

# DEVELOPMENT OF MULTIPLE MOVING NESTS IN THE BASIN-SCALE HWRF SYSTEM: AN UPDATE

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# Acknowledgement

## NCEP/EMC TEAM

Vijay Tallapragada (Team Lead)

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and many others help me behind scene in  
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DTC: code support and management

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# Basin-scale Model Configurations

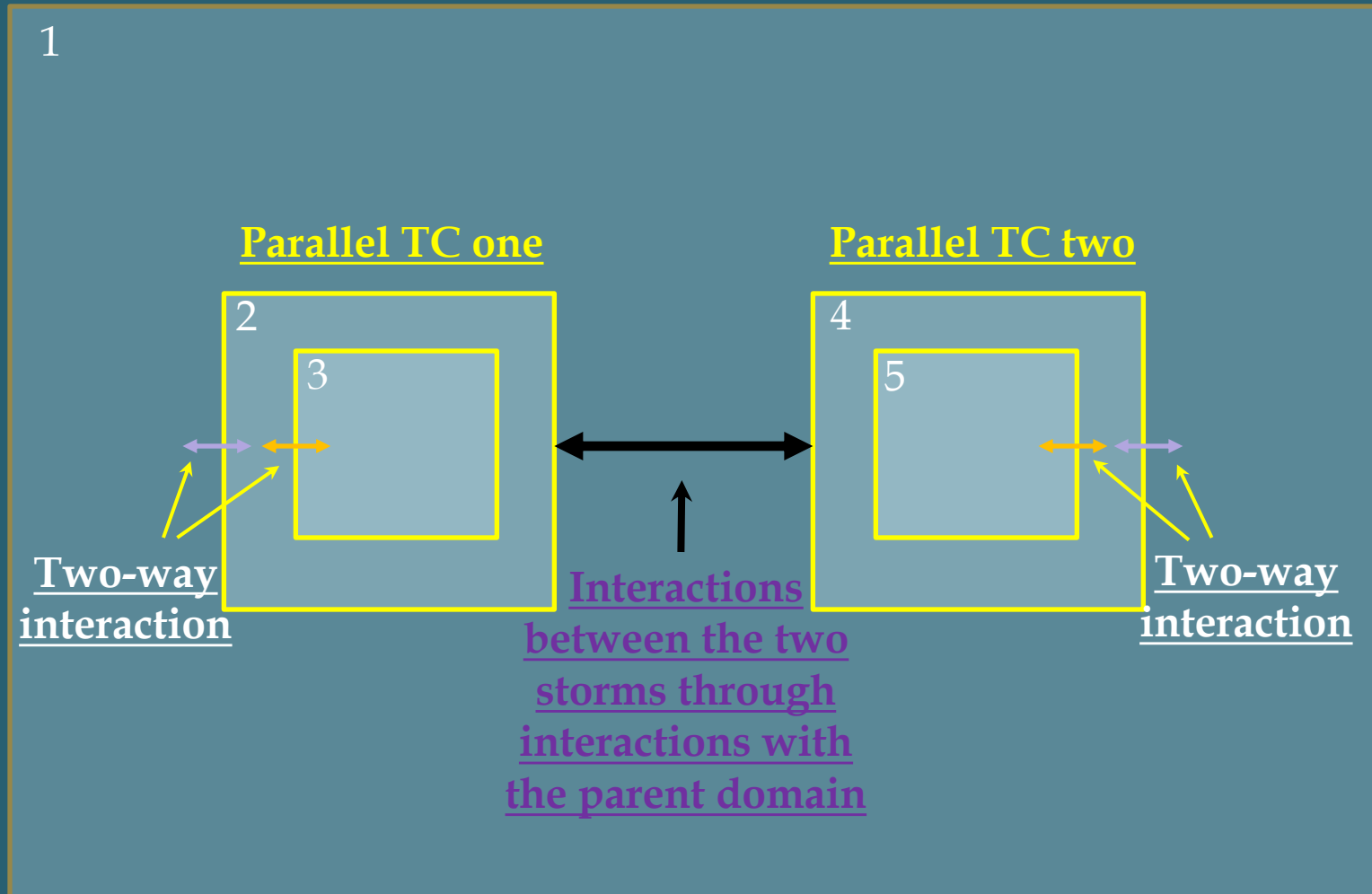
	2012 HWRF Operational	Basin-scale Model (Stream 2)
Domain	27 KM: 77.76° X 77.76° 9 KM: 10.56° X 10.2° 3 KM: 6.12° X 5.42°	27 KM: 178.20° X 77.58° 9 KM: 10.56° X 10.2° 3 KM: 6.12° X 5.42°
Vortex Initialization	Modified Vortex Initialization at 3 KM, with 30x30° analysis domain and GSI	27KM: GFS 9-3 KM: No, Downscaled
Cycling	Yes (3 km vortex only)	No
Ocean Coupling	27-9 KM: Yes 3 KM: No, Downscaled	27-9-3 KM: No
Physics schemes		
Microphysics	<u>Modified Ferrier (High-Res)</u>	<u>Modified Ferrier (High-Res)</u>
Radiation	GFDL	GFDL
Surface	GFDL (High_res)	GFDL (High_res)
PBL Scheme	<u>2012 GFS (High_res)</u>	<u>2012 GFS (High_res)</u>
Convection	<u>SAS (High-Res), No CP (3 KM), Shallow Convection</u>	<u>SAS (High-Res), No CP (3 KM), Shallow Convection</u>
Land Surface	GFDL Slab	GFDL Slab
GWD	Yes(27km); No(9-3km)	No(27km); No(9-3km)

