



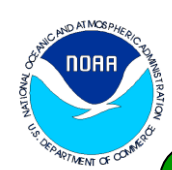
# EMC FY14 Upgrade Review

**N  
C  
E  
P**

## NAEFS Upgrade

Presented by:  
Bo Cui and Yan Luo  
Nov. 12 2013

(Implementation delayed due to WCOSS transition)



# NAEFS Upgrade

## Project Status as of 11/12/13



### **G** Project Information and Highlights

**Lead:** Yuejian Zhu, EMC, Chris Magee, NCO

**Scope:**

- Based on NAEFS/GEFS 1\*1 degree products
  - Using RTMA as proxy of truth, downscaled to CONUS 5km & Alasks 6km (matched NDFG grids), Adding new variables (Tmax, Tmin, Wdir, Wspd, Td and RH) for CONUS and variables (Td and RH) for Alaska. Products include 10%, 50%, 90%, mean, mode and spread
  - Using CCPA as proxy of truth, calibrate 1\*1 degree precipitation forecast, and downscaled to 5km.
  - Using CFSRR climatology to replace NCEP/NCAR 40-y reanalysis for NAEFS anomaly forecast.
- GRIB II (encoding/decoding directly) for:
  - All new products
  - All exist NAEFS related products (conversion)

**Expected Benefits:**

- Reduce the bias significantly for most variables
- Increase probabilistic forecast skills
- WPC (Dave Novak) is supporting and participating fully retrospective evaluations

### **G** Scheduling

Milestone (NCEP)	Date	Status
EMC testing complete/ EMC CCB approval	10/01/2013	
Initial Code Delivery to NCO	<b>12/2013</b>	
Technical Information Notice Issued	12/4/2013	
Initial Test Complete		
CCB approve parallel data feed		
IT testing begins	Jan. 2014	
IT testing ends	Jan. 2014	
Parallel testing begun in NCO (Code Frozen)	Mid-Jan 2014	
Real-Time Evaluation Ends	Feb. 2014	
Management Briefing		
Implementation	Feb. 2014	

### **G** Issues/Risks

**Issues:** N/A

**Risks:**

**Mitigation:**

### **G** Finances

**Associated Costs:**

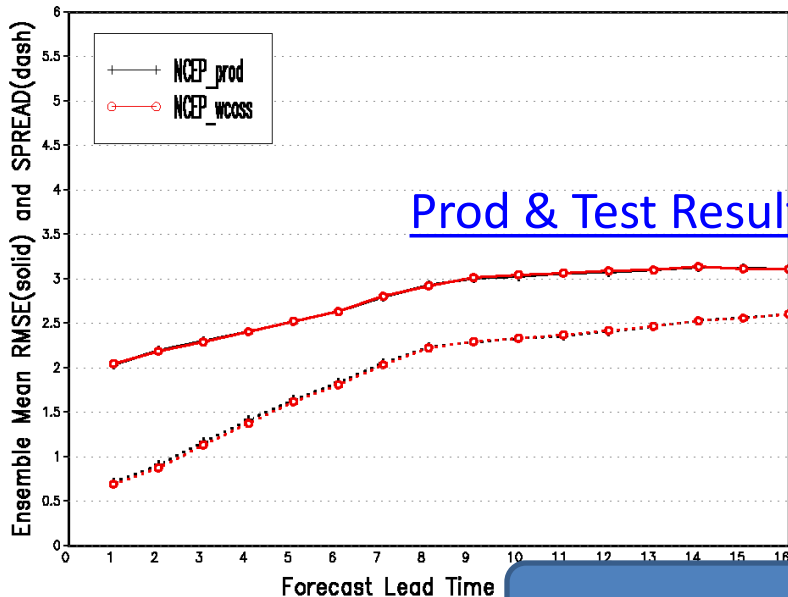
**Funding Sources:** EMC Base: T2O 24 Man-months NCO Base: 2 man-months for implementation, 1 man-month annually for maintenance

<b>R</b>	Management Attention Required	<b>Y</b>	Potential Management Attention Needed	<b>G</b>	On Target
----------	-------------------------------	----------	---------------------------------------	----------	-----------

