



## **A study of the growth of errors in a Numerical Climate Prediction System**

M. Pena (1) and Z. Toth (2)

(1) SAIC at NCEP/EMC, Camp Springs, United States (malaquias.pena.mendez@noaa.gov, +1-(0)301-7638545), (2)  
NCEP/EMC, Camp Springs, United States

Forecast errors of Nino 3.4 index based on the first version of the NCEP Climate Forecast System (Saha et al. 2006) are analyzed to assess the impact of ensemble initialization schemes on intra-seasonal predictions. The evolution of both initial condition (internal) errors and model (external) errors is parameterized based on a long set of retrospective ensemble forecasts. The ensembles are formed by collecting daily forecasts at the end of each month. The tendency of the ensemble mean forecast error under two distinct scenarios is studied. One in which the parameterized external error set to zero (perfect model situation) and the other in which the initial errors are reduced to the value of the most recent daily forecast. The first scenario produces a skill improvement that increases from a small value for short leads to the lead of error saturation. In the second scenario, the skill improvement is significant and constant through the leads until saturation is reached. The comparison of these two scenarios indicates the relevance of improving initial conditions and ensemble initialization procedures for the short leads of prediction. The results suggest that a synergistic skill improvement may be achieved when simultaneously, internal and external errors are reduced.