Future plans for NAEFS data exchange – frequency, resolution, and additional parameters

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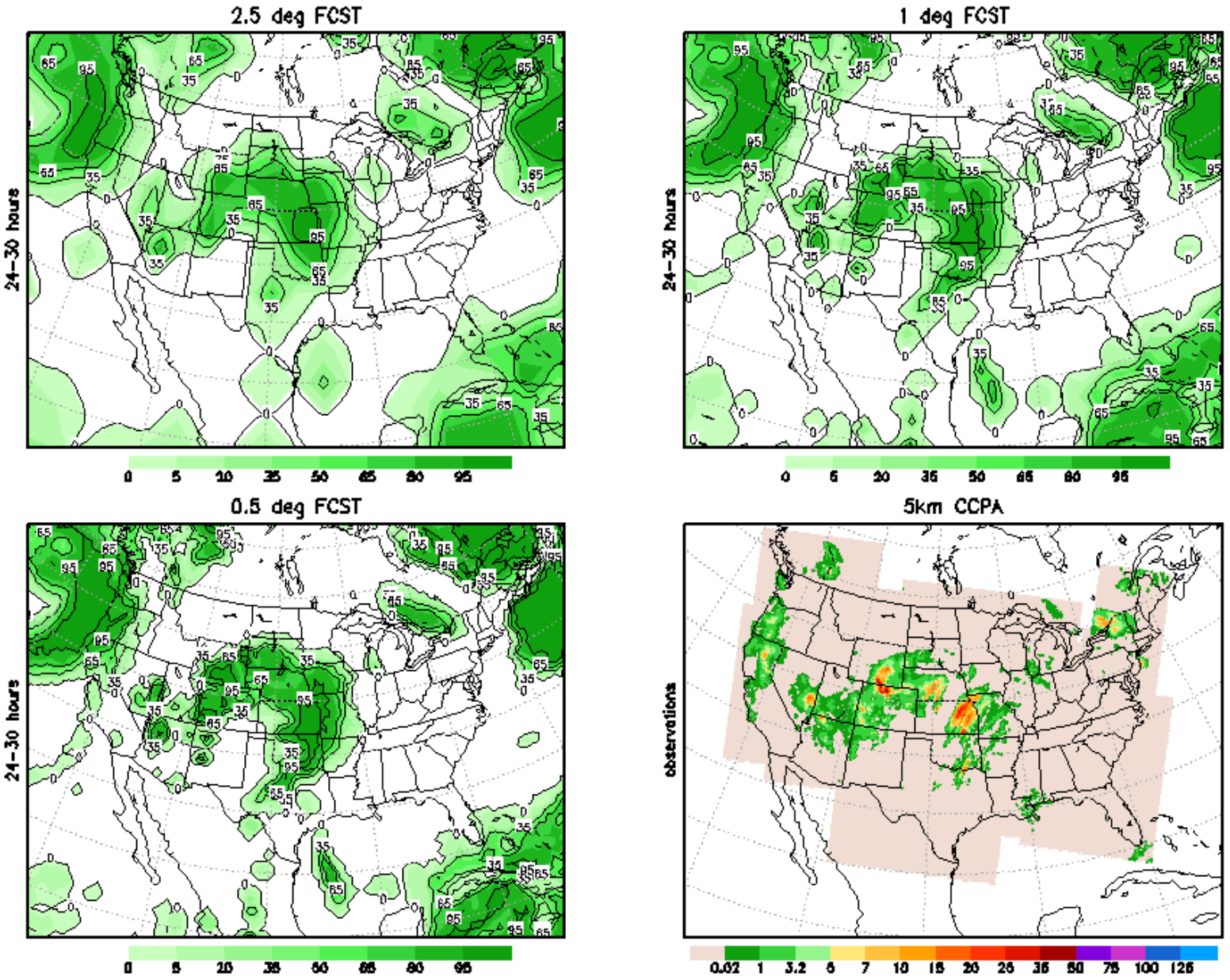
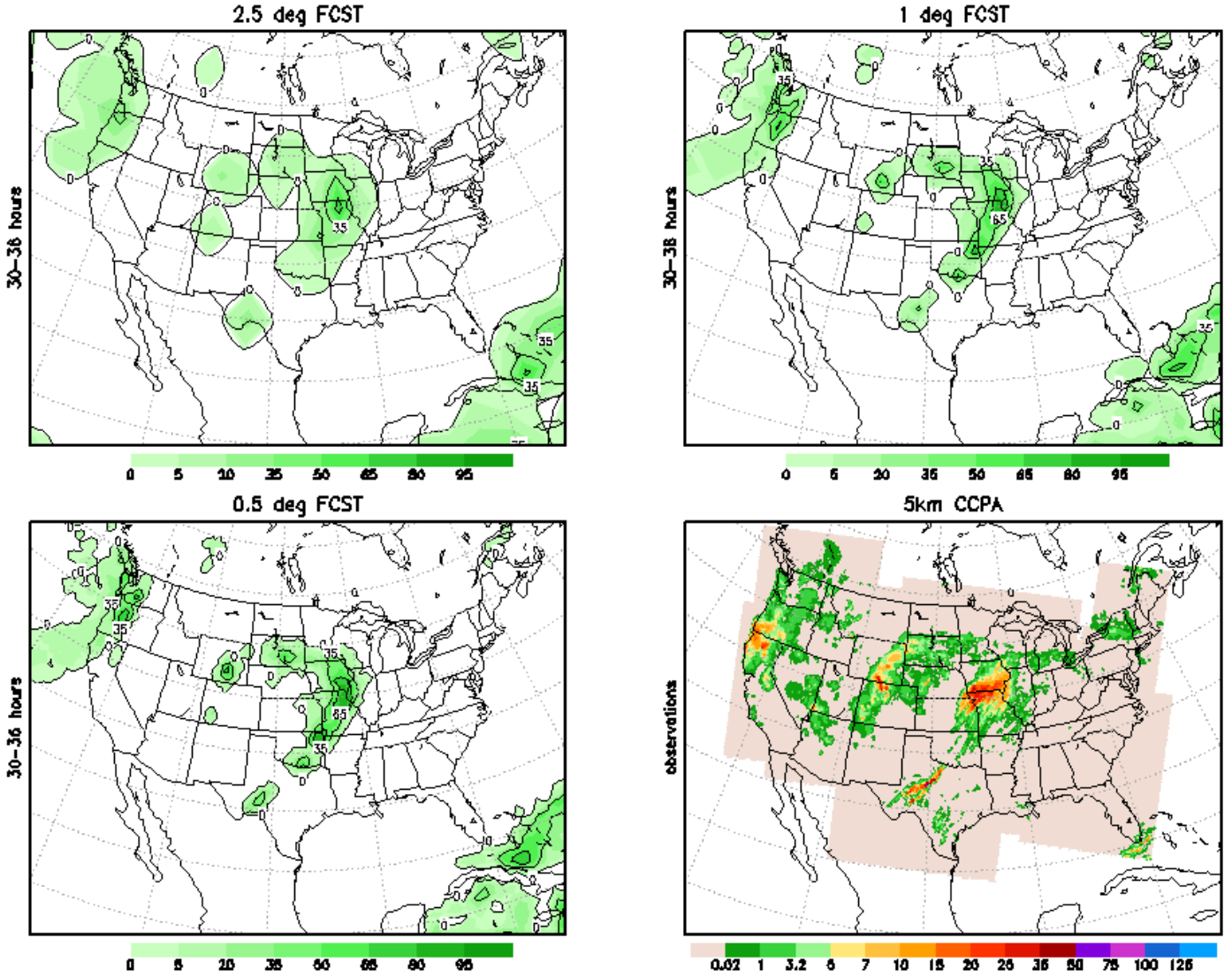
Half-degree output

