

# Getting Effective Warnings to Rural Locations

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

**Hong Kong Observatory**

**3-5 November 2014**

# **A Look at the Guam Weather Forecast Office**

- We are the Weather Forecast Office for all of the US-Affiliated Micronesian Islands
- We are the Weather Office for Guam and the Commonwealth of the Northern Mariana Islands
- We support five Weather Offices in Micronesia
- We issue Tropical Cyclone Products for 37 individual islands in Micronesia
- We issue TAFs and conduct met watches for 12 airports
- The area is ~ 4 million square miles; population ~ 500,000
- We have a direct link to the JTWC and use their products

# Weather Forecast Office Guam



# Major Programs

- Public (routine and non-routine products; gridded data bases for Marianas)
- Marine (waters out to 40 nm beyond major islands)
- Aviation (TAFs and met watches for 12 airports)
- Hydrology (Flash Flood and Drought products)
- Tropical Cyclone (Warnings for 37 individual islands; issue several products)
- Climate (work closely with the Pacific ENSO Applications Climate Center)
- Fire Weather (November to June)
- We also provide maintenance for much of the equipment in Micronesia
- We operate a lot like Hong Kong but on a much smaller scale



# Weather Forecast Office Guam





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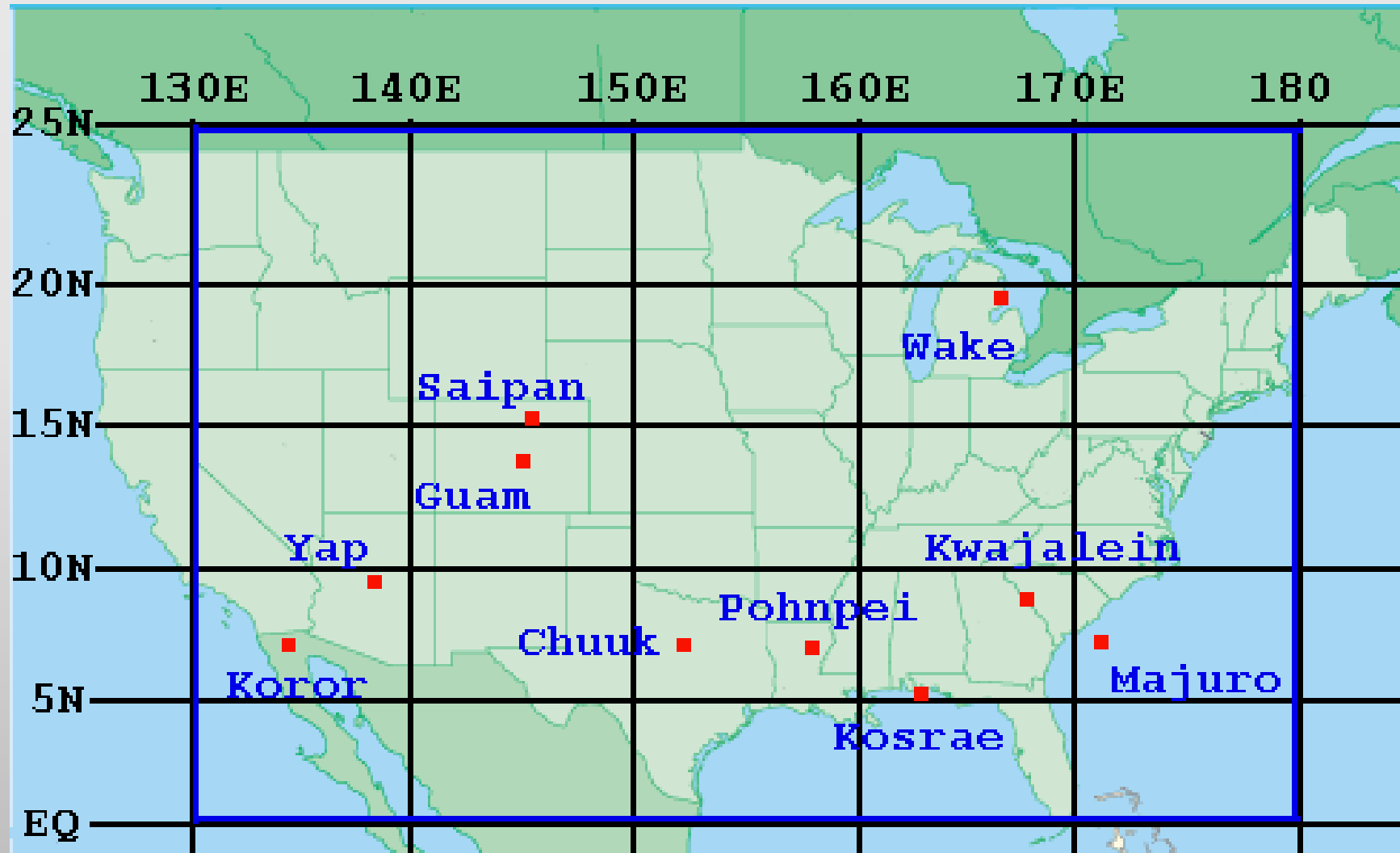


