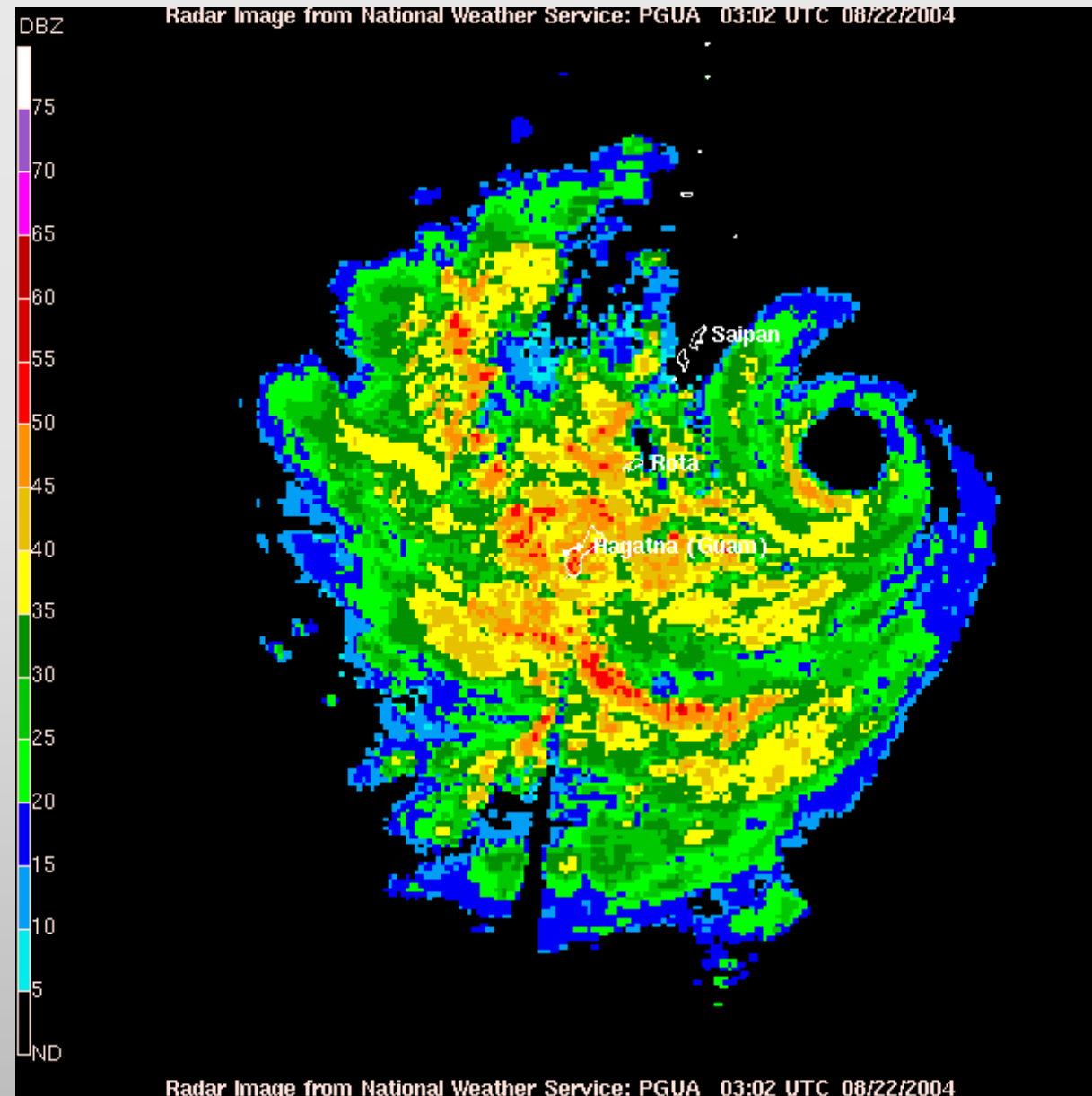


Radar Wave Height

Wave Watch 3 Wave Forecasts
and Radar Wave Height



Super Typhoon Chaba 22 August 1300L



QUESTIONS?