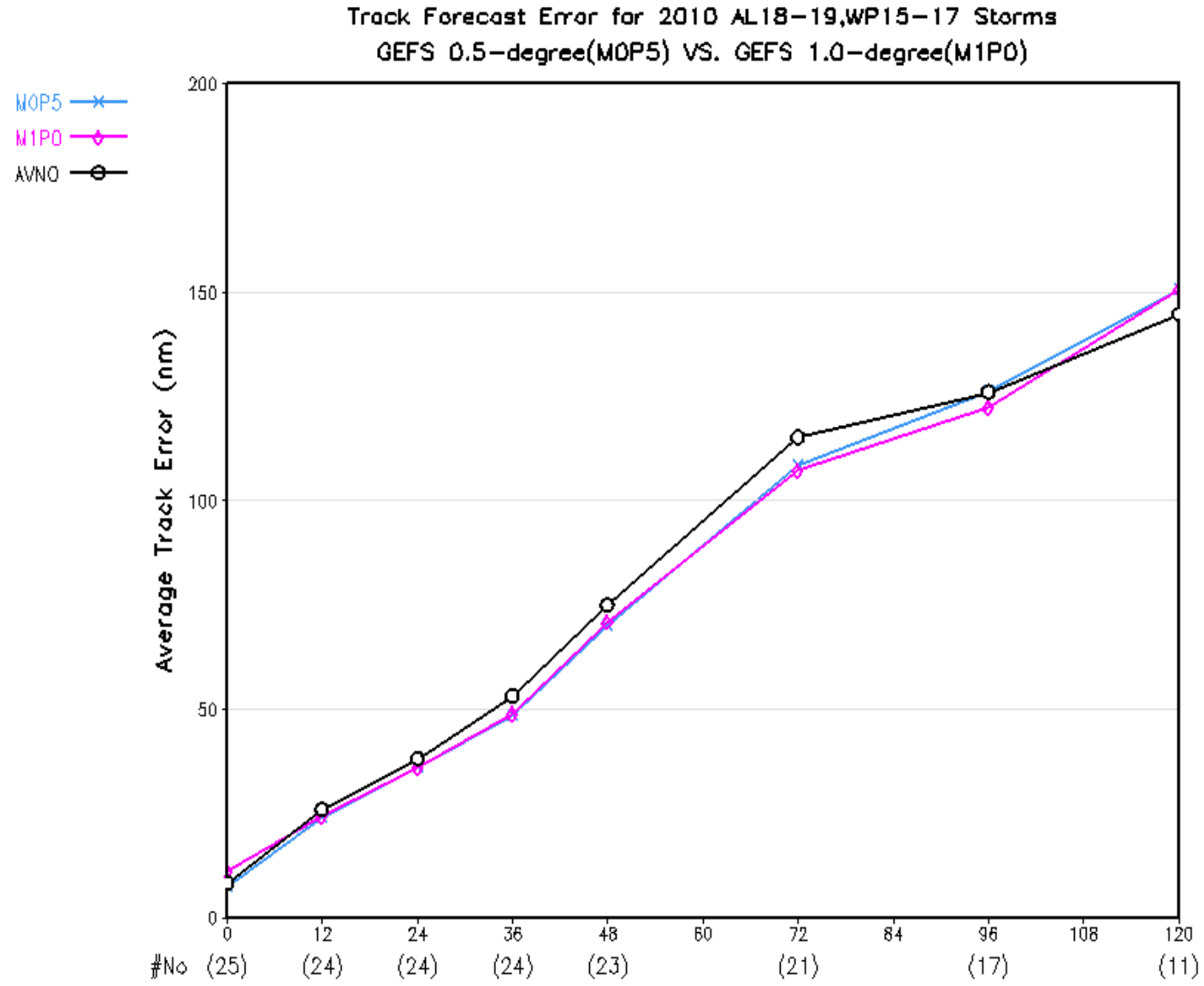
- GRIB2 files are 3 times as large as for 1 deg
- Computer resources for postprocessing increase by about 15%
- If we exchange both 1 deg and 0.5 deg data, the data volume increases by a factor of 4
- If we exchange both 1 deg and 0.5 deg data only during the first 8 days, the volume increases by a factor of 3.
- Users will require subsets, either on a server or created on the fly by NOMADS, to reduce the volume of data to be downloaded