# Weather Forecast Office Guam

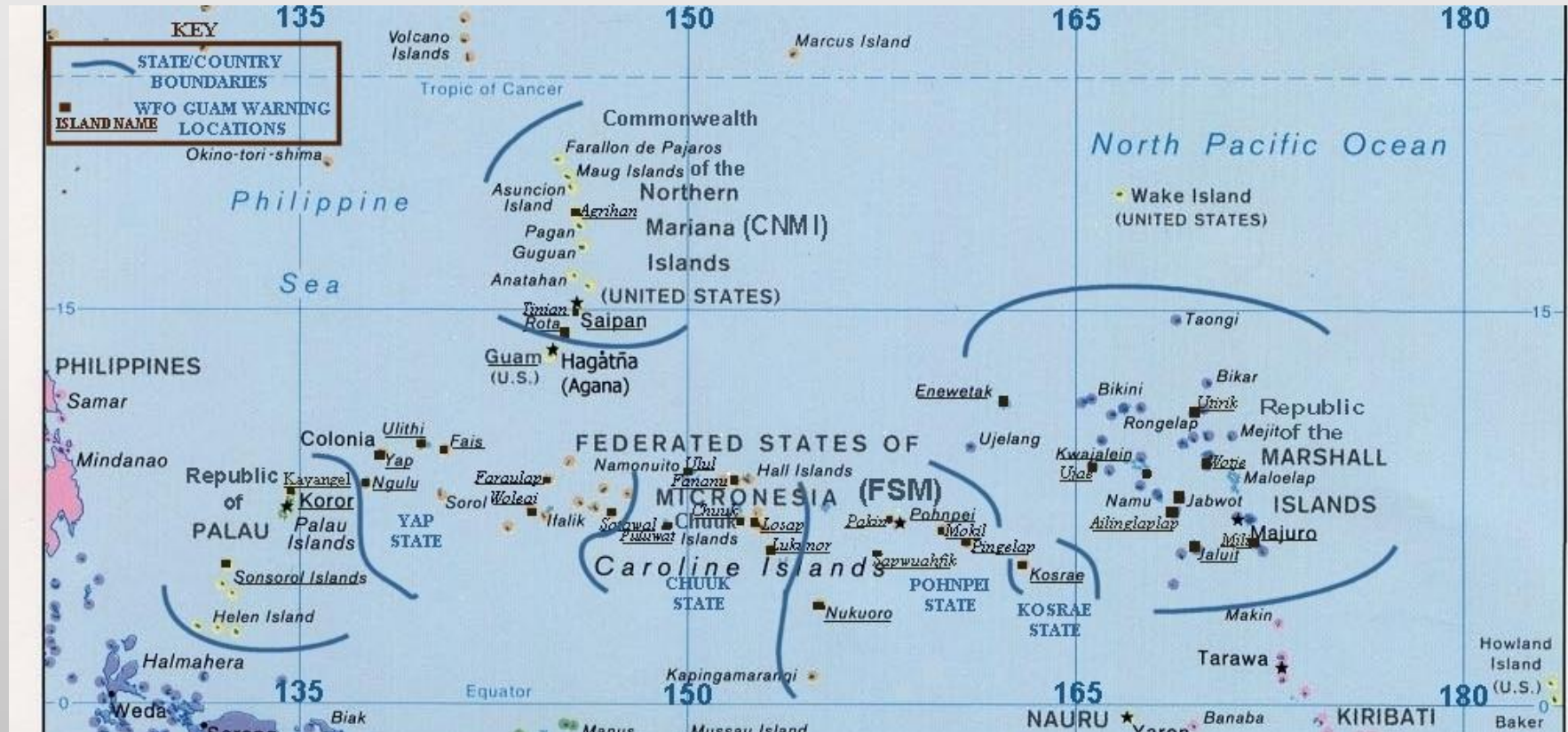




# Guam's Area of Responsibility

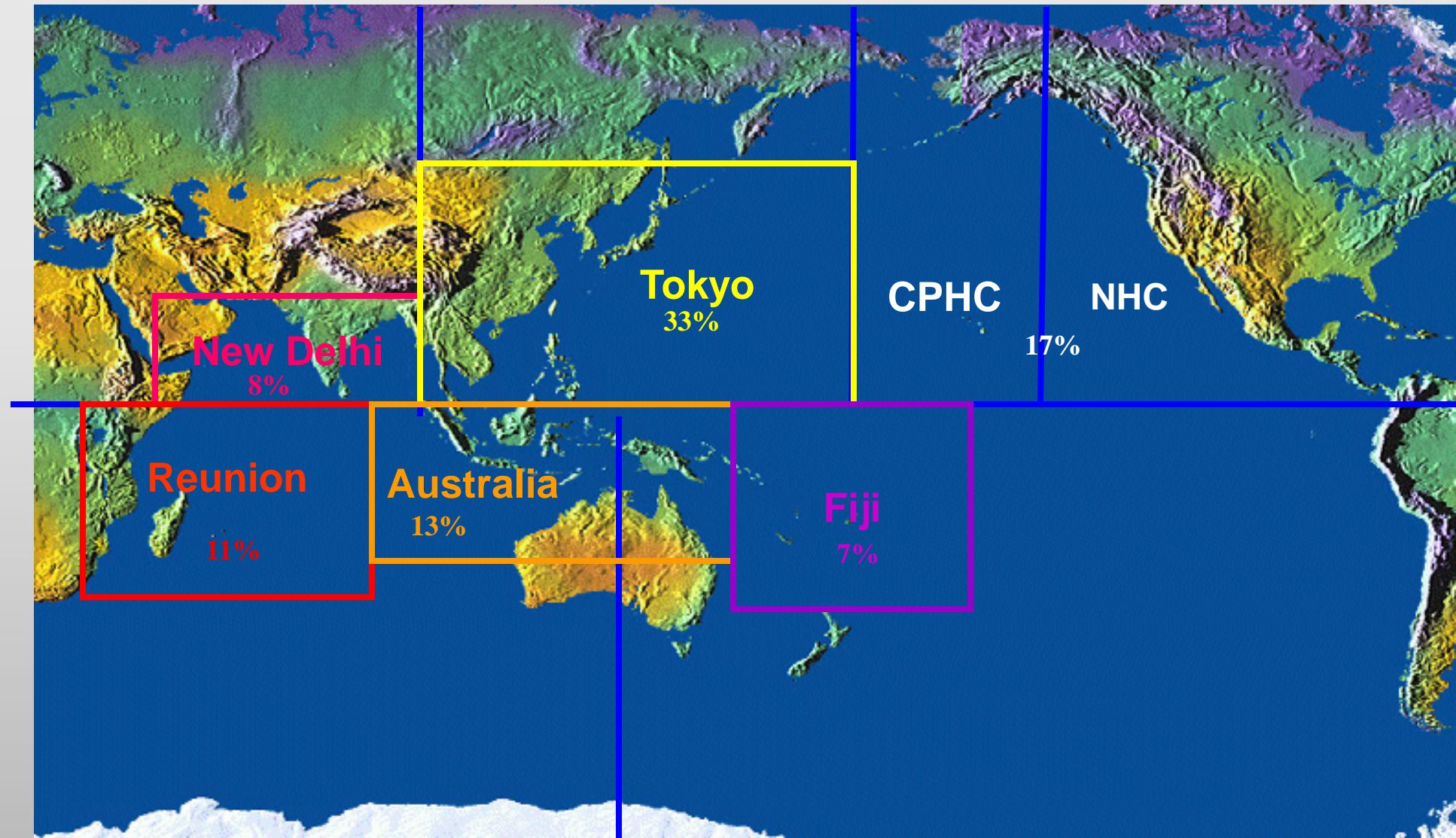


# WFO Guam Tropical Cyclone Warning Points

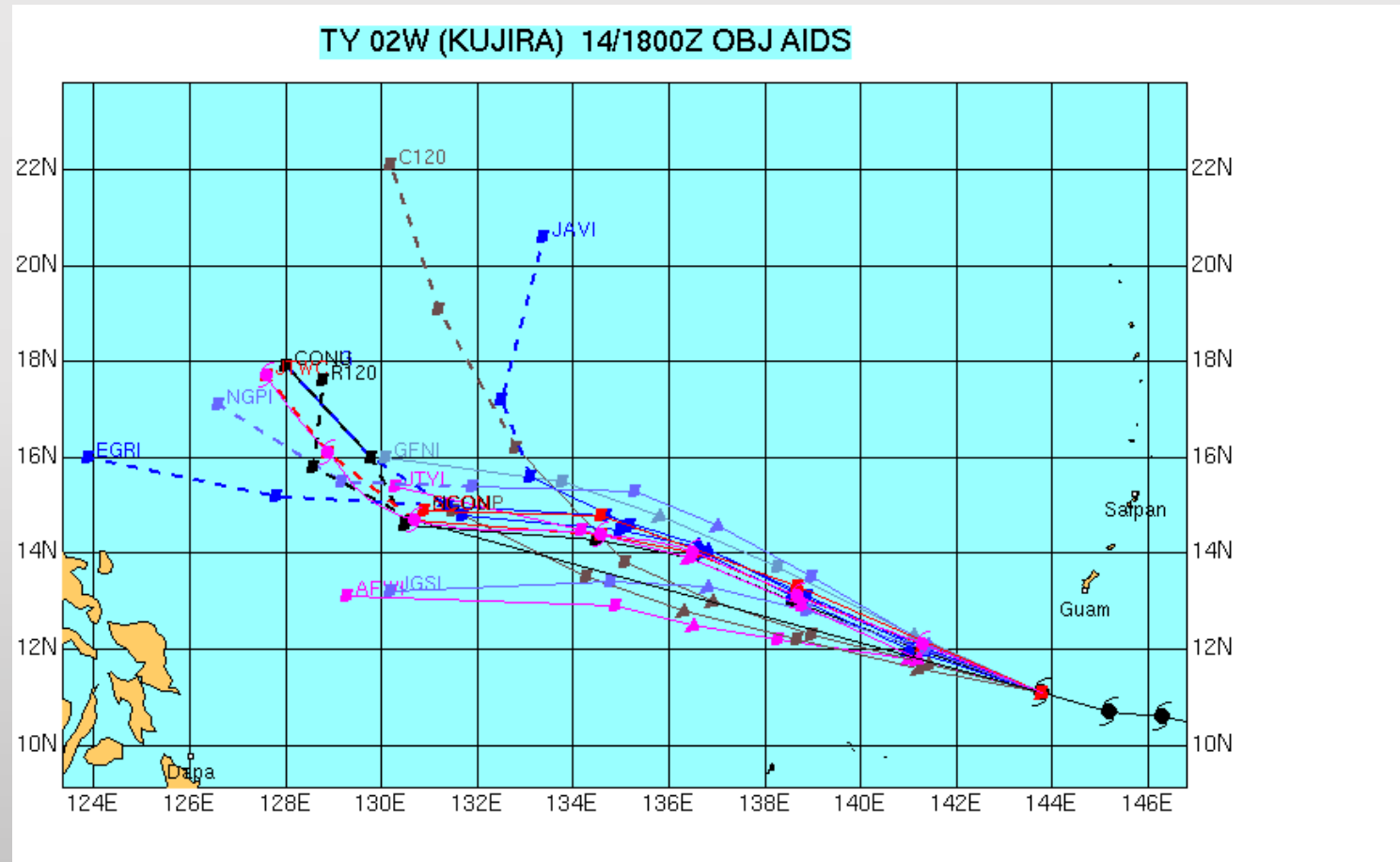




# JTWC AREA OF RESPONSIBILITY FOR US INTERESTS

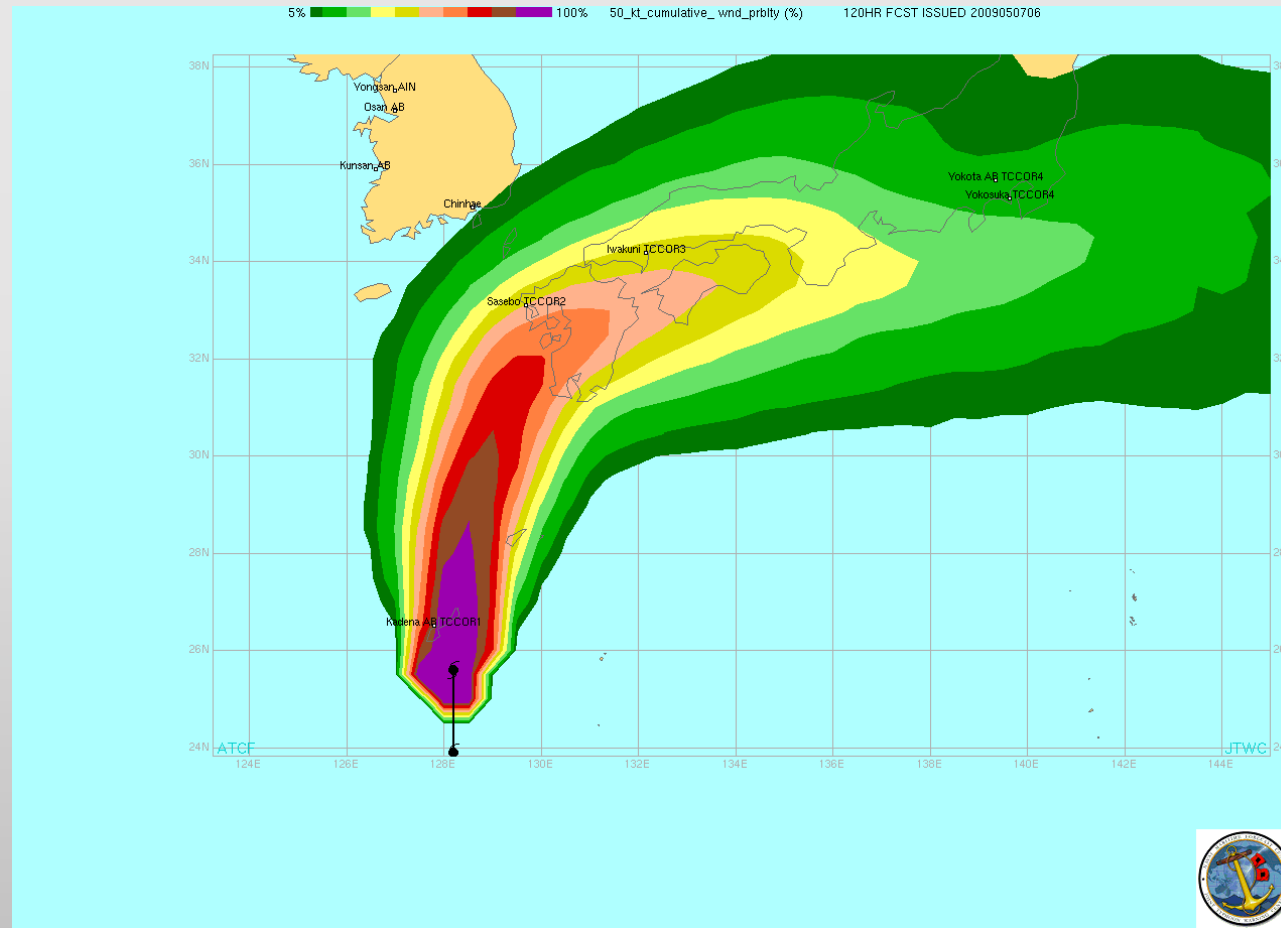


# Computer Model Predictions





# Probability Forecasts (Experimental)



# NPM&OC/JTWC Personnel

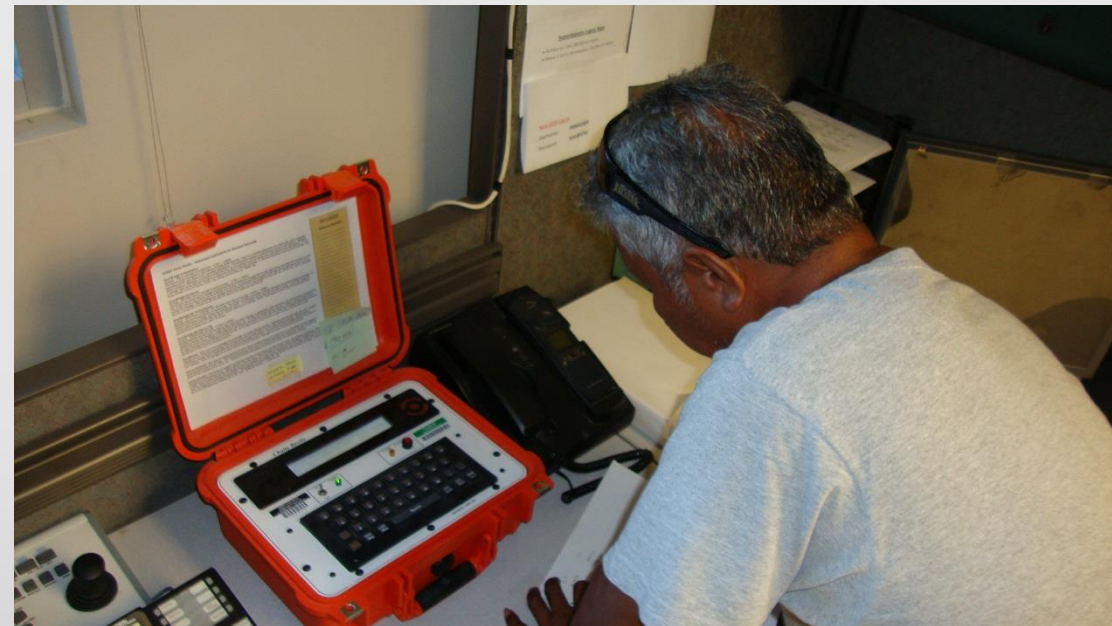
