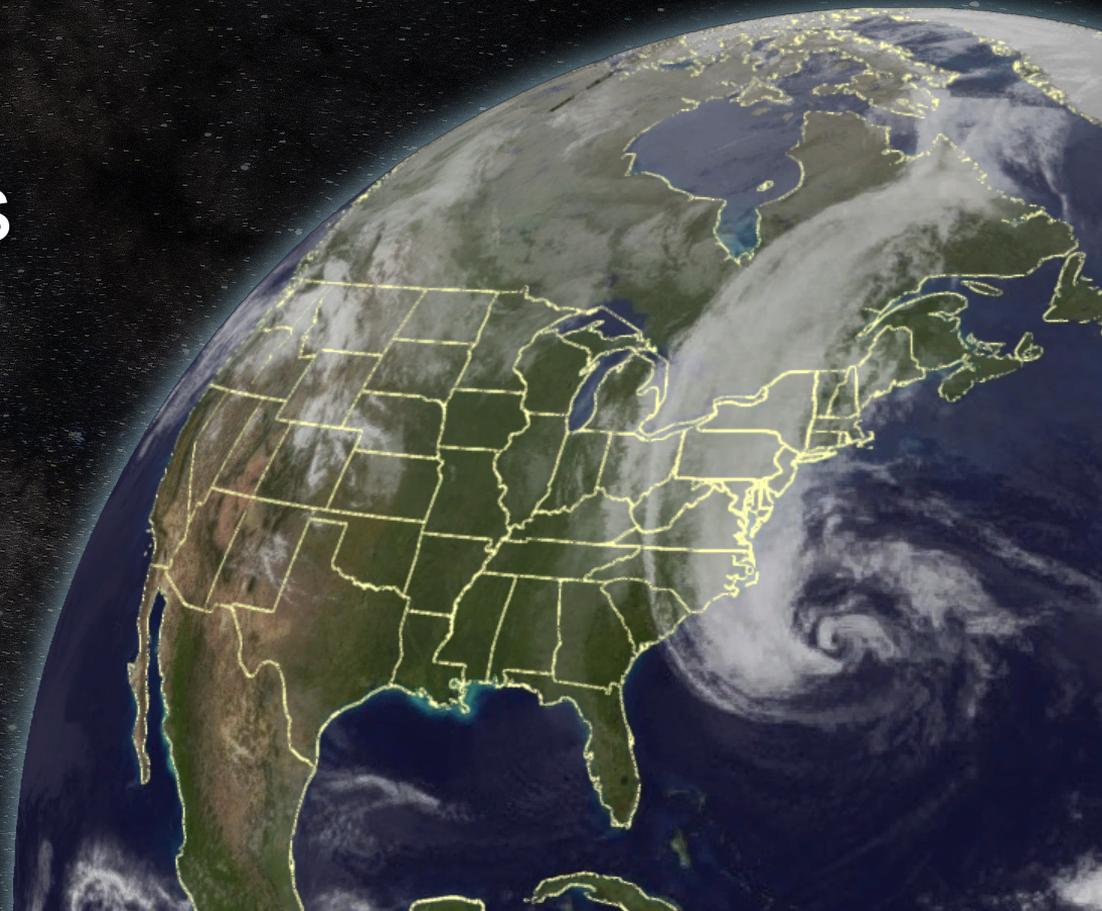


# Tropical Hazards

Tom LeFebvre  
NOAA/ESRL/GSD



GSD Science Review  
3-5 Nov 2015



# Tropical Cyclone Forecast Information

As part of its AWIPS-II work, GSD is assisting with improving the precision and detail of Tropical Cyclone forecast information to the public...

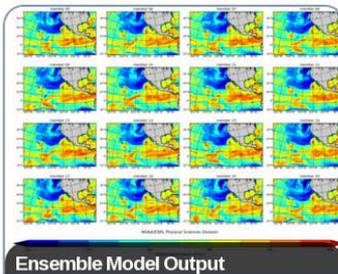
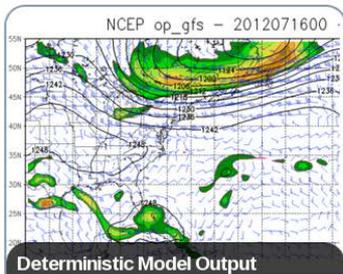
WTUS82 KMFL 230933  
 HLSMFL  
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WTUS82 KMFL 230922  
 TCVMFL

NT ADVISORY NUMBER 32  
 I FL AL242005

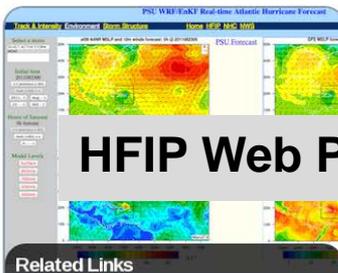
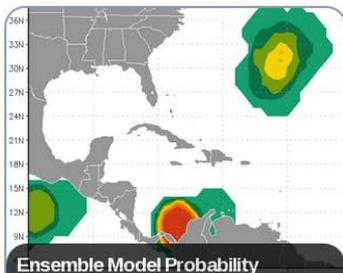
URGENT - IMMEDIATE BROADCAST REQUESTED  
 WILMA LOCAL WATCH/WARNING STATEMENT/ADVISORY NUMBER 32

