Next GEFS implementation

EMC ensemble team

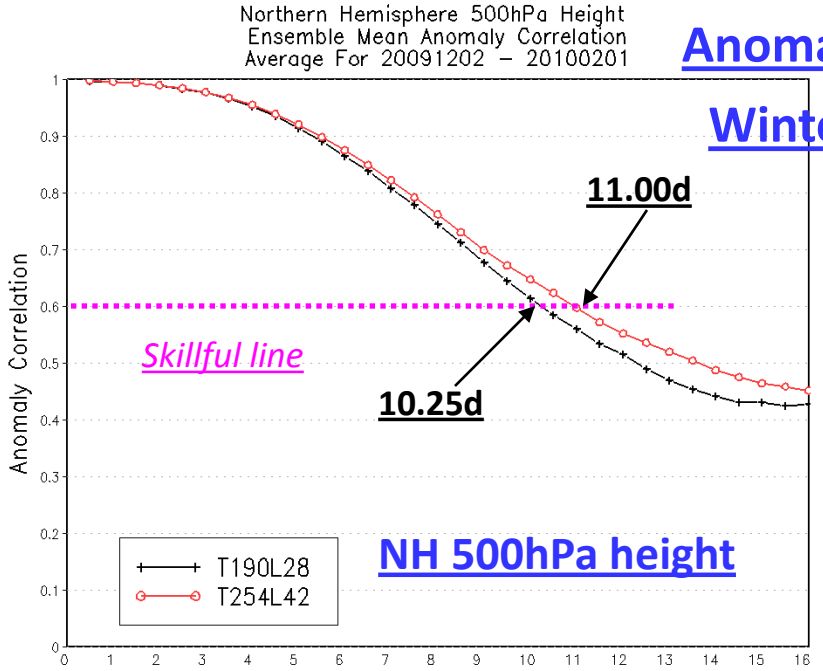
May 25 2011

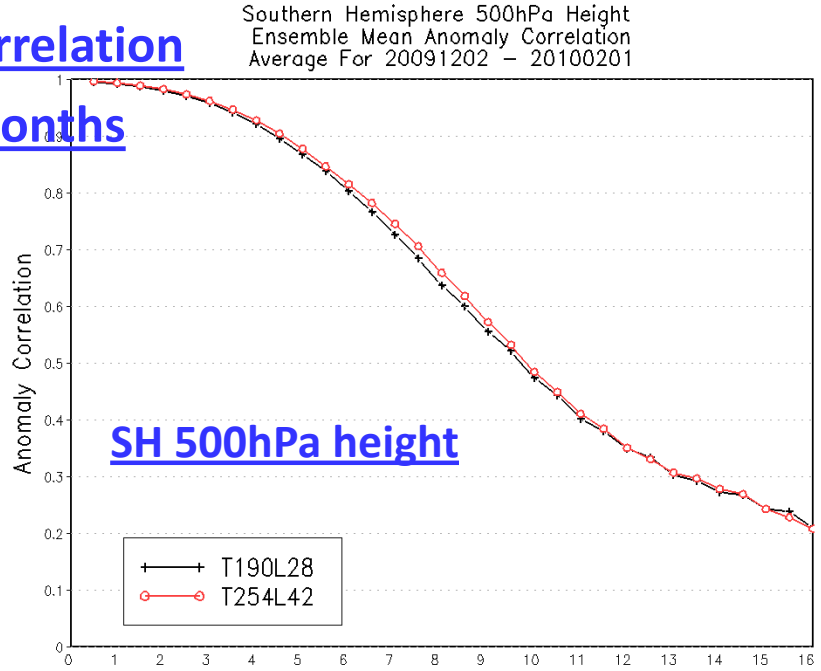
Proposal Changes

- Model and initialization
  - Using GFS V9.01 (current operational GFS) instead of GFS V8.00
  - Improved Ensemble Transform with Rescaling (ETR) initialization
  - Improved Stochastic Total Tendency Perturbation (STTP)
- Configurations
  - T254 (55km) horizontal resolution for 0-192 hours (from T190 – 70km)
  - T190 (70km horizontal resolution for 192-384 hours (same as current opr)
  - L42 vertical levels for 0-384 hours (from L28)
- Part of products will be delayed by approximately 20 minutes
  - Due to limit CCS resources
  - 40-42 nodes for 70 minutes (start +4:35 end: +5:45)
- Unchanged:
  - 20+1 members per cycle, 4 cycles per day
  - pgrb file output at 1*1 degree every 6 hours
  - GEFS and NAEFS post process output data format
- Why do we make this configurations?
  - Considering the limited resources
  - Resolution makes difference (example of T126 .vs T190)
- What do we expect from this implementation?
  - Preliminary results (NH 500hPa and SH 500hPa height and tracks)