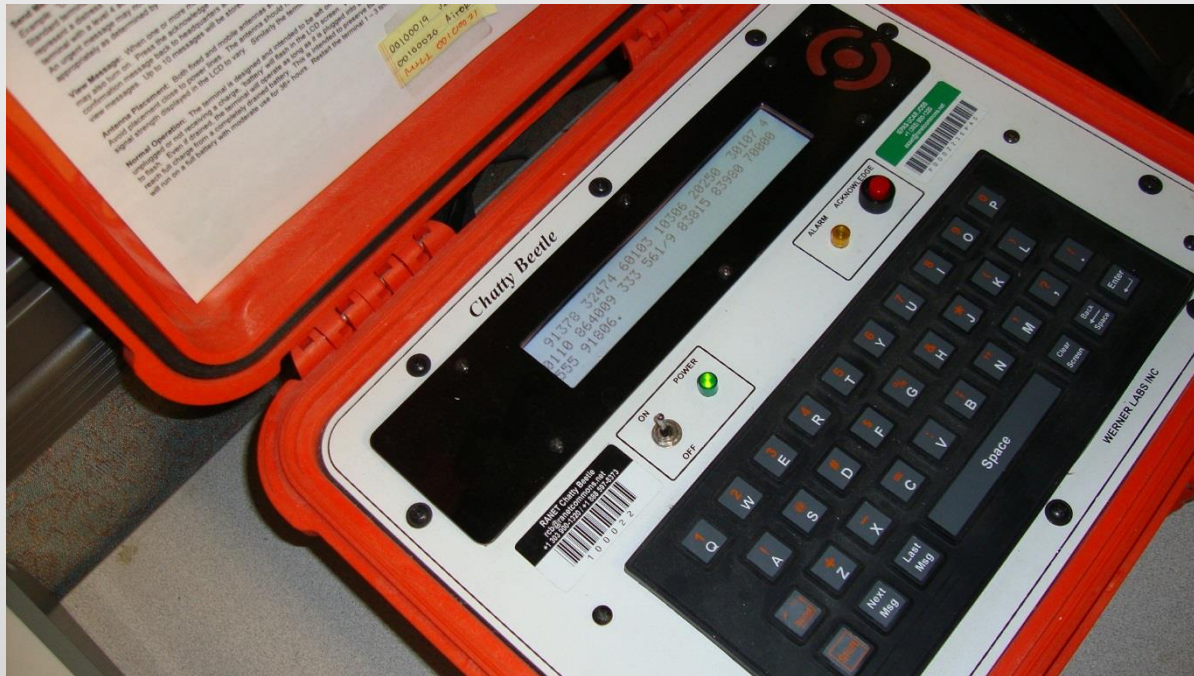




# Chatty Beetle

- Part of the US International RANET Program that started in Africa
- The Chatty Beetle was developed to provide a low cost reliable early warning capability to isolated locations
- It uses the Iridium short burst data satellite technology, but with an interim server that reduces costs to about \$25 per unit per month
- Each Chatty Beetle has its own address; messages can serve multiple users
- A short message is sent to the satellite, then down to a server, then back up to a satellite, then to the receiver
- Messages are prioritized according to urgency/priority
- Message sets off a visible/audible alarm; turning off the alarm sends an acknowledgement of receipt
- We also use it to send weather observations from isolated islands