# Basin-scale HWRF Configuration Test

	Number of Nest Domains	Wall Clock Time	PEs
27 km	No	50 mins	196
27-9-3 km	2 (1 storm)	137 mins	196
27-9-3 km	4 (2 storms)	256 mins	196
27-9-3 km	6 (3 storms)	363 mins	196
27-9-3 km	8 (4 storms)	430 mins	196

Note: Not optimized yet.

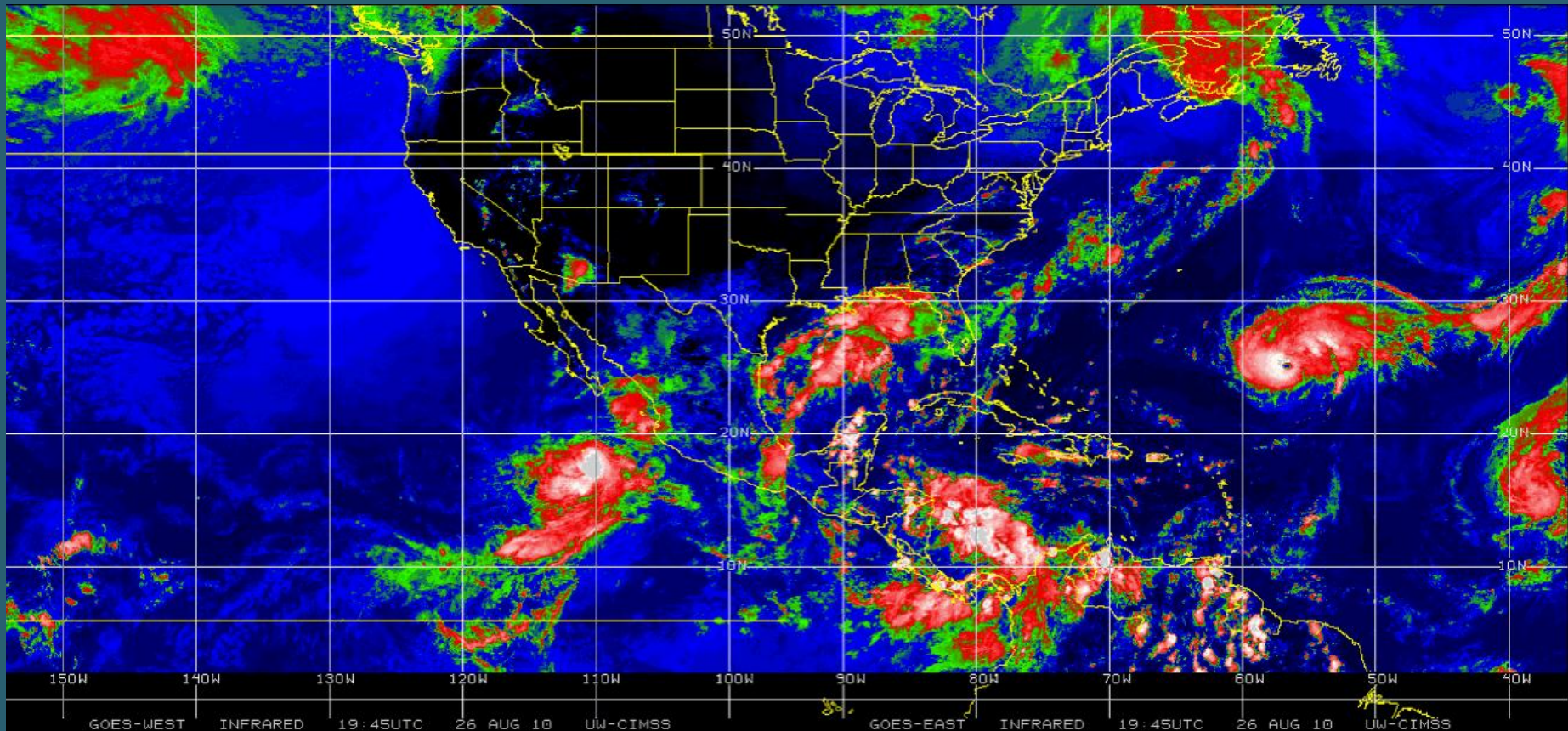
# The basin-scale HWRF system





# Satellite Images

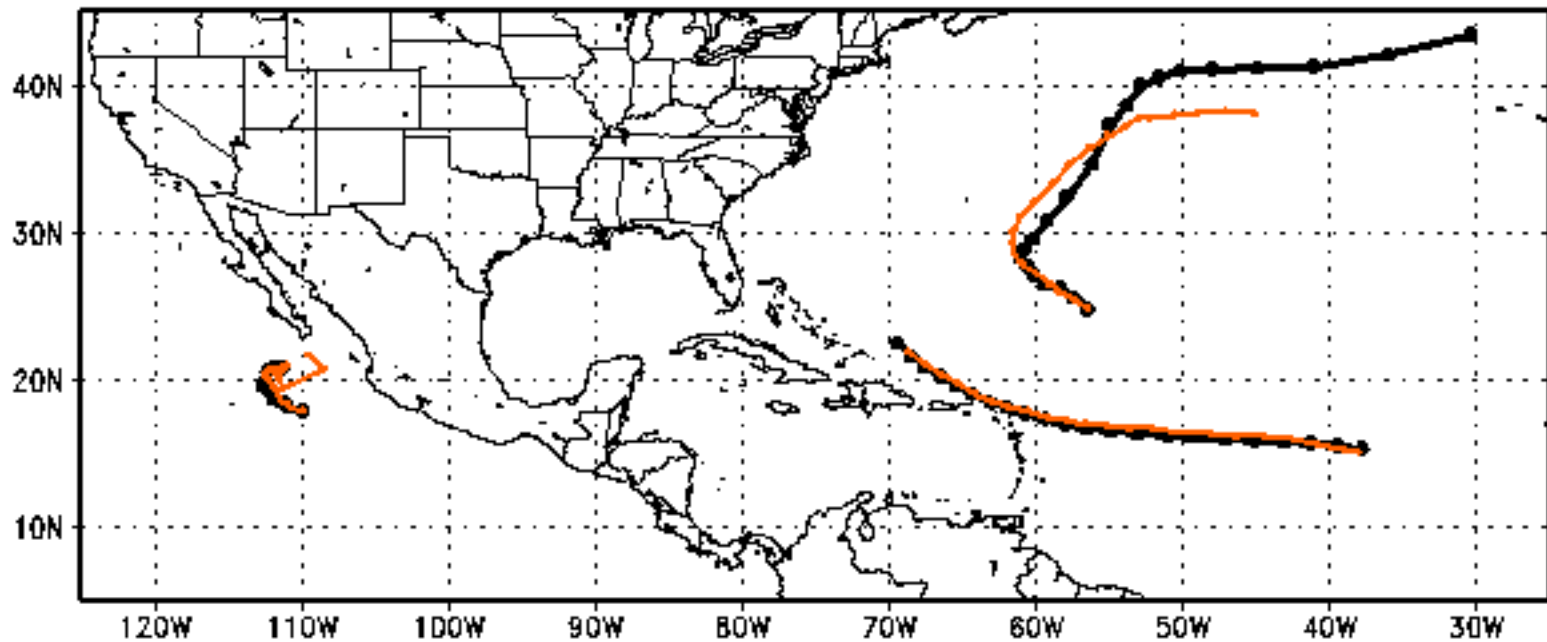
Danielle, Earl, Fiona (Atlantic Basin); Frank (East Pacific Basin)



