# NCEP Developments since 2nd CMS meeting

Hendrik Tolman & Arun Chawla (for Mike Farrar)

# FV3

- NCEP has selected GFDL's FV3 dycore to replace the GSM dycore for its global atmospheric model
- A GFS physics + FV3 dycore model was released to the public in May
- A DA enabled FV3 system is expected to begin cycling tests in the Fall
- Following other systems are also actively under development
  - FV3 based ensemble model
  - FV3 based sub seasonal to seasonal prediction system (more on this in the next session)
  - FV3 based regional models

# Sea Ice Modeling

- NCEP working with the sea ice consortium to develop a common sea ice thermodynamic model (ICEPAK) to serve the needs of the community
- NCEP interested in ice skill at the weather to seasonal range
- A coupled ocean + ice model (HYCOM+CICE) will go into operations in Fall
  - NCEP will set up a monitoring website with skill metrics
- Separately NCEP is developing a simpler KISS model (See Robert Grumbine's presentation)
- Validation of the HYCOM + KISS and HYCOM + CICE systems (using the NUOPC framework) will be carried out at the weather to sub seasonal time scales as NCEP's contribution to YOPP
- A sea ice DA system (using LETKF) is also under development

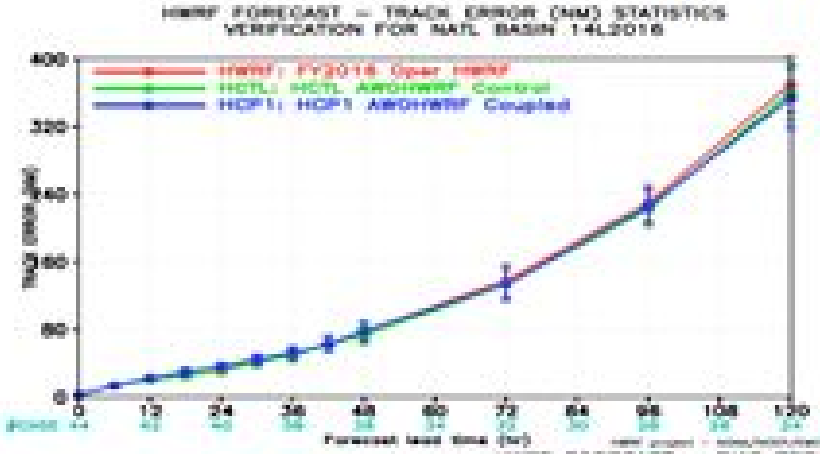
# Ocean models

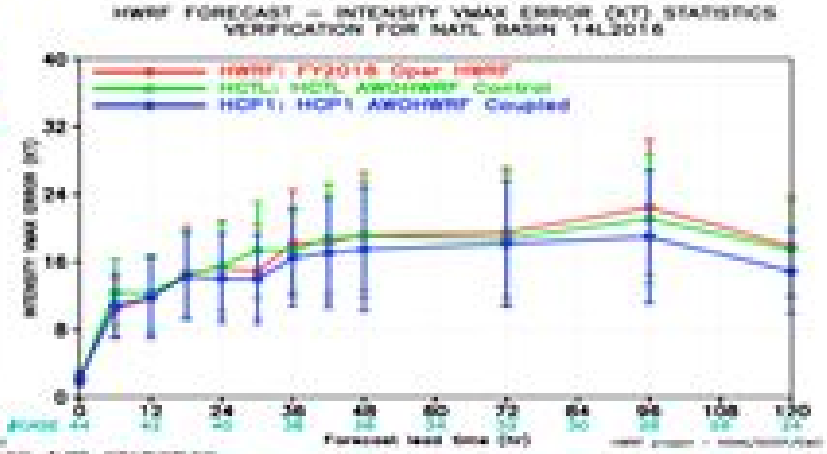
- NCEP is moving all operational ocean modeling to ALE models
  - Global weather scales already using HYCOM
  - Regional coupled hurricane systems use a mix of HYCOM and POM (will transition to HYCOM)
  - Seasonal scale models moving from MOM4 to MOM6
- NCEP working with NASA, GFDL, NCAR and NRL to develop common frameworks for ALE models
  - Exploring merger of HYCOM and MOM6 to have a common model from weather to decadal scales
  - Developing common tools that can be used across different ALE models
- NCEP working with NRL to transition NCODA into operations at NWS
- Working with the community DA system (JEDI) to serve the needs of atmosphere, ocean, ice and wave DA