# Chatty Beetle in Majuro, Marshall Islands





# Palau



# Chuuk





# FLASH FLOODS & VOLCANOES

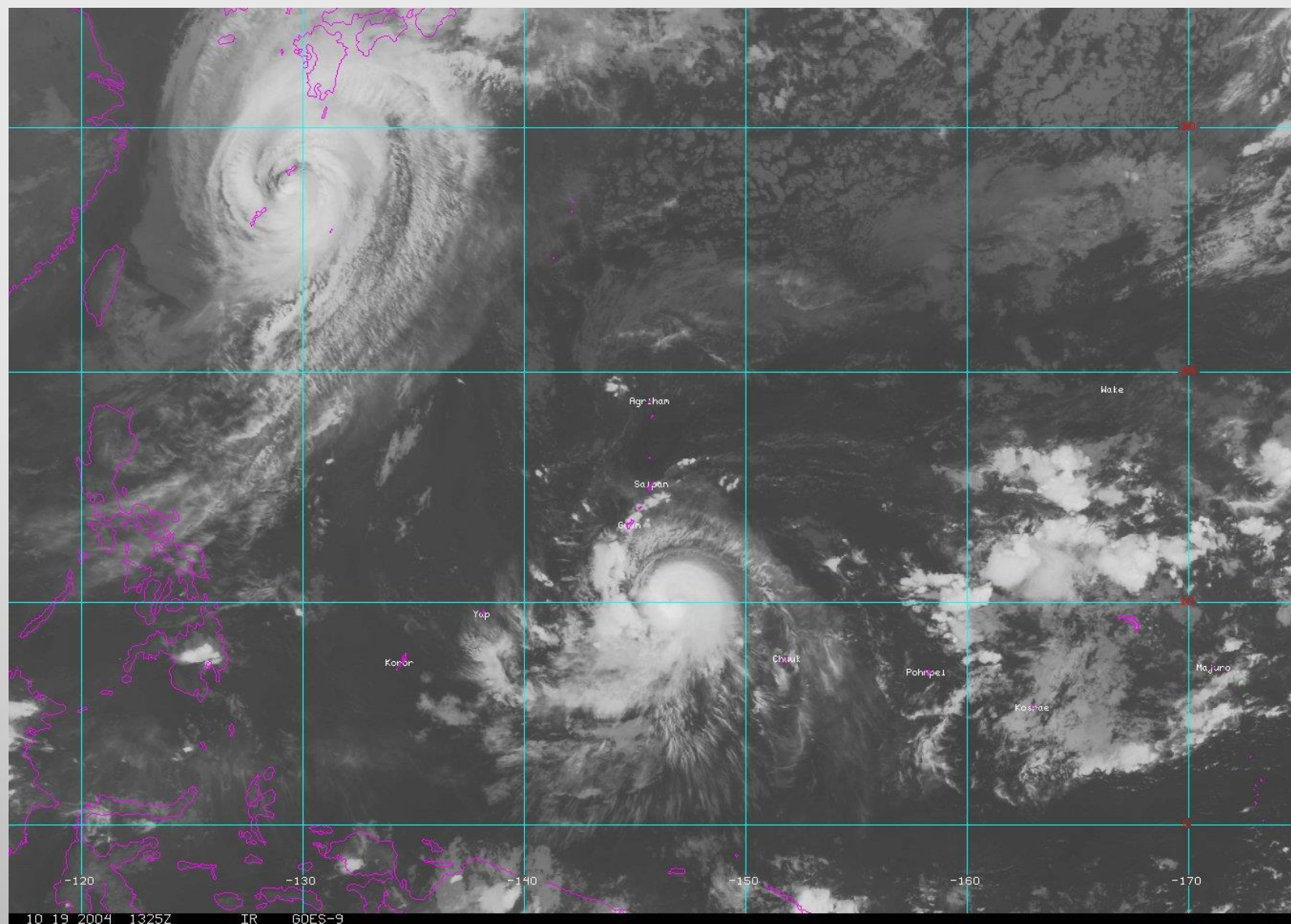




# Typhoon Pakyo (80W) Rapidly Intensifying (Advisory # COR 2) Guam

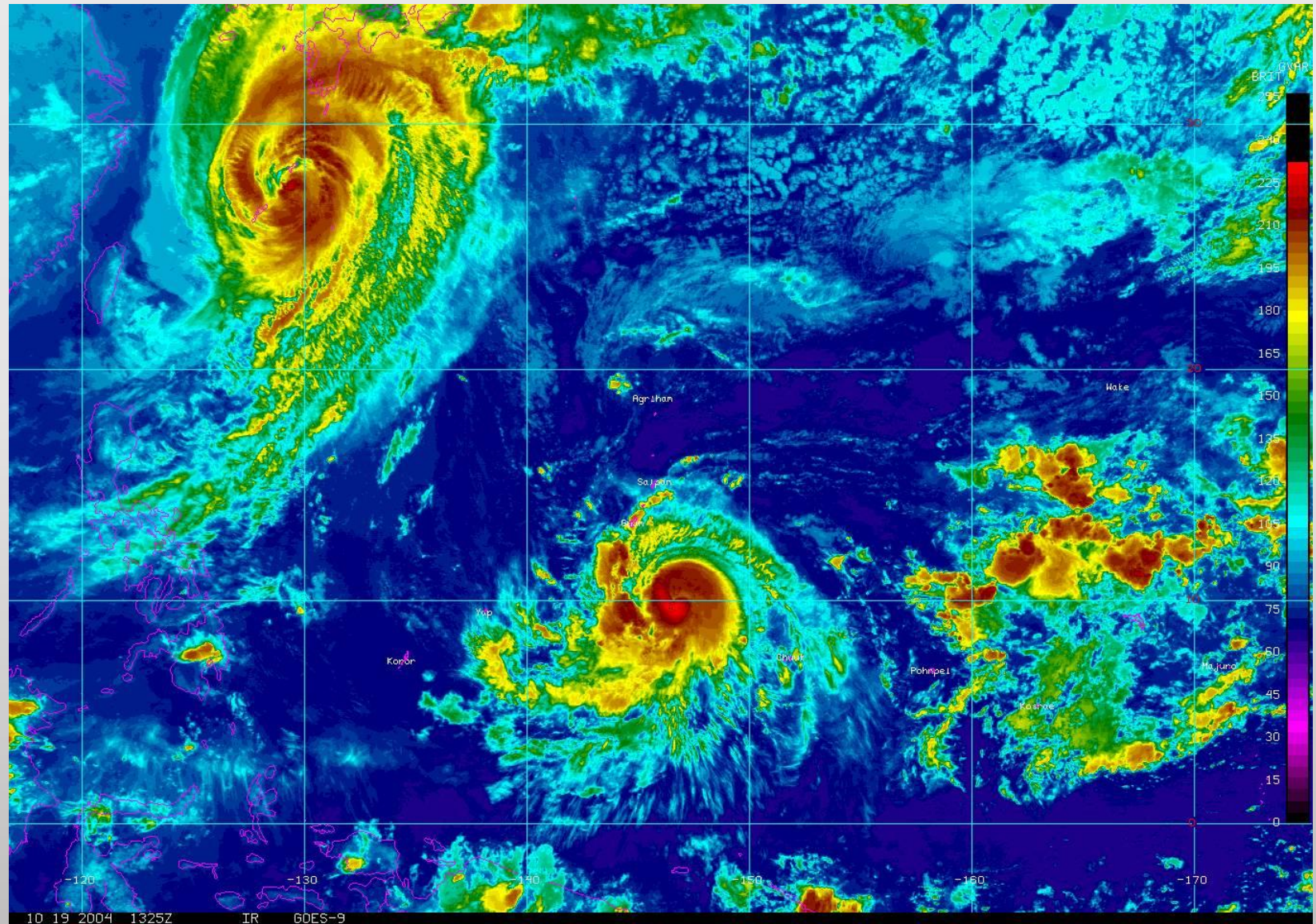
National Weather Service  
Heavy Weather Briefing  
Monday Morning 23 June 2014  
Chip Guard  
Warning Coordination Meteorologist  
Exercise-Exercise-Exercise