Credit: CIMMS satellite images

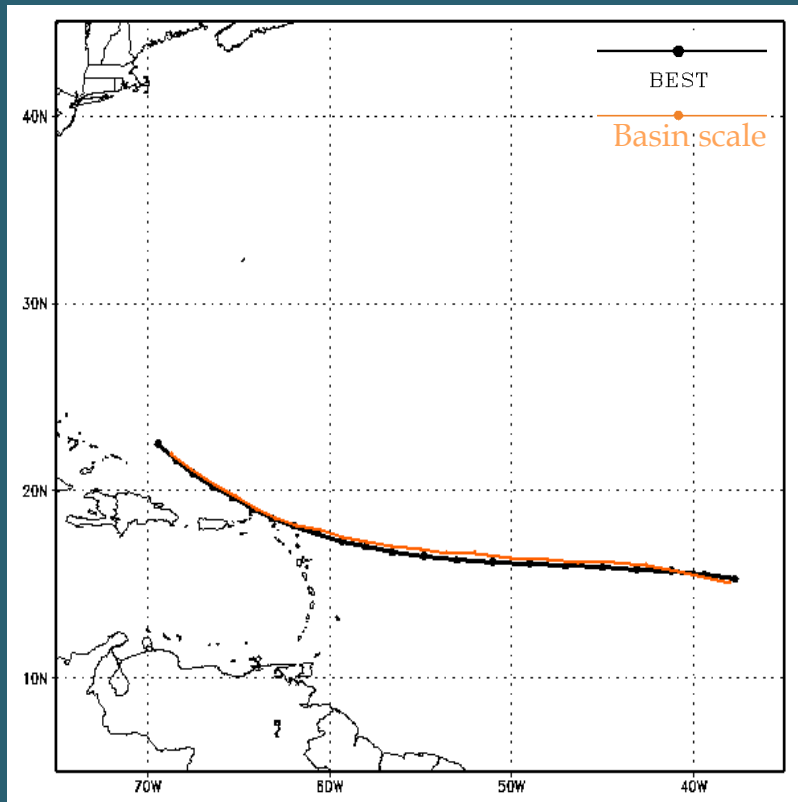
# Multiple Storm Tracks

Danielle, Earl (Atlantic Basin); Frank (East Pacific Basin)