# Summary of changes

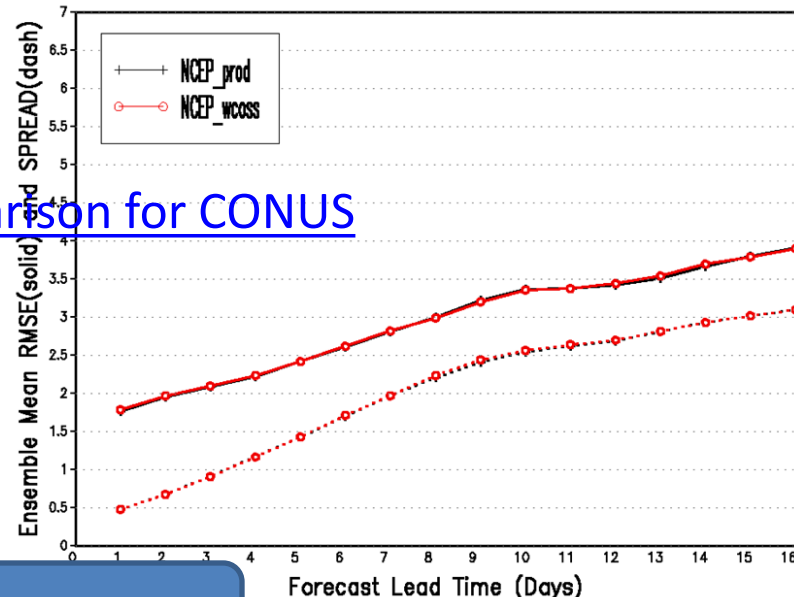
- 1) GRIB II conversion for all exist NAEFS products
- 2) New NAEFS products
  - Bias correction of Td2m and RH2m at 1\*1 degree
  - Downscaled products for **CONUS**(5km)
    - Tmax, Tmin, Wdir, Wspd, Td2m and RH2m
  - Downscaled products for **Alaska**(6km)
    - Td2m and RH2m
  - Calibrated **CONUS** precipitation
- 3) Change of climatology for reference
  - CFSR replaces NCEP/NCAR reanalysis

NAEFS NDGD Probabilistic 10m U Component  
Forecast Verification For 2013082000 - 2013092600



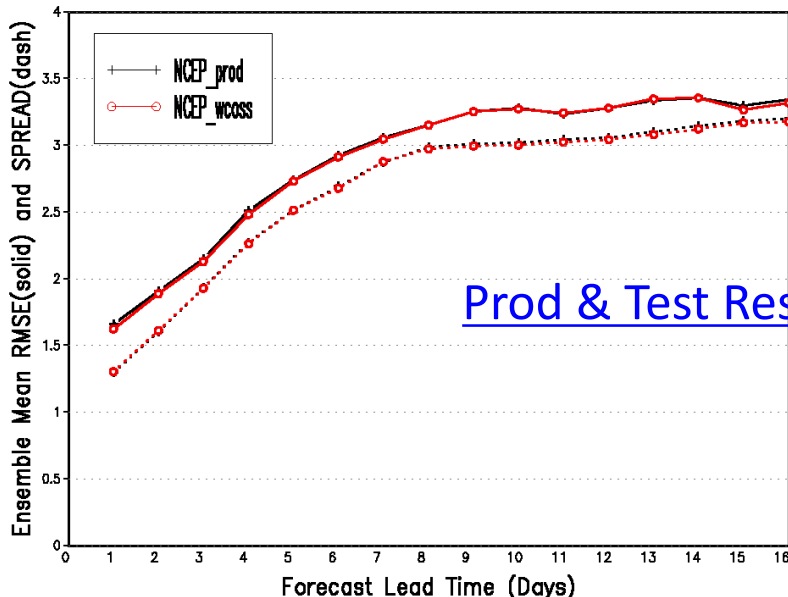
Prod & Test Results Comparison for CONUS

NAEFS NDGD Probabilistic 2m Temperature  
Forecast Verification For 2013082000 - 2013092600



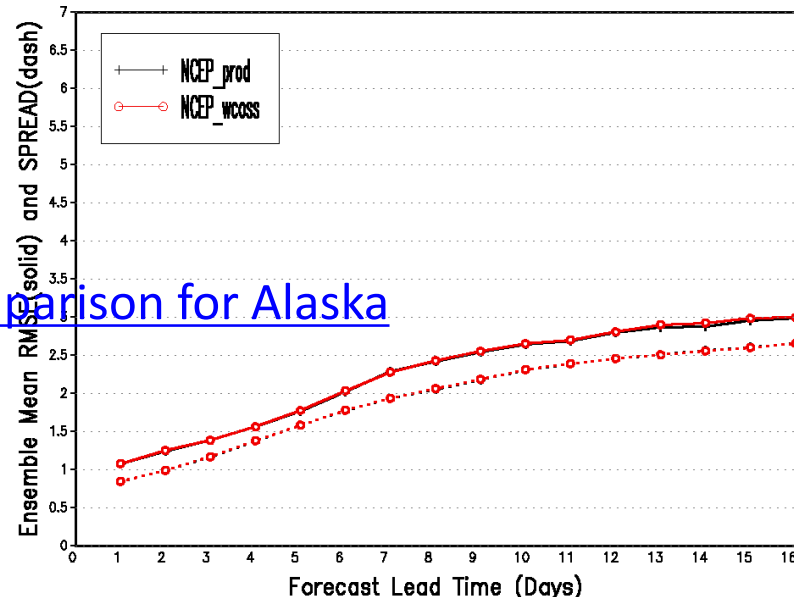
Overview of Grib Conversion

NAEFS NDGD Probabilistic Wind Speed  
Forecast Verification For 2013082000 - 2013092600