# TY COR 3 Data Exercise



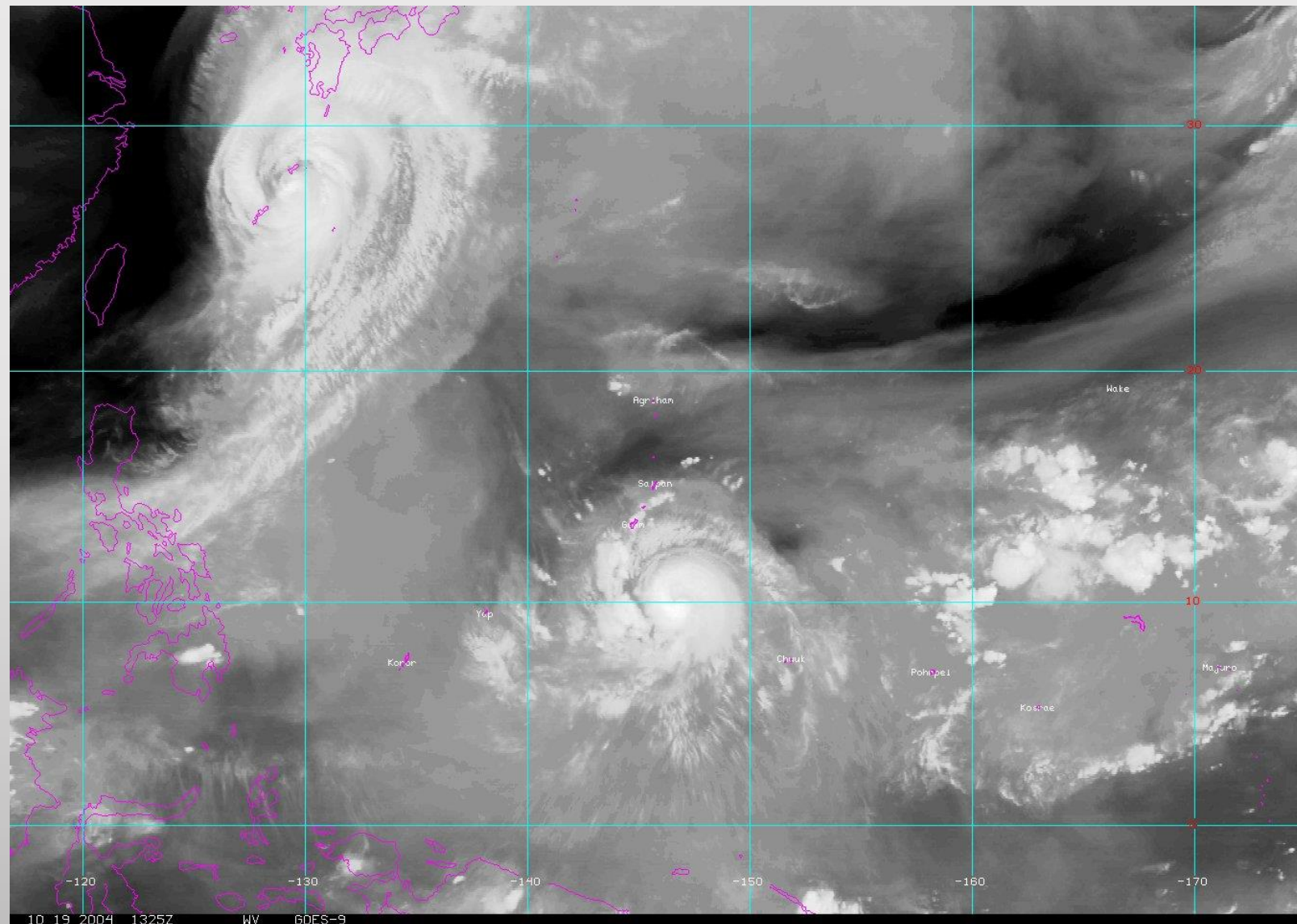


# TY COR 3 Data Exercise





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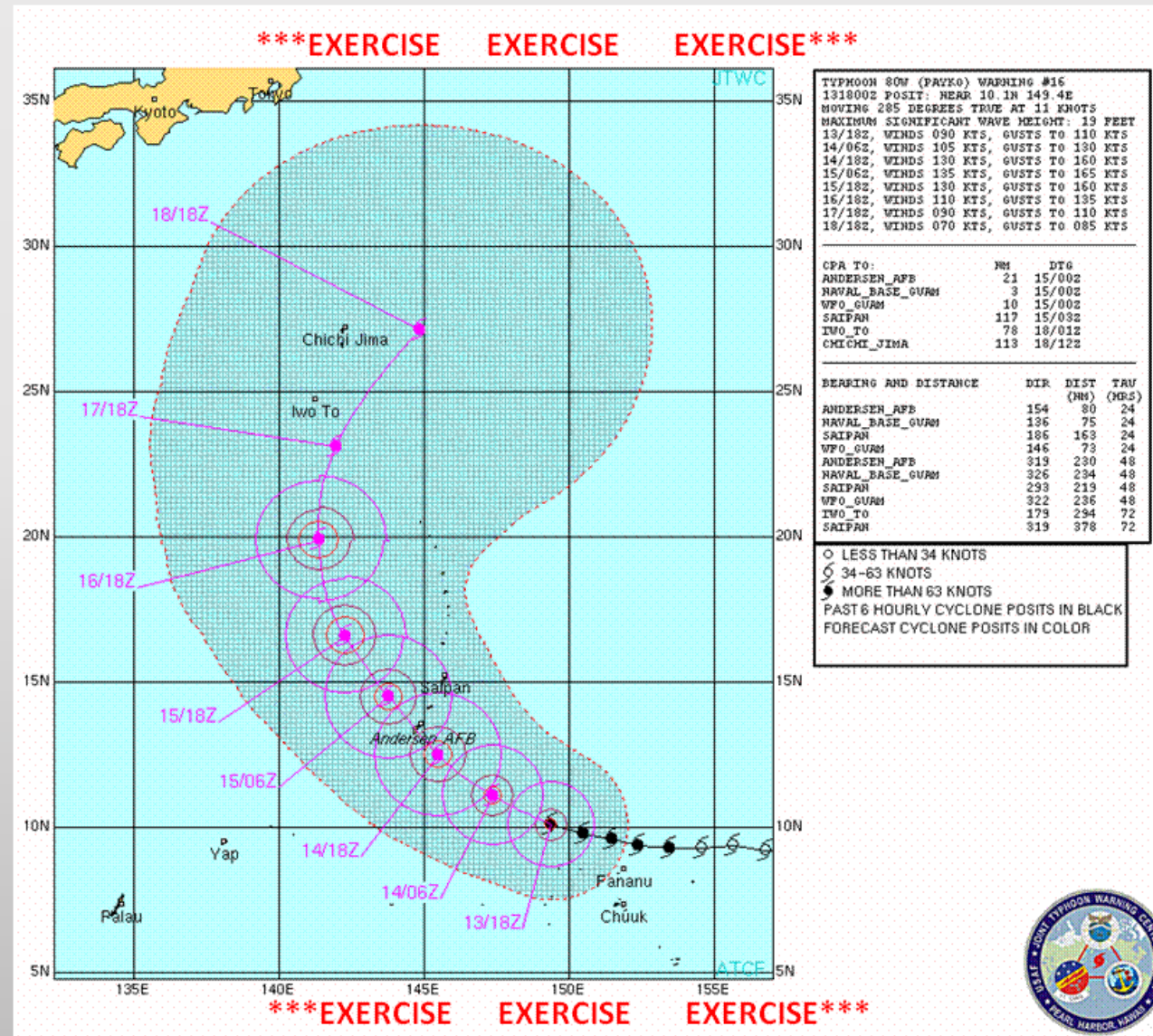
# Exercise-Exercise-Exercise

## Current Data

- **Position (7 am Monday 23 June 2014):**
  - 10.4 North Latitude 148.9 East Longitude
  - 350 miles southeast of Guam and 390 miles south-southeast of Saipan
- **Current Movement:**
  - Toward the west-northwest at 13 mph
  - Forecast to take a more northwest track over the next 6-12 hours
- **Current Intensity:**
  - 105 mph sustained winds gusts 130 mph around the center
- **Wind Field Size:**
  - 175 miles—damaging winds
  - 90 miles—destructive winds
  - 40 miles—typhoon winds