FLRIDA



IG  
 EAST ACROSS

IT 410 MILES



**Specifications of the HFIP Regional Models**

Models	Nesting / Horizontal Resolution (km)	Vertical Levels	PBL	Radiation	Ice and Boundary Conditions
HWRF (DPS)	27/3/3	A2	GFS Non-Local PBL	GFDL Scheme	GFS
GFDL (DPS)	30/15/7.5	A2	GFS Non-Local PBL	Schwarzschild Fels Scheme	GFS
HWRF-HRD/EMC	27/3/3	A2	GFS Non-Local PBL	GFDL Scheme	GFS
RTM				RTM (longwave) / Dudhia (shortwave)	GFS
MSU					
MPS			Navy 1.5 Order Closure		NDGAPS (cloud use GFS if desirable)

- Products Guide**
- 1.) [Deterministic model products](#)
  - 2.) [Ensemble model products](#)
  - 3.) [Probability products](#)
  - 4.) [Track and intensity products](#)
- 1) HFIP Deterministic model products:**  
 Graphics are generated for both the Regional Scale domain (also known as the child domain). Display of the following variables using GrADS visualization tool.
- Mean Sea Level Pressure (4 and 2 mb contours)
  - 10 m wind
  - 1000-850 mb thickness
  - 850 mb wind
  - 850 mb height
- Product Guide**

IMPACT  
 N IS FOR LIFE-

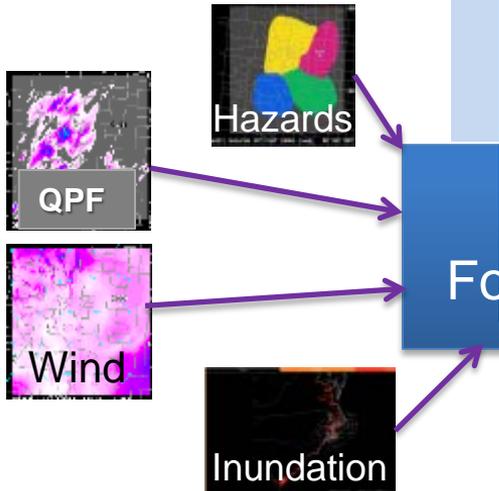
5)

# Hurricane Local Statement

NATIONAL WEATHER SERVICE MIAMI FL AL242005  
200 AM EDT MON OCT 24 2005

## GSD led the implementation of the HLS text format

- Complex collection of tropical cyclone impact information
- Provides critical data for Decision Support
- Saves forecasters time when resources are limited



### \* FLOODING RAIN:

POTENTIAL IMPACTS FROM THE FLOODING RAIN ARE STILL UNFOLDING ACROSS SOUTH FLORIDA. REMAIN WELL GUARDED AGAINST DANGEROUS FLOOD WATERS HAVING POSSIBLE SIGNIFICANT IMPACTS. IF REALIZED, THESE IMPACTS INCLUDE:

- **MODERATE RAINFALL FLOODING MAY PROMPT SEVERAL EVACUATIONS AND RESCUES.**
- RIVERS AND TRIBUTARIES MAY QUICKLY BECOME SWOLLEN WITH SWIFTER CURRENTS AND OVERSPILL THEIR BANKS IN A FEW PLACES, ESPECIALLY IN USUALLY VULNERABLE SPOTS. SMALL STREAMS, CREEKS, CANALS, ARROYOS, AND DITCHES OVERFLOW.
- FLOOD WATERS CAN ENTER SOME STRUCTURES OR WEAKEN FOUNDATIONS. SEVERAL PLACES MAY EXPERIENCE EXPANDED AREAS OF RAPID INUNDATION AT UNDERPASSES, LOW-LYING SPOTS, AND POOR DRAINAGE AREAS. SOME STREETS AND PARKING LOTS TAKE ON MOVING WATER AS STORM DRAINS AND RETENTION PONDS OVERFLOW. DRIVING CONDITIONS BECOME HAZARDOUS. SOME ROAD AND BRIDGE CLOSURES.

### \* FLOODING RAIN:

POTENTIAL IMPACTS FROM THE FLOODING RAIN ARE STILL UNFOLDING ACROSS SOUTH FLORIDA. THESE IMPACTS INCLUDE:

- MODERATE RAINFALL FLOODING MAY PROMPT SEVERAL EVACUATIONS AND RESCUES.

