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
Intensity Probability Forecast Graphic
Intensity Probability Forecast Graphic

Tropical Storm Force Wind Speed Probabilities
For the 120 hours (5 days) from 4 AM PST Mon Nov 3 to 4 AM PST Sat Nov 8

50-knot Wind Speed Probabilities
For the 120 hours (5 days) from 4 AM PST Mon Nov 3 to 4 AM PST Sat Nov 8
Intensity Probability Forecast Graphic

50-knot Wind Speed Probabilities
For the 12 hours (0.5 day) from 4 AM PST Mon Nov 3 to 4 PM PST Mon Nov 3

50-knot Wind Speed Probabilities
For the 48 hours (2 days) from 4 AM PST Mon Nov 3 to 4 AM PST Wed Nov 5

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 $\geq$ 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 Storm Summary

#### Tropical Storm Scales

<table>
<thead>
<tr>
<th>Category</th>
<th>TS A</th>
<th>TS B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Wind (mph)</td>
<td>30-49</td>
<td>50-73</td>
</tr>
<tr>
<td>Wind Gusts (mph)</td>
<td>40-64</td>
<td>65-94</td>
</tr>
<tr>
<td>Description of Damage Level</td>
<td>Weak TS</td>
<td>Severe TS</td>
</tr>
<tr>
<td>Inundation for Reefs 250'-500' wide</td>
<td>&lt;1</td>
<td>1</td>
</tr>
<tr>
<td>Inundation for Reefs &lt;250' wide</td>
<td>&lt;1</td>
<td>1-2</td>
</tr>
</tbody>
</table>
# Saffir-Simpson Tropical Cyclone Scale Typhoon Summary

<table>
<thead>
<tr>
<th>Typhoon Scales</th>
<th>Category</th>
<th>TY 1</th>
<th>TY 2</th>
<th>TY 3</th>
<th>TY 4</th>
<th>TY 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained Wind (mph)</td>
<td>TY 1</td>
<td>74-95</td>
<td>96-110</td>
<td>111-130</td>
<td>131-155</td>
<td>156-194</td>
</tr>
<tr>
<td>Wind Gusts (mph)</td>
<td>TY 1</td>
<td>95-120</td>
<td>121-139</td>
<td>140-167</td>
<td>168-197</td>
<td>198-246</td>
</tr>
<tr>
<td>Description of Damage Level</td>
<td>Minimal</td>
<td>Moderate</td>
<td>Extensive</td>
<td>Extreme</td>
<td>Catastrophic</td>
<td></td>
</tr>
<tr>
<td>Inundation for Reefs 250’-500’</td>
<td>2-3</td>
<td>3-5</td>
<td>5-8</td>
<td>8-12</td>
<td>12-20+</td>
<td></td>
</tr>
<tr>
<td>Inundation for Reefs &lt;250’</td>
<td>2-4</td>
<td>4-6</td>
<td>6-10</td>
<td>10-15</td>
<td>15-30+</td>
<td></td>
</tr>
</tbody>
</table>

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.
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 where the current weakens, make towards 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 ripafety float.
- Call 9-1-1 for further assistance. Always remember exactly where you were when you last saw the victim.

Facts about rip currents:
- Rip current speeds vary: average speeds are 1–3 feet per second, but they have been measured at 24 feet per second—faster than an Olympic swimmer!
- Rip currents are usually found in near channels and inshore winds.
- 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 "underwater" or "riped." These improper terms should not be used to describe them.
- Rip currents are strengthened when the tide is going out.

Safety tips:
- Know how to save and never walk along.
- For maximum safety, save near a lifeguard.
- Obey instructions and stick with lifeguards.
- Always swim with a partner. Your nearest walking down so you can walk over the reef out of harm's way.
- Be cautious at all times. If in doubt, don't go out.

Look for safety flags and signs at beaches:

- Swimming Allowed
- No Swimming

Hazards: Rip currents can kill in winter.

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

Guam
Scatterometer is Gone—ASCAT is Here
Radar Wave Height

Wave Watch 3 Wave Forecasts and Radar Wave Height
Super Typhoon Chaba 22 August 1300L
QUESTIONS?