Ensemble Based Probabilistic Quantitative Precipitation Forecast
Ini:2010102200 Valid:2010102300-2010102306 Amount>=0.254mm/6hrs



Ensemble Based Probabilistic Quantitative Precipitation Forecast
Ini:2010102200 Valid:2010102306-2010102312 Amount>=5.00mm/6hrs




Track Forecast Error for 2010 AL18-19,WP15-17 Storms
GEFS 0.5-degree(M0P5) VS. GEFS 1.0-degree(M1P0)
M0P5
M1P0
AVNO
Average Track Error (nm)
200
150
100
50
0
0
12
24
36
48
60
72
84
96
108
120
#No (25) (24) (24) (24) (23) (21) (17) (11)

3 hourly output

- Data volume is doubled
- Computer resources for postprocessing are doubled when 3-hourly output is postprocessed
- Computer resources for GEFS increase by about 20% when 3-hourly output is postprocessed
- If 3-hourly data is exchanged only during the first 8 days, data volume is multiplied by 1.5
- If 3-hourly and 0.5 degree data are exchanged during the first 8 days, data volume increases by a factor of 4.5

Extended GEFS: Characteristics

- Latest version of GEFS
- Three forecast segments:
  - High Resolution:
    - T254L42; 00h to 192h (8 days)
  - Low Resolution:
    - T190L42; 192h to 384h (16 days)
  - Ext Resolution:
    - T126L42; 384h to 1080h (45 days)
- Approximately 10% more computer resources