### \* TORNADOES:...



# Tropical Cyclone Watch/Warning Product

## •GSD also implemented the TCV text formatter for NWS

WTUS82 KMFL 222132

• Computer-oriented encoding of local tropical storm Watch and Warning information including:

- Wind
- Flooding
- Storm Surge
- Tornado Risk

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* WIND
- LATEST LOCAL FORECAST: STRONG TROPICAL STORM FORCE WIND

* FLOODING RAIN
- LATEST LOCAL FORECAST: FLASH FLOOD WATCH IS IN EFFECT
- PEAK RAINFALL AMOUNTS: ADDITIONAL 6-10 INCHES, WITH LOCALLY HIGHER AMOUNTS

- CURRENT THREAT TO LIFE AND PROPERTY: MODERATE
- THE FLOODING RAIN THREAT HAS REMAINED NEARLY STEADY FROM THE PREVIOUS ASSESSMENT.
- EMERGENCY PLANS SHOULD INCLUDE A REASONABLE THREAT FOR MODERATE FLOODING WHERE PEAK RAINFALL TOTALS NOTABLY EXCEED AMOUNTS CONDUCIVE FOR FLASH FLOODING AND RAPID INUNDATION. RESCUES AND EMERGENCY EVACUATIONS ARE POSSIBLE.
- TO BE SAFE, REMAIN PREPARED FOR THE POTENTIAL OF SIGNIFICANT FLOODING RAIN IMPACTS.
- DANGEROUS FLOODING IS POSSIBLE. FAILURE TO TAKE ACTION MAY RESULT IN SERIOUS INJURY OR LOSS OF LIFE. IF FLASH FLOOD WATCHES AND WARNINGS ARE ISSUED, HEED RECOMMENDED ACTIONS. ALSO LISTEN FOR POSSIBLE RIVER FLOOD WARNINGS FOR LONGER-TERM IMPACTS ALONG RIVERS.

* STOR
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# Tropical Cyclone Storm Surge - Watches and Warnings

## GSD is assisting NWS in enhancing Storm Surge Watches and Warnings NHC

NHC is using P-Surge Storm Surge model and high-res topography and collaboration to produce inundation maps:

1. Forecasters adjust guidance and send to WFOs for refinement
2. NHC sends Watch/Warning grids to WFOs
3. WFOs refine grid and return modified grids
4. NHC mosaics WFO edits

GSD designed and implemented the tools used to support this collaborative process



WFO

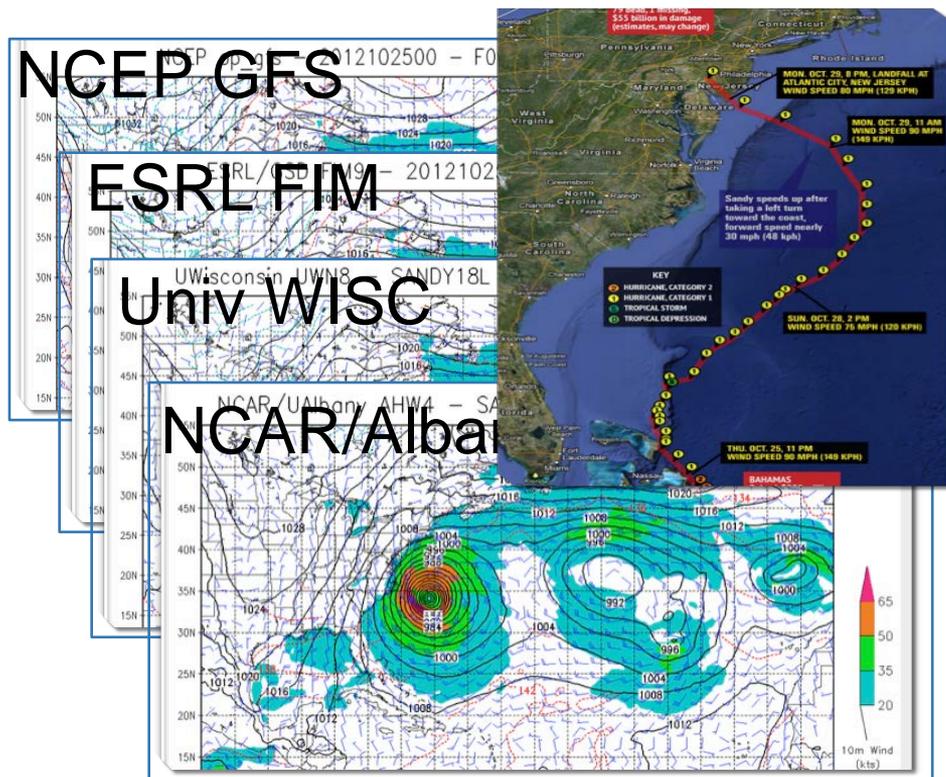


## Product Web Pages

- Compares Operational and Experimental Hurricane forecasts
- Used as an operational briefing tool at NHC, NWSHQ, and FEMA
- Operational forecasters exposed to research models

### Feedback has been positive:

“...website is great and most impressed with the fact that it works on their iPads and smartphones”



Visit the HFIP poster and see the HFIP Products real-time system

## GSD developers continue to provide NWS with techniques to:

- Save forecasters valuable time, reduce effort
- Allow more time for Impact-based Decision Support Services
- Complete the transition from Research to Operations

## Future Work includes...

- Enhancements to existing techniques
- Extending Hazard collaboration to Wind, Inland Flooding
- New methods for defining tropical cyclone wind fields