**CPA ~Tuesday night**

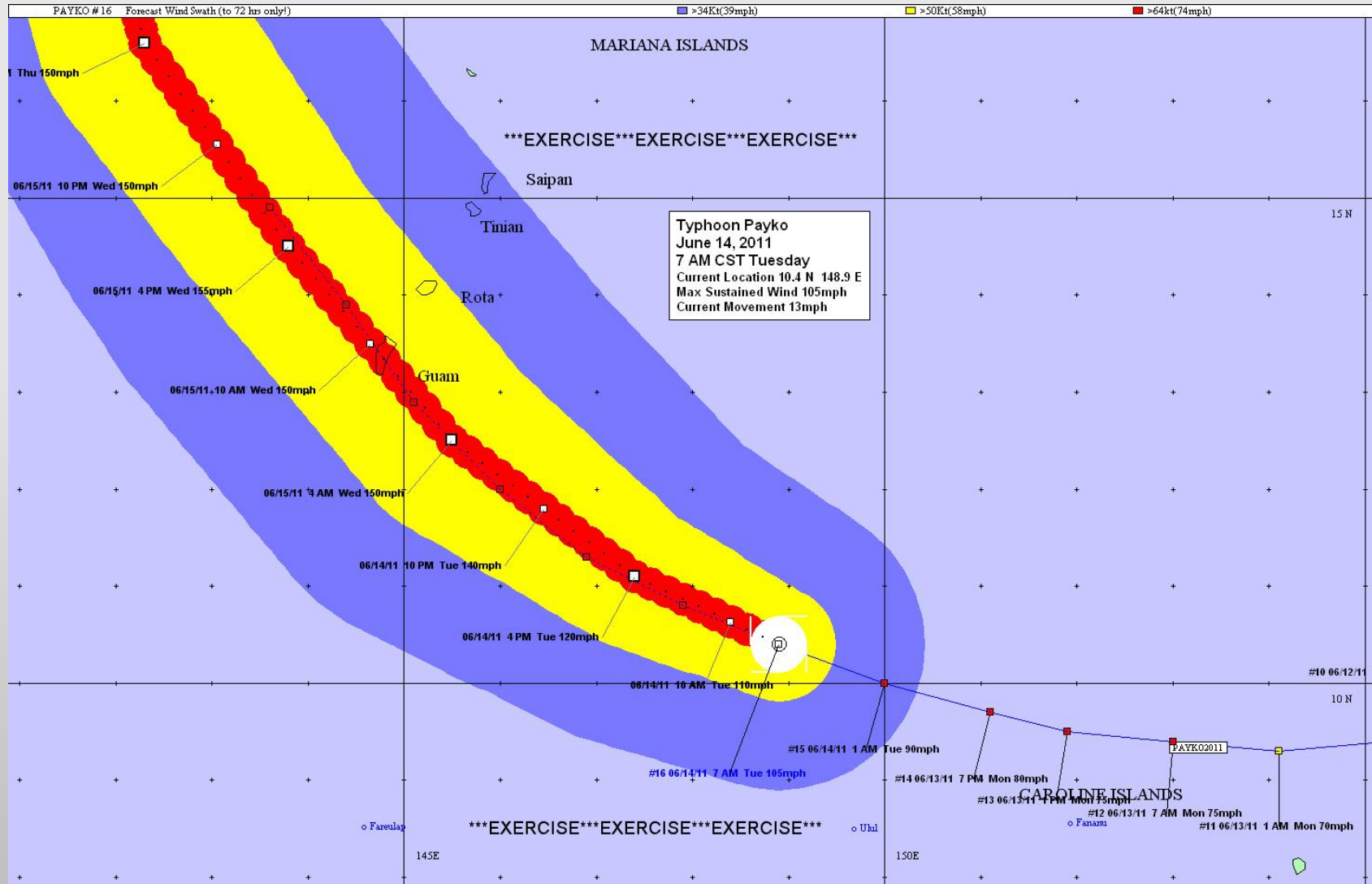
# Current Data-JTWC





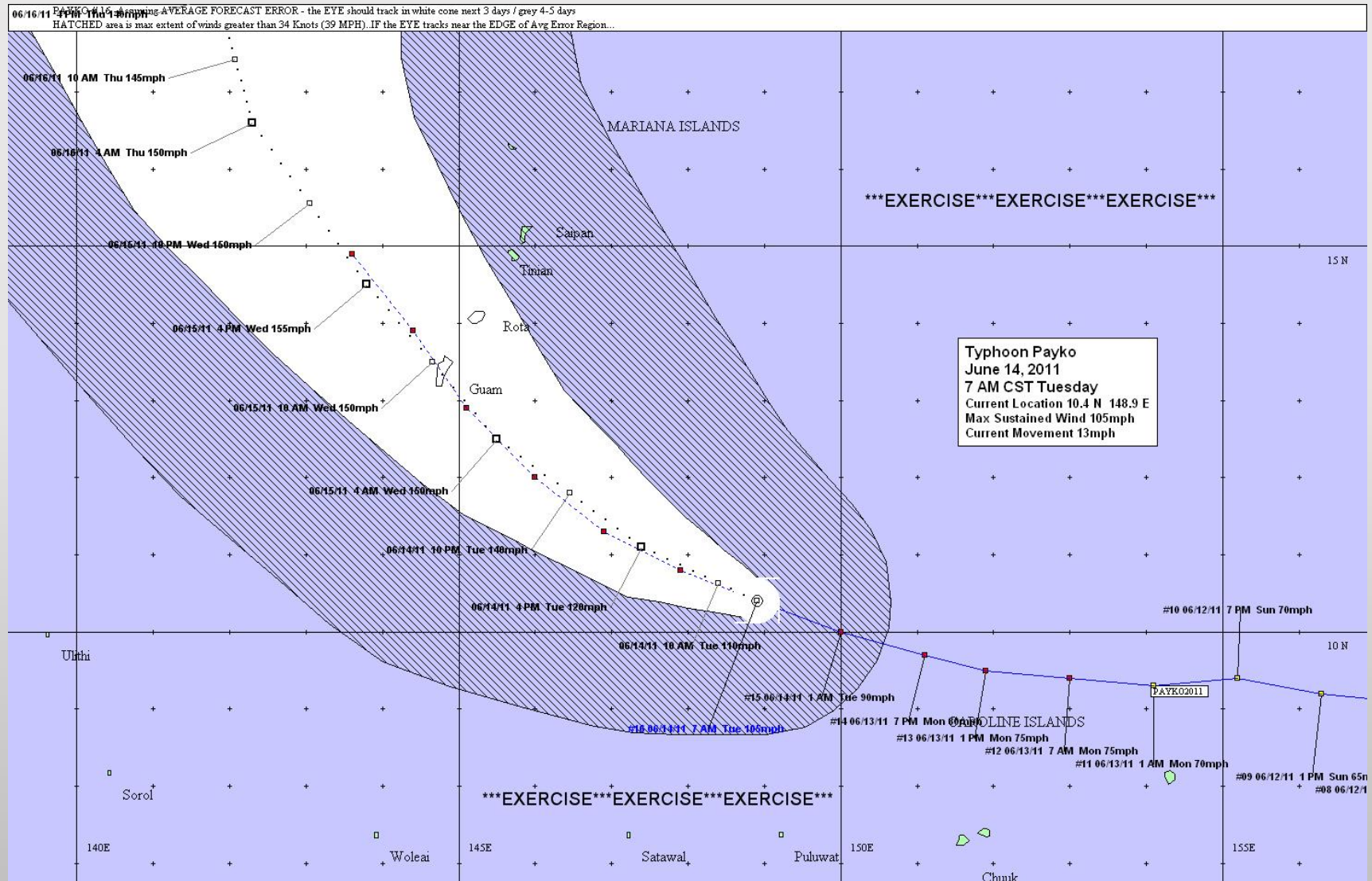
# Current Data

# EXERCISE



# Current Data

# EXERCISE



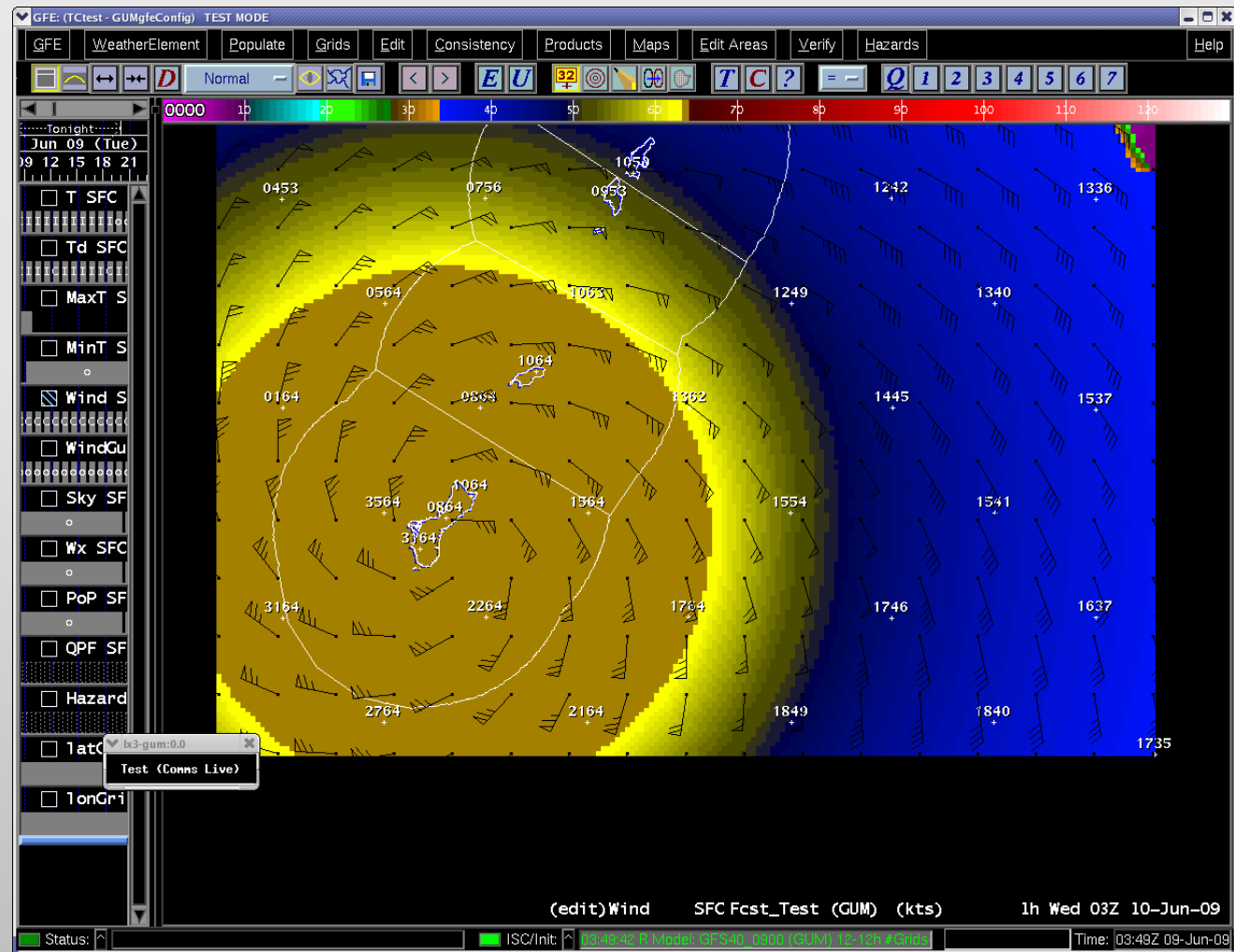
# Exercise-Exercise-Exercise

## Wind Information

- **Onset time of sustained 39 mph (34 kt) winds:**
  - Early Tuesday morning
- **Onset time of sustained 58 mph (50 kt) winds:**
  - Tuesday around noon
- **Onset of 75 mph (64 kt) winds**
  - Tuesday afternoon
- **Maximum sustained wind predicted on Guam:**
  - 160 mph with gust to 205 mph Wednesday night
  - Eye passage is likely; plan for it



# Projected Wind Field at CPA



# Exercise-Exercise-Exercise

## Seas/surf information

- **30-35 feet open ocean; 28-32 foot surf**
- **15-18 feet inundation on all coasts**
- **High Tide information**
  - 2.3 ft    At: 12:40 PM Monday
  - 2.3 ft    At: 12:11 AM Tuesday
  - 2.5 ft        At: 2:06 PM Tuesday
  - 2.2 ft    At: 1:05 AM Wednesday
  - 2.3 ft    At: 3:55 PM Wednesday



# Exercise-Exercise-Exercise NWS status board

- **Current:**
  - **A Typhoon Warning is in effect for Guam and Rota; a Tropical Storm Warning is in effect for Tinian and Saipan.**
  - **Guam is in COR 3; Rota is in Typhoon COR 3; Tinian and Saipan are in Tropical Storm COR 3**
- **Planning:**
  - **Set COR 2 soon**
  - **Flash flood watch this afternoon; Flash Flood warning early tomorrow morning**
  - **Monitor storm for continued rapid intensification**

# Exercise-Exercise-Exercise

## Expected damage

Low-End Typhoon Category 5 damage: 156-175 mph

- All damages from Tropical Storm Category A through Typhoon Category 4
- All commercial power out; most water and waste water inoperative; most commercial communications out
- Severe damage to power distribution; numerous concrete poles and lines down
