# DEVELOPMENT AND VALIDATION OF THE REGIONAL WAVE PREDICTION SYSTEM (RWPS)

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1ST INTERNATIONAL WORKSHOP ON WAVES, STORM SURGES AND COASTAL HAZARDS, Liverpool, UK, 2017





- **1.** Motivations for Implementing RWPS
- 2. RWPS High-Level System Architecture
- 3. Input and Products
- 4. Validation RWPS vs WW3-Global vs Measurements
- 5. Summary







none Motivation for implementing RWPS

#### **Current WW3 global grid mosaic Forced by GFS Winds**



Max. coastal resolution = 4 arc min (7.5 km)

## Resolution from 1.8 km to 200 m for Weather Forecast Office (WFO) domain

23°N 83.5°W 83°W 82.5°W 82°W 81.5°W 81°W 80.5°W 80°W 79.5°W





1.05

0.90

0.75

0.60

0.45

0.30

0.15

0.00

nonn Motivation for implementing RWPS

## Forecaster Winds (WFO-Winds)

A composite of WFO Winds for Southern Region (Not all with the same color scale)

Boundary Conditions from WWIII which is forced by GFS Winds



During a Hurricane situation WFOs must use official winds from the National Hurricane Center



#### nona Motivation for implementing RWPS



Official NHC winds vs GFS



GFS deviated ~180 deg from the Official forcast from NHC

1) Provide Boundary Conditions to WFO Domains During a storm event





**Motivation for implementing RWPS** 

NHC Wind Guidance from NHC Wind-Forecaster



#### **NHC Wave Guidance from GFS model**





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NHC



**NORR** Motivation for implementing RWPS









## **RWPS High-Level System Architecture**





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#### RWPS RTOFS-GLOBAL Surface Horizontal Current (knots) Hour 63 (21Z06SEP2017)











#### 1/0 – Output Tracked Wave Fields pi\_10m: Hs: it = 1, isys = 1

#### Vave Spectra Partition



NOAA

# Wave Spatial and temporal Tracking



NCEP



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#### RWPS Validation

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#### Hurricane Irma, Aug - Sept, 2017







#### RWPS Validation

#### Hurricane Irma, Aug – Sept, 2017











#### **RWPS Validation**

#### Hurricane Irma, Aug – Sept, 2017



From Henrique Alves





#### Scatter Plots RWPS, WW3-Global, Measurements Aug20-Sept07 2017



none Validation

Includes Hurricanes Harvey Irma, Jose and Katia





non Validation

#### catter Plots RWPS, WW3-Global, Measurements Aug20-Sept07 2017



Includes Hurricanes Harvey, Irma, Jose and Katia





#### catter Plots RWPS, WW3-Global, Measurements Aug20-Sept07 2017

RWPS on NH2

NCEP

none Validation



Includes Hurricanes Harvey, Irma, Jose and Katia



#### Scatter Plots RWPS, WW3-Global, Measurements Aug20-Sept07 2017



Includes Hurricanes Harvey, Irma, Jose and Katia



none Validation



## **Future Work**

- 1. Use of GFS winds in case of NHC winds are not available or not arriving on time.
- 2. Validation in more detail.
- 3. Validate RWPS output for Pacific Domain (NH1) using satellite measurements.
- 4. Use of RTOS global currents.
- 5. If RWPS becomes operational then OCP and CPHC domains will be added.







- 1. RWPS has been running steadily for several months forced by NHC-GFE Winds.
- 2. In its first hurricane season RWPS is showing promising results.
- 3. Needs more validation and approval to be implemented as an operational system on WCOSS (operational supercomputer of NWS-NCEP).





2'

END



NOAA



none Validation

#### Hurricane Harvey, Aug 23-29 2017





Validation

NOAA

#### Time Series RWPS, WW3-Global, Measurements @ Hurricane Harvey, 2017







Validation

**NOAA** 

#### Time Series RWPS, WW3-Global, Measurements @ Hurricane Harvey, 2017







## **Ship Routing**

Gulf Stream Ship Route- 3hr Forecast Miami to Freeport ۲

Hour 12 from (06Z230CT2014)



\*\*Experimental\*\*: The accuracy or reliability of these forecasts are not guaranteed nor warranted in any way. These forecasts should not be used as the sole resource for decision making. These graphics may not be available at all times.

http://innovation.srh.noaa.gov/nwps