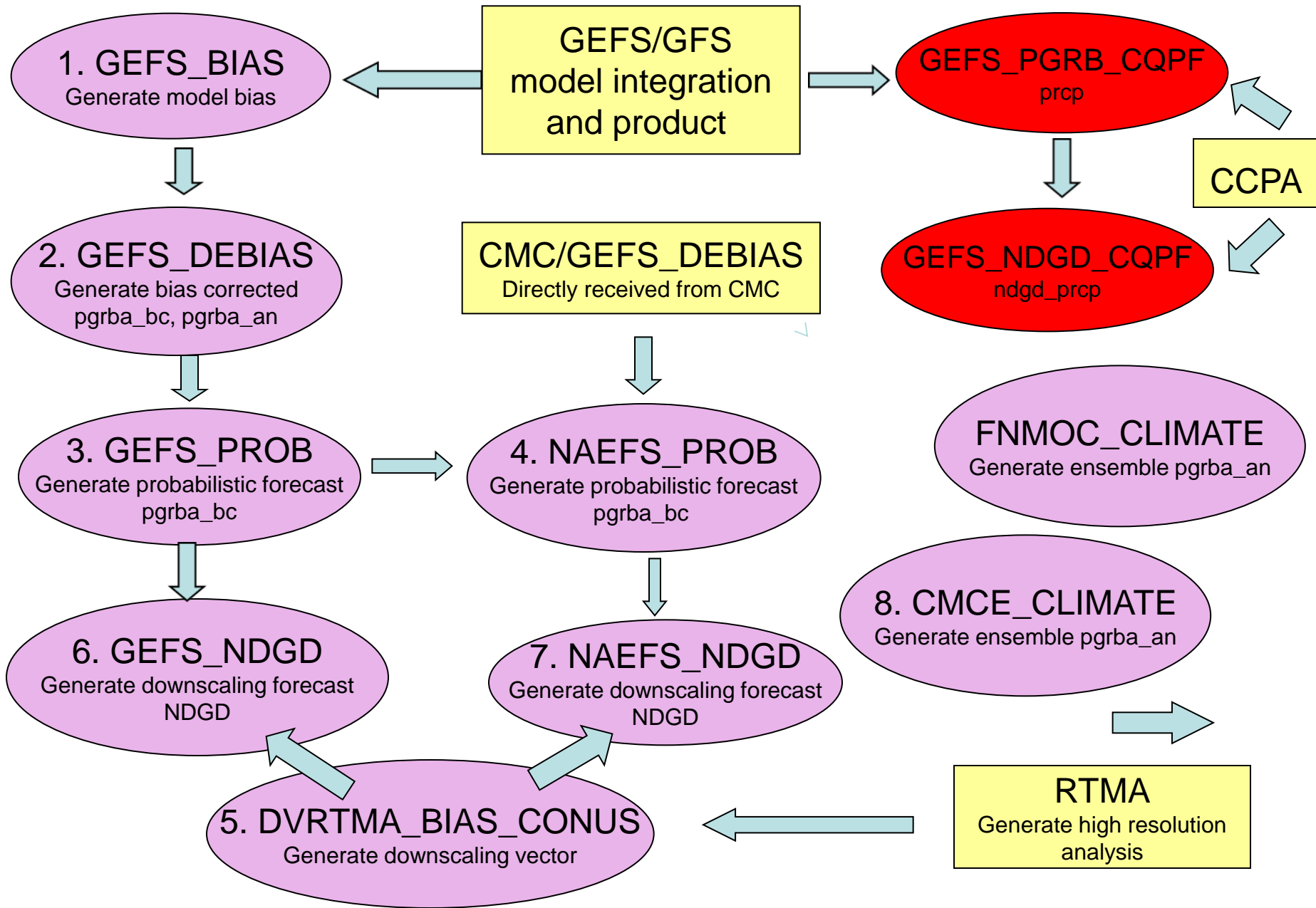


Prod & Test Results Comparison for Alaska

NAEFS NDGD Probabilistic 2m Temperature  
Forecast Verification For 2013082000 - 2013092600