New variables for NAEFS exchange: 1 of 4

Variable	Priority?	Available now?
	High, medium, low	yes, no, uncertain
AVOR: 1000mb		
AVOR: 925mb		
AVOR: 850mb	FNMOC	NCEP
AVOR: 700mb		
AVOR: 500mb	FNMOC	NCEP
AVOR: 300mb		
Relative Vorticity: 850mb		
Divergence: 850mb		
Divergence: 500mb		
Divergence: 300mb		
Omega (VVEL): 1000mb		
Omega 925mb		
Omega: 700mb		
Omega: 500mb		
Omega: 300mb		
Omega: 700-500mb mean layer		

New variables for NAEFS exchange: 2 of 4

RH or Td: 300mb		
RH: 500-900mb mean layer		
ThetaE: SFC		
ThetaE: (SFC-600mb)		
T: 300mb		
U,V: 600mb		
U,V: 400mb		
U,V: 300mb		
U,V: 150mb		
U,V: 70mb		
Z: 600mb		
Z: 300mb		
T: Cloud Top		
Z: Cloud Top		
T: Tropopause		
Z: Tropopause		

Convective Precip		
LFC (surface, most unstable, mixed layer)		
LI		
Convective Cloud Amount		
Convective Cloud Speed		
Most Probably Precip Type		
CAPE (most unstable layer)		
CAPE (sfc)		
CAPE (downdraft)		
CIN (most unstable layer)		
Craven Brooks Sig Svr (CAPE X Shear)		
Dendritic Growth Layer Depth		
Eff shear: LPL – 0.5 EL		
Fosberg Fire Wx Index		
Dry TRW Parameter		
Freezing Level		
Haines Fire Wx Index		
K Index		
LCL (sfc)		
LCL (most unstable)		
LSL (mixed layer)		
Max Wind Level		
Max Wind Speed		
Mixing ratio: SFC-600mb		
Wind Shear: brn		
Storm relative helicity: 0-1km		
Storm relative helicity: 0-3km		

SPC Cloud Physics Thunder Parameter		
SPC Derech Parameter		
SPC Frontogenesis Funct (same lyr as moist pv)		
SPC Lwr Atm Fire Wx Idx		
SPC Significant Tornado Parameter		
SPC Supercell Composite Parameter		
Moist Potential Vorticity		

Visibility		
Ceiling		
Icing: (0, 3Kft, 6, 12, 15, 18, 24)		
Icing between 0 and 24Kft		
Jet Stream (Winds): 18Kft		
Jet Stream: 34Kft		
Jet Stream: 45Kft		
Turbulence between sfc and 18Kft		
Turbulence between 18Kft and 45Kft		
Turbulence every 3Kft SFC-45K ft		
Significant wave height		

GEPS day 1-16 timings

May 2012 operational dataset

GEPS Day 1-16 80 parameter	By Internet	Dedicated link Mbps
GB min 7-8 GB	~55 minutes**	20-40 minutes
GB max 10-13 GB	~90 minutes**	30-60 minutes

** Internet times can be over 200 minutes if internet is slow

Estimated GEPS timings
hires day 1-8, lores day 9-16

GEPS Day 1-16 80 parameters	By Internet	Dedicated link 45 Mbps
GB min 16-20 GB	180-230+ minutes**	70-130 minutes
GB max 30-40 GB	300+ minutes**	110-230 minutes

** Internet times can be over 800 minutes if internet is slow

Bottom line for Hires GEPS

Dedicated link will be required for exchange of hi res global eps dataset

Estimated REPS (SREF) timings NAEFS variables, day 1-4

GEPS Day 1-4 80 parameters	By Internet	Dedicated link 45 Mbps
GB min 8-10 GB	~55 to 180** minutes	25-50 minutes

** Internet times can be over 200 minutes if internet is slow

Bottom line for REPS/SREF exchanges

- Internet may be able to deliver dataset in 60-90 minutes on good days
- Dedicated link would ensure exchanges are more reliable

GEPS day 17-35 - Estimated timings

GEPS Day 17-35 80 parameters	By Internet	Dedicated link Mbps
GB min 7-8 GB	~55 minutes**	20-40 minutes
GB max 10-13 GB	~90 minutes**	30-60 minutes

** Internet times can be over 200 minutes if internet is slow

Links

- See Mbps calculator tab in :
  - http://collaboration.cmc.ec.gc.ca/cmc/cmoi/product_guide/docs/naefs/NAEFS_Overview.xls