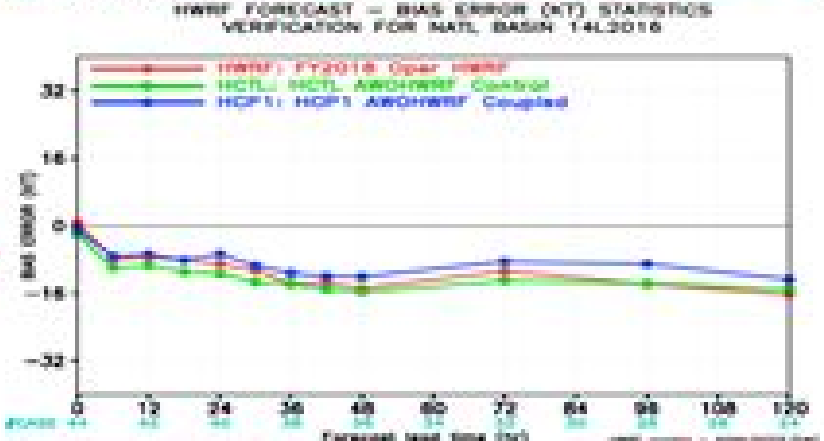
# Coupled modeling at NCEP

- NCEP is exploring coupled modeling at multiple scales
  - Weather -- Wave and Atmosphere coupling
  - Weather -- Ocean and ice coupling
  - Hurricane -- Wave, atmosphere and ocean coupling
  - Sub seasonal -- Wave, atmosphere, ocean and ice coupling
  - Seasonal -- Wave, atmosphere, ocean, ice and aerosol coupling
  - At this moment land coupling is assumed as part of the atmosphere model
- All coupling is using the NEMS framework
  - Exception is hurricane coupling which requires moving grid coupling
- NCEP collaborating with NRL, GFDL, URI and NOS on the different coupled modeling projects

# AWO coupling for Matthew



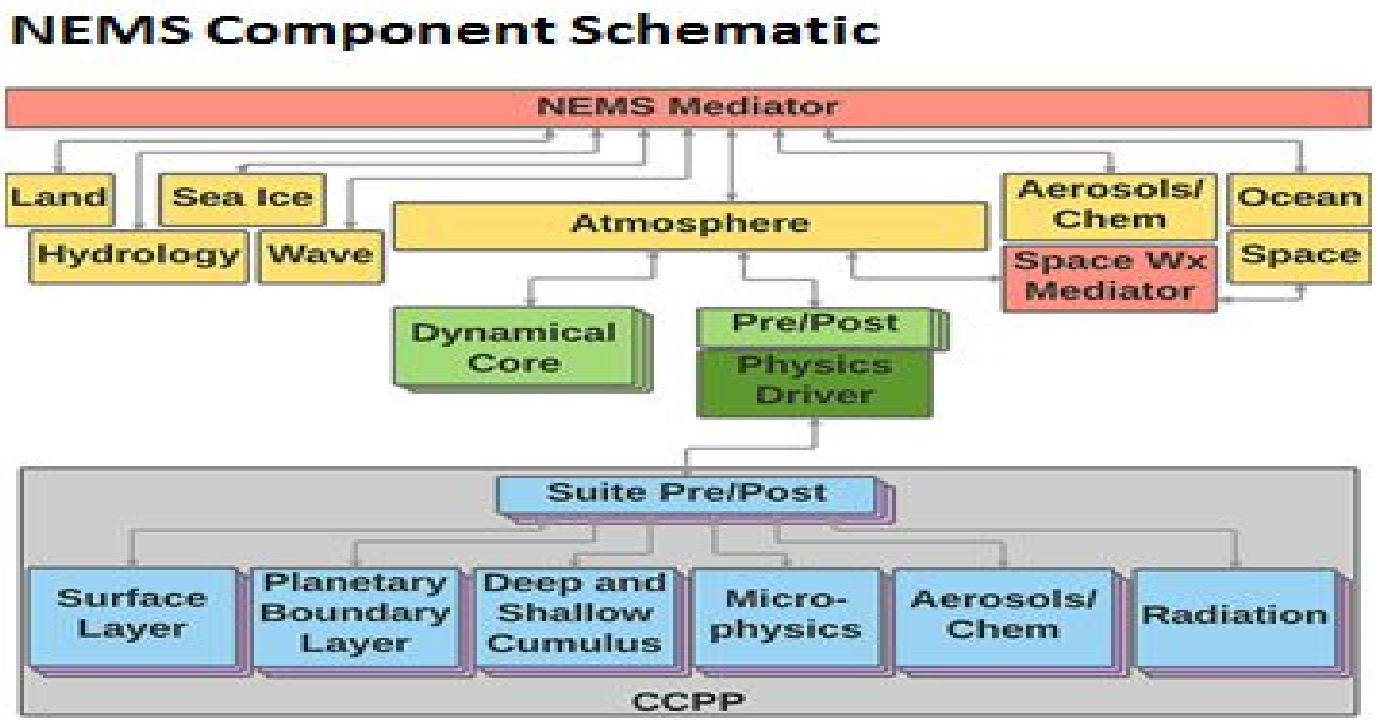



Operational HWRF

Control

Coupled

# Infrastructure




*Courtesy of the Developmental Testbed Center*

# NEMS Status

- A functioning mediator
- NUOPC caps for the following models is ready and has been tested with the mediator
  - GSM, MOM5, FV3, MOM6, HYCOM, WW3, CICE5, NMMB
- Additional work on select caps for coupled physics is currently underway
- NUOPC cap development work for the following modeling systems is under way
  - GOKART, LIS, SIS2, ADCIRC
- Prototype coupled systems in the NEMS environment for weather and seasonal scales have been developed and tested