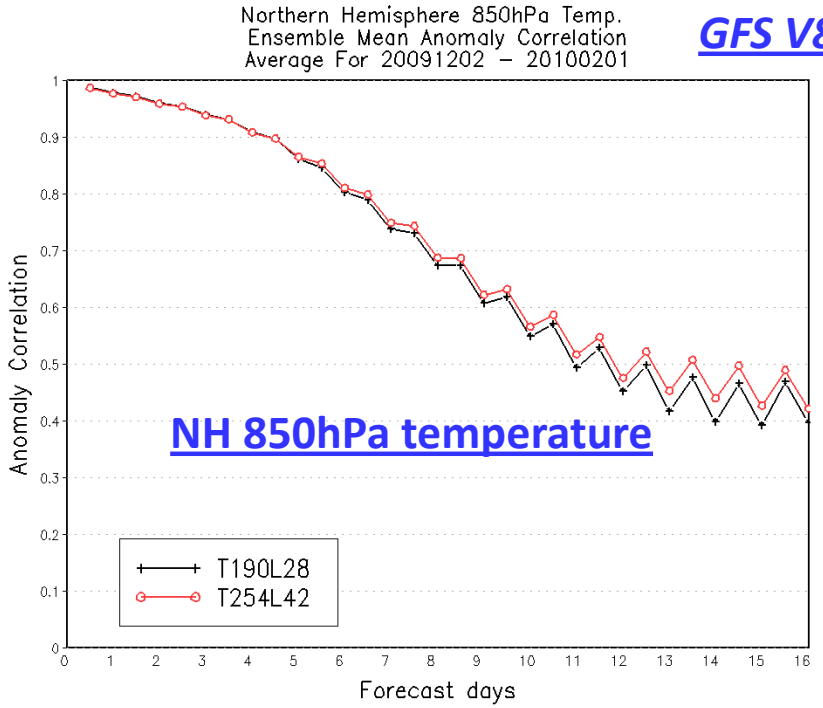
Anomaly Correlation

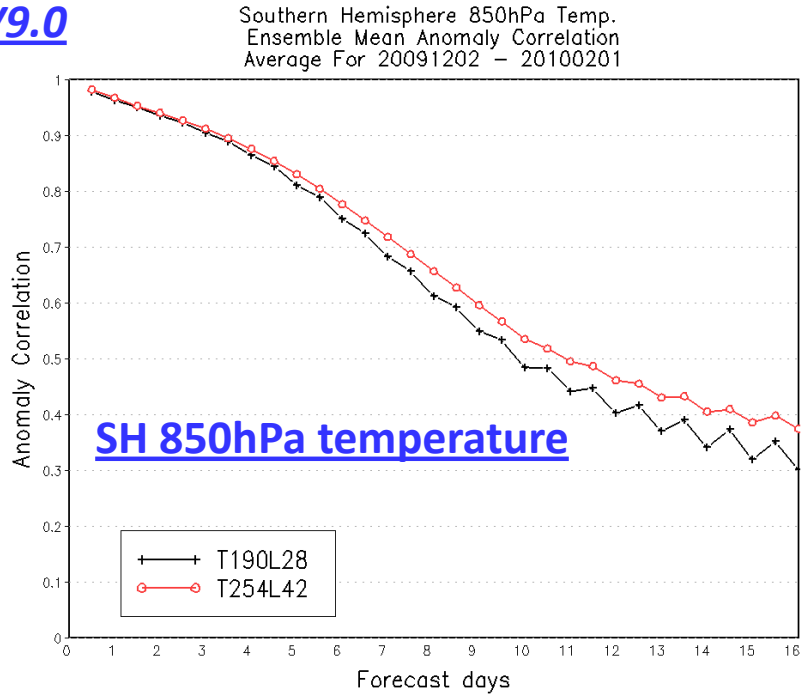
Winter 2 months



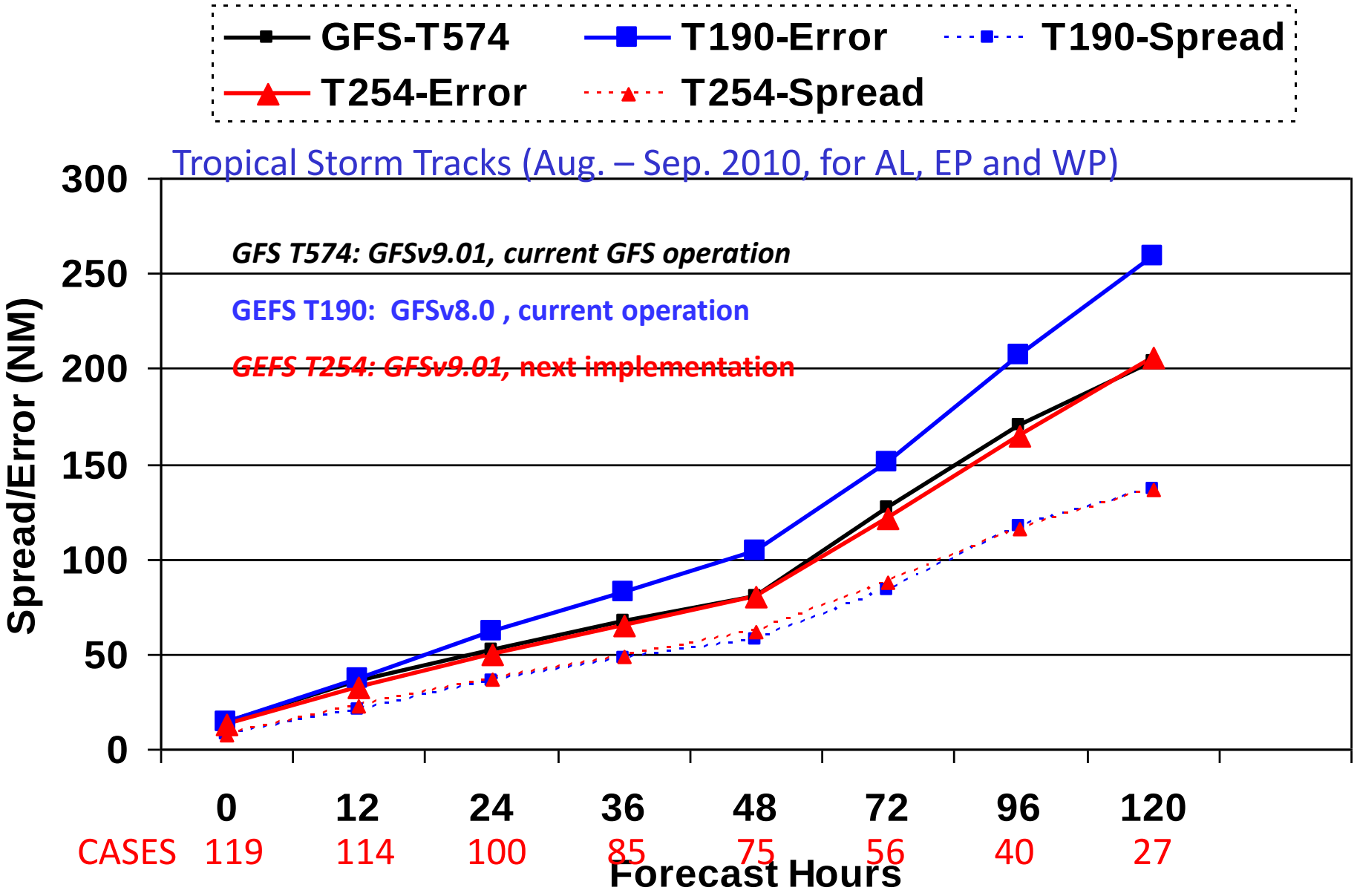


GFS V8.0 .vs V9.0



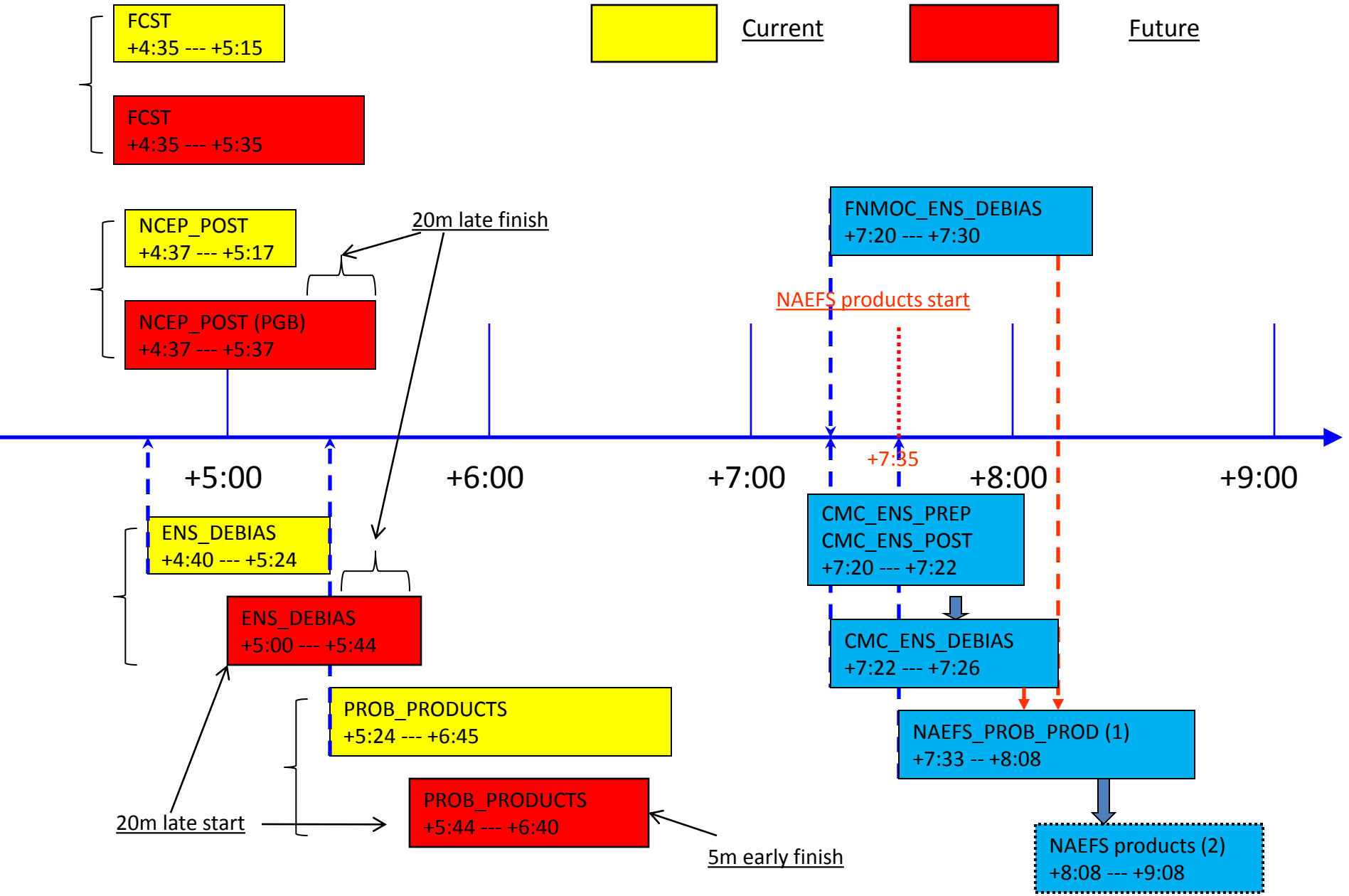


GEFS-T254 next implementation in 2011



What have we tested?

- For new configuration
  - T254 for 0-192 hours, T190 for 180-384 hours
  - L42 for all lead time
- GFS V9.0 and GFS V9.01
- Relocation and without relocation
- Inflate rescaling factor for ETR (tuned)
- Adjust STTP coefficients
- Test periods:
  - Winter: Dec. 1 2009 – Jan. 31. 2010 (done)
  - Summer: Aug. 1 2010 – Sep. 30 2010 (done)
  - Winter: Dec. 2010 – Jan. 2011 (in process now)
