Climate Test Bed (CTB) Seminar Series Presents

Youlong Xia

Environmental Modeling Center
NOAA/NWS/NCEP
College Park, Maryland

Application of USDM Statistics in NLDAS-2: Objective Blends of Ensemble –Mean NLDAS drought Indices over the Continental United States

11:00 AM – 12:00 Noon, Wednesday, April 24, 2013
EMC Conference Room #2155

NOAA Center for Weather and Climate Prediction
5830 University Research Court, College Park, MD 20740

Abstract

This study proposed an objective blending framework for ensemble-mean NLDAS drought indices by calibrating drought area percentages from the Continental United States (CONUS) to six USDM (US Drought Monitor) regions and forty-eight states to select optimal weights. Corresponding three experiments are CONUS, Region and State, respectively. The results show that State and Region have larger correlation coefficients and smaller root mean square error (RMSE) and bias than CONUS when compared to the drought area percentages derived USDM, indicating that State and Region have better performance than CONUS. In general, State marginally outperforms Region in terms of RMSE, bias and correlation. Analysis of normalized optimal weight coefficients shows that soil moisture percentiles (top 1m and total column) play the dominant role for most of forty-eight states, evapotranspiration percentile plays an important role for eight states (WA, SD, LA, MS, OH, WV, NY and MA), and total runoff plays an important role for the Southeast region and nine states, most of which are close to coasts and lakes (WY, MN, WI, MI, FL, SC, PA, RI and DE). This is a favorable result as simulated soil moisture is more reliable when compared to total runoff and evapotranspiration. Particularly in arid/semi-arid (forest and dense vegetation) regions there are poor simulations for total runoff (evapotranspiration). Optimally blended NLDAS drought index has higher simulation skills (correlation coefficient and Nash-Sutcliffe efficiency) in the states of South, Southeast, High Plains, Midwest region than those of West and Northeast region. The highest simulation skills appear in TX and OK. By using optimal equations, we can reconstruct the long-term drought area percentages and optimally blended NLDAS drought index over the CONUS.