**Protocol for**
**A Subseasonal Reforecast and Real-time Forecast Experiment**

## A. General Requirements

1. The model used for real-time forecasts must be the same as that used for reforecasts. Model resolution, physics, and numerics are left to the forecast provider. Models can be coupled ocean-atmosphere-land models or atmosphere-land models.
2. Reforecasts must be performed over the period of 1999-2015. Additional years are encouraged.
3. A minimum of four ensemble members is required. Additional members are encouraged.
4. Ensemble generation procedure is left to the forecast provider.
5. Forecasts should be a minimum of 32 days in length. Forecasts of 45 days are preferred and strongly encouraged.
6. One-year of real-time forecasts is required.

## B. Initialization Requirements

1. Initialization frequency is once per week.
2. All procedures for generating reforecasts and real-time forecasts, including initialization time, should be the same.
3. It should be noted that skill will strongly depend on initialization time, and forecast providers are encouraged to use the most recent observations to initialize real-time forecasts.
4. Initialization of the atmosphere is required. Procedures are left to forecast provider.
5. Initialization of the ocean is required for coupled ocean-atmosphere models. Procedures are left to forecast provider. For models that do not include an ocean, the time evolving predicted (and/or persisted) ocean state should be used.
6. Initialization of the land surface is required. Procedures are left to the forecast provider.

## C. Requirements Specific to Real-time

1. All forecasts (and corresponding reforecasts) must be available by 5pm Eastern time on every Wednesday of every month. All real-time forecasts and corresponding reforecasts (listed in C3) must be sent to NCEP via NCEP Central Operation (NCO) data lines. *Note: Any exceptions will need to be reflected in a special agreement between NCEP and the contributing modeling center or institute"*
2. If a forecast (and corresponding reforecast) is not available on time, it will not be included in the experimental forecast production. If a forecast has been made

available on time, but a problem is discovered subsequently, NCEP Climate Prediction Center (CPC) is under no obligation to reproduce the forecast.

3. To test potential CPC real-time products, a subset of the full list of output data variables (listed in D) is required in real-time including 2m temperature, precipitation, 500 hPa height, 200 hPa height, sea surface temperature, soil moisture.

**D. Output Data Requirements**

1. Data will be output on a 1x1 grid
2. Total fields, not anomalies, must be provided.
3. All ensemble members, not the ensemble mean, must be provided.
4. The land-sea mask must be provided on the same 1x1 degree grid as the data output. All missing values must be specified consistently as '-9999'.
5. Daily means of the following variables should be output:
    - 2m temperature
    - precipitation
    - 500 hPa geopotential height
    - 200 hPa geopotential height
    - 2m dewpoint
    - zonal and meridional winds at 850 hPa
    - zonal and meridional wind at 200 hPa
    - outgoing longwave radiation
    - wind at 10m
    - vertically integrated soil moisture
    - runoff
    - sea surface temperature
    - snow depth
    - snow cover
    - sea ice concentration
    - latent heat flux (W $m^{-2}$)
    - wave heights (if available)
    - zonal and meridional wind stress
    - sea level pressure
6. The following additional variables should be output
    - maximum 2m temperature (every 24 hours)
    - minimum 2m temperature (every 24 hours)

Note: The above variables are the full list to be archived for the reforecasts and forecasts for research purposes.