Next Generation Global Prediction System (NGGPS)

Annual Meeting

July 14-15 2015

Welcome

Fred Toepfer, NGGPS Project Manager
NGGPS Meeting Agenda

• Welcome
• EMC Welcome
• NGGPS Status
• Team Plan Presentations
• Team Breakout/Cross Team Discussions
NWS R2O Initiative Overview

Multi-year effort to:

- Design Develop and Implement a Next-Generation Global Prediction System (NGGPS) for the NWS
- Position NWS for the next-generation High Performance Computing
- Continue Improvements in hurricane warning prediction (in conjunction with HFIP)
NGGPS Over-Arching Objectives

• Re-establish US as the World leader in Global Weather Prediction
  – Extend forecast skill beyond 8 to 10 days
  – Improve hurricane track and intensity forecast

• Extend Weather Forecast to 30 days
  – Implement a fully-coupled NWP System Atmosphere, Ocean, Sea Ice, Land Surface, Waves, Aerosols and Atmospheric Composition
  – Support development of products for weeks 3 and 4

• Support unification of the NWS Numerical Weather Prediction Suite

• 5-year Community Effort
Over-Arching NGGPS Strategy

• Implement Multi-year NWS-led community effort to build and implement
  – Future global prediction system supporting multiple forecast applications at NCEP
  – Community codes

• Accelerate Forecast Performance Improvement through accelerated Research to Operations
  – Implement a Global Modeling Test Bed
  – Community Codes supporting both R&D and operations

• Overall system designed (re-architected) to take advantage of evolving HPC architectures (CPU/GPU Hybrid or Massively Integrated Cores (MIC))
  – Highly scalable
  – Adapt to continued evolution of HPC
NGGPS Development Strategy

• Establish Planning and Implementation Teams
  – Community participation through external grants to universities, support to test beds, and broad laboratory participation
  – Establish software engineering and infrastructure support at EMC
• Select a future atmospheric dynamic core from existing research and operational models
• Define Community Code Baseline (where doesn’t already exist) for NGGPS components, including NEMS
• Begin conversion of GFS Physics package into the Common Community Physics Package
• Establish Global Modeling Test Bed
• Extend NEMS infrastructure to include sea ice, ocean, wave, land surface, and aerosol and atmospheric composition model components
• Demonstration of a fully coupled system
NGGPS Description

- Fully coupled (ocean, waves, sea ice, land surface, atmosphere, aerosols) system
- Built using NEMS/Earth System Modeling Framework
- Each component model will be community code
Atmospheric Dynamic Core Development Schedule

- Test Computational Efficiency
  - Report Results (6/30/2015)
- Test Meteorological Performance
- Select NGGPS Dynamic Core (4/1/2016)
- Development and Pre-implementation Testing
- Parallel Testing
- Operationally Implement Dynamic Core (4/1/2019)

Dynamic Core Testing (18 months)
NGGPS
Operational Application

Whole Atmosphere Model

NGGPS
Unified Global Coupled Model

“GFS”
Short term weather

“GEFS”
Week 2 through 4-6

“CFS”
Seasonal & annual

Application
= Ensemble + Reanalysis + Reforecast

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From Hendrik Tolman
Meeting Objectives

- Review and Update 5-year Development Plans for NGGPS Components Codes
- Prioritize near term activities
- Initiate development of Annual Operating Plan for FY16
  - Objectives
  - Activities
Summary

• Moving forward on NGGPS Implementation Plan revision, re-alignment of team plans, and identification of priorities
• Coordinating proposal driven scientific development by universities, federal labs, and testbeds (integrated in team plans)
  – Focus on accelerated development of model components
• Dynamic core testing underway with final decision anticipated spring 2016
• Physics development plan – developing GFS physics package/driver for both Phase 2 testing and community code
Questions?

NGGPS Website:
http://www.nws.noaa.gov/ost/nggps