# NAEFS FLOW CHART



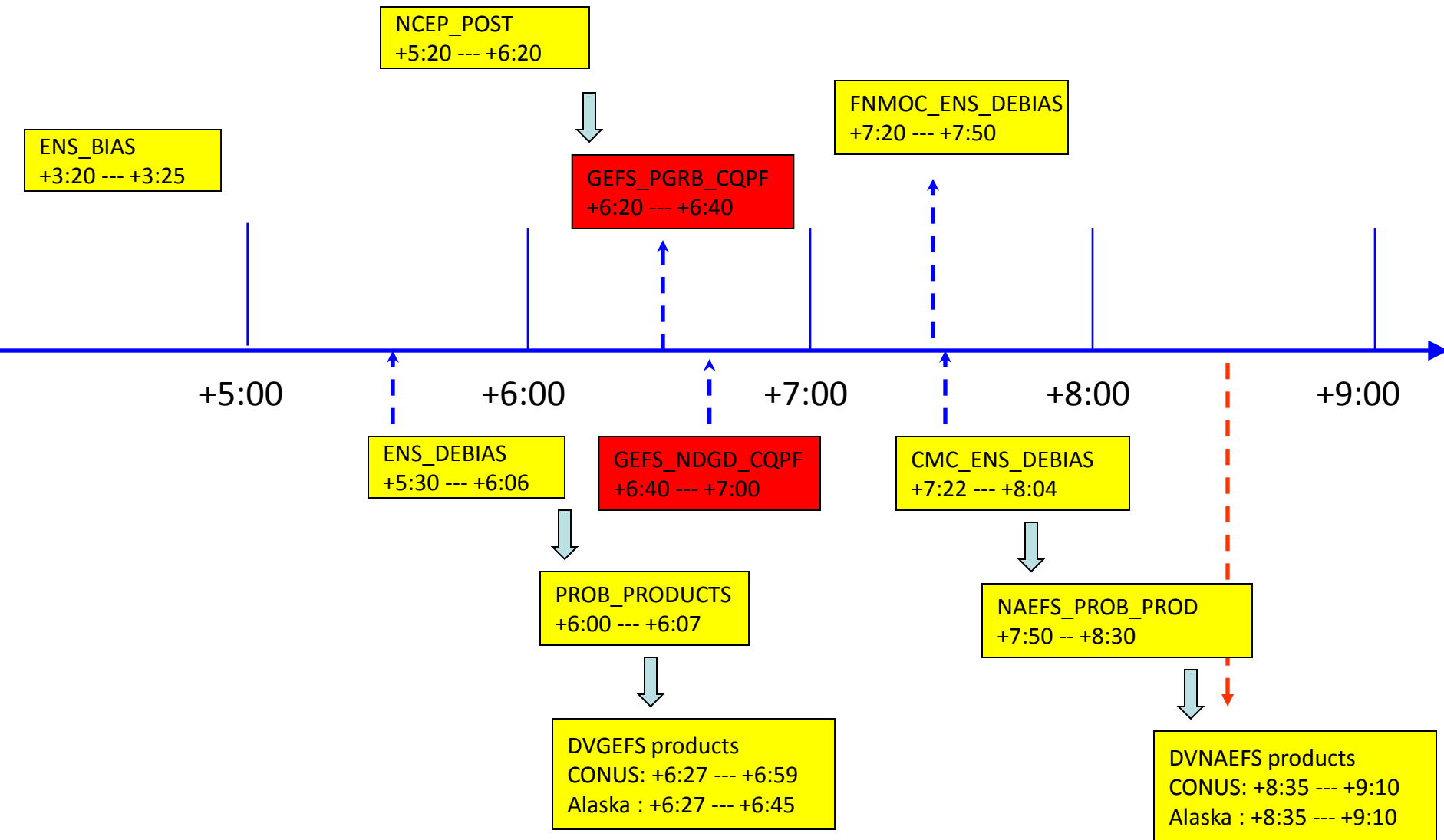
# GEFS/NAEFS 6-hr window flow chart



Current  
& Future



Future



# What have we tested?

- Test periods for CONUS and Alaska
  - Spring: Mar. 1 20 1 2011 – Apr. 25, 2011 (done)
  - Winter: Feb. 20, 2012 – Mar. 30, 2012 (done)
  - Summer: Aug. 20 2013 – Sep. 26 2013 (done)
- Test periods for precipitation calibration
  - 2009: Mar. 1, 2009 – Feb. 28, 2010 (done)
  - 2012: Mar. 1, 2012 – Feb. 28, 2013 (done)
  - 2013: Mar. 1, 2013 – Oct. 31 2013 (done)
- Communicating with service centers
  - WPC (Dave Novak) is supporting and participating fully retrospective evaluations

