

1. Description of the specified system at the end of 2007

The Northern American Ensemble Forecast System (NAEFS) consists of NCEP and CMC Global Ensemble System (GENS). NCEP/GENS consists of ensembles of global 16-day forecasts from perturbed FNL initial conditions (twenty perturbed forecasts and one control forecast each from 0000, 0600, 1200, 1800 UTC). Ensembles are run at T126L28-resolution for the entire 16 days. The system provides improved ensemble support for 4-7 day forecasting, week-two probabilistic forecasting, allows tropical cyclone tracking out to 7 days, and provides boundary conditions for the Short Range Ensemble Forecast out to 90 hours.

Global Ensemble System: NCEP Global Ensemble System is using Ensemble Transform with Rescaling (ETR) method to generate orthogonal initial perturbation vectors, applying tropical storm relocation techniques to run GFS model for 16-day forecasts at horizontal T126, vertical L28 resolutions.

2. Brief description of important system updates during 2007

NCEP/GENS upgrade (March 27 2007):

- 1). Increasing ensemble membership from 14 to 20 at each cycle.

NAEFS upgrade (December 12 2007):

- 1). GFS bias correction.
- 2). Combination of GFS and GEFS forecasts
- 3). Probabilistic NAEFS forecasts.
- 4). Downscaled NAEFS forecasts.

3. Future plans, in a 'bullet' type format.

NCEP/GENS upgrade (configuration):

- 1). Increasing horizontal resolution from T126 to T190 for first 180 hours (Y08).
- 2). Adding stochastic scheme to GEFS (Y08)
- 3). Extended ensemble forecast to 30 days for 00UTC cycle (Y08).

NAEFS upgrade (products)

- 1). Upgrade/add new products which include bias correction and down-scaling.
- 2). Working on bias correction of precipitation forecast.

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The NCEP Short-Range Ensemble Forecast (SREF) system is a multi-model (Eta, RSM, NMM and ARW), multi-physics (various convective schemes), multi-IC (two analysis and Breeding perturbations) and multi-LBC (provided by various global ensemble members) super-ensemble system. It has a total of 21 members running four times per day (03, 09, 15, 21UTC) into 87hr (3.5 days) covering the entire North America (including Canada, USA and Mexico). Horizontal resolution varies with model ranging from 32km to 45km. Since its operational implementation in 2001, the system has been providing improved support and uncertainty information for 1-3 day weather forecasting and has become an integral part of the U.S. National Weather Service's daily production. Some real-time ensemble products can be viewed at the following web sites:

<http://www.nco.ncep.noaa.gov/pmb/nwprod/analysis/> and <http://www.emc.ncep.noaa.gov/mmb/SREF/SREF.html>. The SREF also provides LBCs for various higher-resolution ensemble experiments around the country.

2. Brief description of important system updates during 2007

NCEP SREF upgrade (December 2007):

- 1). Bias correction for all four subcomponents (Eta, RSM, NMM and ARW)
- 2). Addition of four aviation products (icing, low ceiling height, clear-air turbulence and flight restriction)
- 3). Addition of bufr sounding output from six WRF members
- 4). Expansion of RSM model domain to cover the entire Alaska region.

3. Future Plans (2008 and 2009)

- 1). Model version upgrade for NMM, ARW and RSM three models (2008).
- 2). Horizontal resolution increase from 40/45km to about 32km for NMM, ARW and RSM three models (2008)
- 3). Replacement of four Eta members with two NMM and two ARW members (2008)
- 4). Replacement of Breeding with Ensemble Transform technique in generating IC perturbations (2009)
- 5). Downscaling (2009)

6). Precipitation bias correction (2009).