- Communicating with service centers
  - To review new GEFS track forecast with NHC, will send real time parallel track to NHC for coming season if it is available.
  - To work with CPC to see if there is any progress for week-2 temperature, and precipitation.



GEFS/NAEFS 6-hr window flow chart

Downstream Dependencies

- Sigma (hybrid) files
  - SREF
    - Yes
    - It uses sigma forecast
  - Wave ensemble
    - No
    - It uses bias corrected 10m winds
  - Tracking
    - No
    - It uses pgrba file
  - MDL GMOS
    - No
    - It uses pgrba and pgrbb files
  - Public access
    - No
    - We don't post sigma files to public

- pgrb files (pgrba + pgrbb)
  - SREF
    - No
    - It produces pgrb file by itself
  - Wave ensemble
    - Yes
    - But file has the same format for 10m wind
  - Tracking
    - Yes
    - But it uses pgrba file only, the file has the same format
  - MDL GMOS
    - Yes
    - It uses both pgrba and pgrbb
  - Public access
    - Yes
    - pgrba and pgrbb

CCS resources (estimated)

- Computation (Current)
  - T190L28 out to 384 hours
    - Assigned window (75min)
    - Actually using 45 minutes
    - Average 21 nodes

- Computation (future)
  - T254L42 out to 192 hours
    - Use 30 min
    - Average 42 nodes
    - 100% additional resources
  - T190L42 from 180 to 384 hours
    - Use 30 min
    - Average 42 nodes
    - 100% additional resources

Disk Space (GB/day)

Current	Future	Files
50	50	pgrba (some files online for 17d)
350	770	sfcsig from model (x 2.2)
75	160	sflux from model (x 2.1)
900	1425	total in /com/gens
125	275	total in /nwges (x 2.2)

Plan Schedule

- Project kick off – May 25
- Start to set up EMC SMS based parallel – May 25
  - Starting ETR cycling first
  - Long forecast once per day
  - Long forecast 4 times per day
  - Post process and NAEFS products
- EMC CCB meeting – July?
- Submit/discuss TIN – June 15
- Submit RFCs – July 15
- Expect NCO parallel – in August/September
  - Service centers evaluation
- Expect implementation – Q4FY2011-Q1FY2012