# Implementation Check List

- NAEFS-Q2-2014: RFCs
  - GEFS\_BIAS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - GEFS\_DEBIAS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - FNMOC\_BIAS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - FNMOC\_DEBIAS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - JGEFS\_PROB\_AVGSPR\_G2 (1 RFC)
    - Scripts
    - Source codes
  - JNAEFS\_PROB\_AVGSPR\_G2(1 RFC)
    - Scripts
    - Source codes
  - JDVRTMA\_BIAS\_CONUS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - JDVGEFS\_RTMA\_PROB\_AVGSPR\_CONUS\_G2 (1 RFC)
    - Scripts
    - Source codes
  - JDVNAEFS\_RTMA\_PROB\_AVGSPR\_CONUS\_G2 (1 RFC)
    - Scripts
    - Source codes



# Implementation Check List (continued)

- **NAEFS-Q2-2014: RFCs**
  - JDVGEFS\_RTMA\_PROB\_AVGSPR\_ALASKA\_G2
    - Scripts
    - Source codes
  - JDVNAEFS\_RTMA\_PROB\_AVGSPR\_ALASKA\_G2
    - Scripts
    - Source codes
  - JGEFS\_PGRB\_CQPF (1 RFC)
    - Scripts
    - Source codes
  - JGEFS\_NDGD\_CQPF (1 RFC)
    - Scripts
    - Source codes
  - JGEFS\_PGRB\_ENSPQPF (1 RFC)
    - Scripts
    - Source codes

Note: Subversion and Vertical Structure are ready

# Downstream Dependencies

- Downstream
  - JNAEFS\_PROB\_AVGSPR\_GEMPAK
  - JGEFS\_PROB\_AVGSPR\_GEMPAK
  - JDVGEFS\_RTMA\_PROB\_AVGSPR\_ALASKA\_GEMPAK
  - JDVNAEFS\_PROB\_AVGSPR\_GEMPAK
  - JDVNAEFS\_RTMA\_PROB\_AVGSPR\_ALASKA\_GEMPAK

# Technical Implementation Notice

- Products will be removed
  - No
- Products will be changed/modified
  - Not intend, but there is a possibility to mis-match GRIB II messages from current exist products (converted from GRIB I) to fully encoded GRIB II.
- New products
  - Yes
- Test data samples for users
  - [ftp://ftp.emc.ncep.noaa.gov/gc\\_wmb/bcui/NAEFS\\_Upgrade/](ftp://ftp.emc.ncep.noaa.gov/gc_wmb/bcui/NAEFS_Upgrade/)

# CCS resources (estimated)

Current	Future	Files
18.4	18.6	NCEP GEFS pgrb2a_bc
3.6	3.7	NAEFS pgrb2a_bc
6.8	10	NAEFS ndgd_gb2
0	0.8	NCEP GEFS prcp_gb2
0	0.9	NCEP GEFS ndgd_prcp_gb2
0.4	2.0	NCEP GEFS prcp
0	9	NCEP GEFS ndgd_prcp

Note: Disk Space (GB/day)

# CCS resources (tested)

## Computation (Current)

Jobs	Nodes	Tasks	Minutes
GEFS DEBIAS	1	6	33
GEFS Prob	1	2	22
NAEFS Prob	1	8	37
GEFS CONUS	1	10	33
NAEFS CONUS	1	10	37
GEFS Alaska	1	10	20
NAEFS Alaska	1	10	35

## Computation (Future)

Jobs10	Nodes	Tasks	Minutes
GEFS DEBIAS	1	6	33
GEFS Prob	1	2	22
NAEFS Prob	1	8	37
GEFS CONUS	4	64	33(?)
NAEFS CONUS	4	64	37(?)
GEFS Alaska	4	64	20(?)
NAEFS Alaska	4	64	35(?)
GEFS PGRB CQPF	1	1	8
GEFS NDGD CQPF	1	8	15

# Evaluations

- All NCEP service centers
- WFOs
- OHD and MDL
- Private sector – first energy

# Plan Schedule

- Project kick off – November 12, 2013
- Start to set up EMC ECflow based parallel – November 2013
- EMC CCB meeting – December 6, 2013
- Submit/discuss TIN – December 6, 2013
- Submit RFCs – December, 2013
- Expect NCO parallel – in Mid-January 2014  
– Service centers evaluation
- Expect implementation – Q2FY14 ( Feb. 2014)