- Major damage to airport and port facilities
- Heavy debris blocking all roads; massive building and infrastructure damage
- Major storm-shutter destruction and flood damage



# Exercise-Exercise-Exercise

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# Exercise-Exercise-Exercise

## Expected damage

Low-End Typhoon Category 5 damage: 156-175 mph

- Likely damage to gantry cranes and piers
- Numerous containers blown into the harbor
- Most large ships ripped from moorings
- Major flooding on coastal areas below 25 feet
- Major parts of sewage system damaged; damage to power generation facilities
- Possible damage to undersea comm cables
- Damage Estimate: \$1.5B-\$2.5B



# Exercise-Exercise-Exercise Plan For

High End Category 5 Typhoon: 180-194 mph

- Total failure of non-concrete structures
- Major damage to large primary power distribution lines, poles and towers
- All ships torn from moorings; major pier and gantry crane damage
- Several deaths likely; numerous dead animals
- Total loss of vegetation; total defoliation
- Several fuel and water tanks crushed
- Damage estimate: \$3B-\$4.5B

# Exercise-Exercise-Exercise Forecast Storm Intensity at CPA

- Low-End Category 5 Typhoon  
160 mph (Stronger than Pongsona and Paka; Similar to Karen, but slower moving with much more stuff on the island to destroy)



# Exercise-Exercise-Exercise

## Comments

Worst conditions: Tuesday night

Rapid Intensification is Occurring!!! **Beware!!!**

Keep alert for changes such as:

- faster movement

- more rapid intensification

- expansion of size of wind field

- torrential rain and frequent lightning

- direct hit becoming more and more likely

# Exercise-Exercise-Exercise

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