NAEFS and GEFS Plans

Yuejian Zhu
Present for discussion
August 5th 2008
Major Implementation Plan (on hands charter)
Shooting for 1Q 2009 (before Dec 15 2008)

- Using current GFS/GSI version
  - No plan for implementation concurrent with GFS/GSI implementation
  - Using new GSI/GFS analysis
  - Configuration changes between GFS and GEFS (adv. and disadv.)
- Upgrade horizontal resolution from T126 to T190 for 20 perturbed forecasts
  - 4 cycles per day
  - Up to 180 hours
  - T126 from 180 hours, up to 384 hours (16 days)
  - Using 8th order horizontal diffusion for all resolutions
- Extended 16 days forecast to 35 days
  - 00Z cycle only
  - T126L28 resolution
  - User request (for MJO prediction)
- Introduce ESMF (Earth System Modeling Framework) for GEFS
  - Version 3.1.0r
  - allows concurrent generation of all ensemble members.
- Add stochastic perturbation scheme to account for model errors
  - Increasing ensemble spread
  - Improving the forecast skills
Plans for FY2009

• GEFS
  – Configuration: (4Q 2009)
    • Hind-cast at GEFS resolution (T190L28 (0-180h), T126L28 (180-840h)).
      – Details setting up in discussion
    • Hydro-meteorological ensemble (river ensemble)
      – Pending on operational LDAS/GLDAS
    • Coupling ocean-land-atmosphere model for GEFS
      – Considering ocean model in ESMF
  – Science:
    • 3-D mask for ET with re-scaling (4Q 2009)
    • Surface perturbations (4Q 2009)
Plans for FY2009 (cont.)

• NAEFS
  – Products (1Q-2Q 2009)
    • Statistical down-scaling for CONUS:
      – Additional variables (Tmax and Tmin, wind speed and direction)
      – Pending on RTMA availability
    • Statistical down-scaling for Alaska:
      – 8 variables (T2m, Tmax, Tmin, Psfc, U10m, V10m, 10 meter Ws and Wd)
      – In testing
    • Statistical down-scaling for other regions:
      – Hawaii, Puerto Rico and Guam
      – Pending on RTMA availability
  – New NAEFS component – FNMOC ensemble
    • 4Q 2009 – 2Q 2010 (could be in 2010 plan)
    • Pending on one year evaluation (May 2008 – April 2009)
    • Using mini-Bayesian method for first moment correction
    • Need to coordinate with CMC/MSC
Plans for FY2009 (cont.)

• NAEFS
  – ECMWF global ensemble – Blending to NAEFS (4Q 2009)
    • Pending on one year evaluation (May 2008 – April 2009)
    • Using mini-Bayesian method for first moment correction
    • Need to coordinate with NCO for 00UTC data and 6hr forecast intervals
  – NAEFS new variables for data exchange (1Q/2Q 2009)
    • Approximated 25 additional variables for NAEFS data exchange
    • Using GRIB2 format
    • Need to coordinate with CMC/MSC
  – Precipitation bias correction (4Q 2009 – 2Q 2010)
    • Full-Bayesian with pseudo-precipitation
  – Probabilistic verification
    • Unified probabilistic verification (2Q, 2009)
    • Shared codes with SREF
Plans for FY2010

• GEFS
  – Configuration:
    • Variable resolutions:
      – T270L42 (0-180hr) (considering half-degree products)
      – T190L28 (180-384hr)
      – T126L28 (384-840hr)
    • Full coupling with ocean model (assume in)
  – Science:
    • Improving TS relocation
      – Adopt all new developed TS relocation schemes
    • Improving stochastic scheme
      – Adaptive 2/3-demisional parameters adjustment
Plans for FY2010  (Cont.)

• NAEFS
  – New NAEFS component – FNMOC global ensemble
    • 4Q 2009 – 2Q 2010
    • Pending on one year evaluation (May 2008 – April 2009)
    • Using mini-Bayesian method for first moment correction
    • Need to coordinate with CMC/MSC
  – Improving NAEFS products
    • Introduce full Bayesian model to calibrate high moments
      – For precipitation forecast
      – All variables
  – Statistical down-scaling
    • Precipitation
    • Improving current method
    • Adding new variables (pending on RTMA availability)
  – TC related products
    • Including bias correction
  – Seamless weather-climate interface
    • Merge GEFS and CFS