EXTRAS

ENSEMBLE PRODUCT REQUEST LIST

NCEP SERVICE CENTERS, OTHER PROJECTS

FUNCTIONALITY	CENTRALLY MADE PRODUCTS	DOMAIN	CENTER #'s	CENTER
Mean	PMSL	NH,NA,SA,CA,AF,glob	6	**AMMA, HPC,LAP,OPC,SPC,TPC**
Mean	Z: 500mb	NH,NA,SA,CA,AF,glob	6	**AMMA,HPC,LAP,OPC,SPC,TPC**
Spread	Z: 500mb	NH,NA,SA,CA,AF, glob	6	**AMMA,HPC,LAP,OPC,SPC,TPC**
Mean	T (K): 500mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	T (K): 700mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	T (K): 850mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	Wind: 500mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	Wind: 700mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	Wind: 850mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	Z: 700mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Mean	Z: 850mb	NH,NA,AF,global	5	**AMMA,HPC,OPC,SPC,TPC**
Spread	Wind: 10 m	NH, NA,AF,global	5	**AWC,OPC,TPC,AMMA,SPC**
Grouping	pmsl: lows/troughs/mins & highs/ridges/maxes	NH, global,NA,SA,CA	4	**HPC,LAP,OPC,TPC**
Mean	T (K): 300mb	NH,AF, global	4	**AMMA,OPC,SPC,TPC**
Mean	Wind: 10 m	NH, NA,AF,global	4	**AMMA,OPC,SPC,TPC**
Mean	Wind: 250mb	NH,NA,AF,global	4	**AMMA,HPC,OPC,TPC**
Mean	Wind: 300mb	NH,AF, global,NA	4	**AMMA,OPC,SPC,TPC**
Mean	Wind: 925mb	NH,NA,AF, global	4	**AMMA,OPC,SPC,TPC**
Spread	Wind: 500mb	NH,NA,AF, global	4	**AMMA,OPC,SPC,TPC**
Spread	Wind: 850mb	NH,NA,AF, global	4	**AMMA,OPC,SPC,TPC**
Spread	Wind: 925mb	NH,NA,AF, global	4	**AMMA,OPC,SPC,TPC**
Spread	Z: 700mb	NH,AF, global	4	**AMMA,OPC,SPC,TPC**
Spread	Z: 850mb	NH,AF, global	4	**AMMA,OPC,SPC,TPC**
Mean	AVOR: 500mb	NA,SA,CA	3	**HPC,LAP,SPC**
Mean	AVOR: 850mb	NA,SA,CA	3	**HPC,LAP,SPC**
Mean	CAPE	NA,AF	3	**AMMA,HPC,SPC**
Mean	QPF	NA,SA,CA,AF	3	**AMMA,HPC, LAP**

ENSEMBLE FUNCTIONALITIES

List of centrally/locally/interactively generated products required by NCEP Service Centers for each functionality are provided in attached tables (eg., *MSLP, Z,T,U,V,RH, etc, at 925,850,700,500, 400, 300, 250, 100, etc hPa)*

	FUNCTIONALITY	***CENTRALLY GENERATED***	***LOCALLY GENERATED***	***INTERACTIVE ACCESS***
1	Mean of selected members *Done*			
2	Spread of selected members *Done*			
3	Median of selected values *Done Sept. 2005*			
4	Lowest value in selected members *Done Sept. 2005*			
5	Highest value in selected members *Done Sept. 2005*			
6	Range between lowest and highest values *Done Sept. 2005*			
7	Univariate exceedance probabilities for a selectable threshold value *Done, Dec 05*			
8	Multivariate (up to 5) exceedance probabilities for a selectable threshold value *Done, Dec 05*			
9	Forecast value associated with selected univariate percentile value *Done Sept. 2005*			
10	Tracking center of maxima or minima in a gridded field (eg – low pressure centers) *Done Sept. 2005*			
11	Objective grouping of members *Planning starts FY06, Deliver FY07-08*			
12	Plot Frequency / Fitted probability density function at selected location/time (lower priority) *Detailed Planning FY06, Deliver FY07*			
13	Plot Frequency / Fitted probability density as a function of forecast lead time, at selected location (lower priority) *Detailed Planning FY06, Deliver FY07*			
14	Spaghetti (ability to interactively change contour/domain etc) *Basic function done; Interactive version to be scheduled (TBS)*			

Additional basic GUI functionalities:

- Ability to manually select/identify members *(TBS)*
- Ability to weight selected members *Done, Sept. 05*

Potentially useful functionalities that need further development:

- Mean/Spread/Median/Ranges for amplitude of specific features *(TBS)*
- Mean/Spread/Median/Ranges for phase of specific features *(TBS)*