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## Sensitivity evaluation based on initial condition and search for optimal ensemble technique

National Institute of Meteorological Science (NIMS)/Korea Meteorological Administration (KMA) has been operating Climate Prediction System since 2014 for long-range forecasting. The system is based on GloSea5GC2 that is fully coupled global climate model. GloSea5 consists of atmosphere (UM), ocean (NEMO), land surface (JULES), and sea ice (CICE) components through the coupler OASIS. The system use the time lagged ensemble generation technique, and it uses prediction data produce for one week to make weekly forecasts (for monthly forecast, collect prediction data for three weeks). For each initial date, the system utilizes SKEB2 physics to produce there ensemble members for Hindcast and four ensemble members for Forecast.

NIMS/KMA continuously improves the system, and is conducting research development on initialization of soil condition, to modify information of river discharge model (TRIP), and the own production of ocean/sea-ice initial field currently. In the initialization of soil condition, we utilize JRA55 and CMAP. Observation calibration is performed using JRA55 and CMAP, and the system is performed using the soil initial data produced. In the production of ocean/sea-ice initial field, the initial data is made by NEMO VAR. For data assimilation, it utilizes real-time ocean observation data such as Argo and satellite etc., and operates NEMO to reproduce global ocean/sea-ice conditions. For TRIP, information of river mouth is realistically applied. In addition, we want to analyze how much performance of the system is affected by the number of ensemble members. According to analyze ensemble sensitivity, we are looking for the optimal ensemble techniques such as the number of ensemble members and the operating date of burst mode in the system.

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