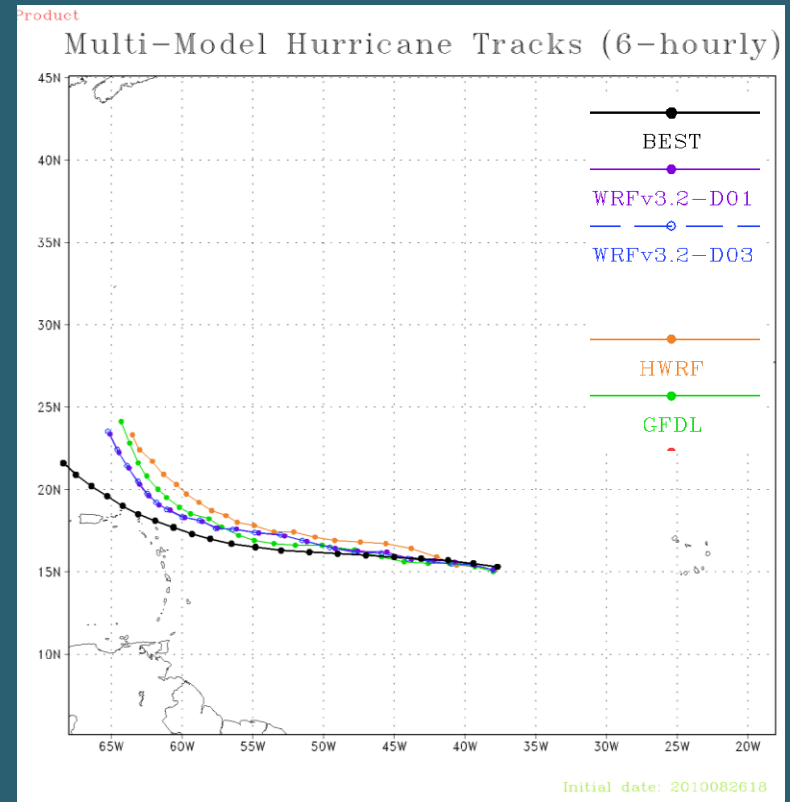
# Earl track comparison

Earl track init. Time: 2010082618Z



Basin scale forecast

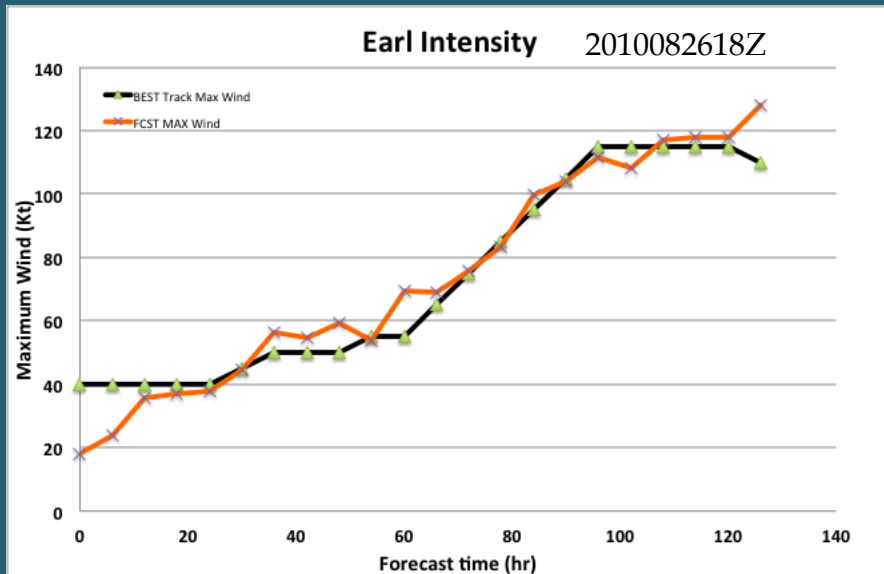
Earl track init. Time: 2010082618Z



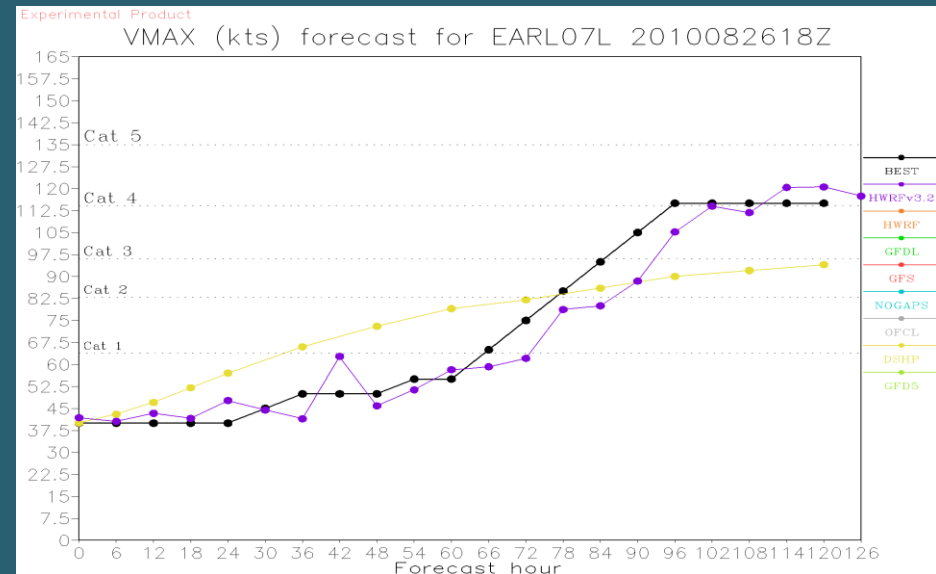
HWRF 2012 retrospective forecast



# Earl intensity comparison



Basin scale forecast



HWRP 2012 retrospective forecast

# Main Issues

- ▣ Merge with HWRF system
  - Initialization
  - Coupling
  - Post-processing
- ▣ Bug fix: swcorner\_dynamics.F90 program
- ▣ Need flexible reservation
- ▣ More than 5 storms?
- ▣ Parallel issue

# What next?

- ▣ Fix Bugs
  - Moving algorithm
  - Southwest corner issue
- ▣ Merge into HWRF system
- ▣ Add multiple nests support function in UPP
- ▣ Expand the framework (More than 4 storms)
- ▣ Optimize current configuration
- ▣ Run retrospective 2010 and 2011 when reservation is ready
- ▣ Explore storm based parallelization
- ▣ Add multiple nests initialization (debatable)

# Future Tropical Prediction System

- ▣ 7-day forecast
- ▣ Flexible multiple moving nests
- ▣ Independent DA system
- ▣ Cycling system