### 4. Tropical Cyclone Wind Speed Probabilities

**Tropical Cyclone Wind Speed Probabilities**

- Probabilities of 34-, 50-, and/or 64-knot wind speeds (as appropriate) based on the official forecast track throughout the 120-hour forecast cycle.
- These probabilities are based on the TPC/NHC’s average track, intensity, and wind radii forecast errors.

**Visual 6-13**

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### WFO Hurricane Local Statements

**WFO Hurricane Local Statements**

Local WFOs analyze TPC/NHC products and issue Hurricane Local Statements (HLS), which contain:

- Lead statement
- Counties, parishes, or cities included in the HLS
- Watches and/or warnings in effect
- Recommended precautionary actions
- Storm surge and storm tide information
- Present winds and the expected time of onset of tropical storm or hurricane-force winds
- Tornado, flood, flash flood, rip current, beach erosion, and inland high wind potential
- The time of the next statement

**Visual 6-14**

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Inland Tropical Storm/ Hurricane Watches and Warnings

- Issued when a tropical storm is expected to remain at tropical storm/hurricane strength well inland
- Calls greater attention to the threat
- Issued when tropical storm/hurricane-force winds are anticipated beyond coastal areas—even though the actual occurrence, time, and location may be uncertain
- Wind fields from the tropical storm forecast/advisory will be used as guidance when preparing the watch

Visual 6-15

Notes:

Tracking Tropical Cyclone/ Hurricane-Force Winds

Notes:

Visual 6-16
**Hurricane Forecasting**

- The TPC/AHCC relies on hurricane computer modeling and observational instrumentation for hurricane forecasting.
- Over the past 20 years, forecast accuracy has increased.
- Despite advances in data collection systems, the accuracy of forecasts is still limited.

*Visual 6-17*

**Hurricane Forecasting (cont’d.)**

- The NHC average forecast track error at 72 hours is roughly 150 nautical miles.
- A ‘perfect’ forecast is knowing the location and intensity with 100% percent accuracy.

*This gap is the reality that underlies decision-making.*

*Visual 6-18*
### Three Main Sources of Errors

**Visual 6-19**

- Methods of observation:
  - Satellite
  - Reconnaissance
  - Radar
- Inaccuracies in the observations or insufficient numbers of observations
- Incomplete understanding of the physics of the hurricane and the atmosphere in which it is embedded

### Inaccuracies in Observations

**Visual 6-20**

- Having enough observations to supply data for the computer models is a problem, especially over the ocean
- Observational tools take measurements in different ways, and all of them have different accuracies
- The forecaster must determine, out of all these measurements and computer runs, which ones best represent the storm
- Forecasters must also be concerned about rapid changes that take place between model runs
### Probabilities and Margins of Error

- Plan for a hurricane one category higher than is currently forecast
- Prepare in advance to take action in case the track shifts suddenly or the storm’s speed increases

Visual 6-21

### Errors in Forecasting Hurricane Track

![1990-2005 NHC Track Forecast Errors](chart)

Visual 6-22

Notes:

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Notes:
Track Errors and Evacuation Decisions

- You must make the decision to evacuate knowing about track errors – about 60 n mi at 24 hours (2-yr running average 2004-2005)
- Hurricane conditions typically affect a swath of about 125 statute miles wide. Watches and warnings are usually issued for 300 miles of coastline
- Costs of evacuations and loss of life are weighed against errors in forecasting to decide on a course of action

Errors in Forecasting Hurricane Intensity

Notes:
HURREVAC as a Forecasting Display Tool

HURREVAC uses the TPC/NHC advisory package to graphically show the:
- Hurricane’s track
- Forecast track errors
- Strike probabilities
- Wind fields

When combined with HS information, HURREVAC provides data for making an evacuation decision.

Visual 6-25

Activity 6:1—Preparedness and Evacuation Planning

- Using local materials, review and interpret a series of advisory releases and HURREVAC data to determine the potential of tropical storm or hurricane

Visual 6-26
<table>
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<th>Lessons Learned</th>
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- When monitoring the storm, what are the most critical factors?
- How can we correct/improve the inaccuracies in tropical storm observations?
- What tools/products have been most useful and accurate in forecasting tropical storms?
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