

Application of NARR-Based NLDAS Ensemble Simulations to Continental-Scale Drought Monitoring

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Government estimates indicate that droughts cause billions of dollars of damage to agricultural interests each year. More effective identification of droughts would directly benefit decision makers, and would allow for the more efficient allocation of resources that might mitigate the event. Land data assimilation systems, with their high quality representations of soil moisture, present an ideal platform for drought monitoring, and offer many advantages over traditional modeling systems. The recently released North American Regional Reanalysis (NARR) covers the NLDAS domain and provides all fields necessary to force the NLDAS for 27 years. This presents an ideal opportunity to combine NARR and NLDAS resources into an effective real-time drought monitor. Toward this end, our project seeks to validate and explore the NARR's suitability as a base for drought monitoring applications - both in terms of data set length and accuracy.

Along the same lines, the project will examine the impact of the use of different (longer) LDAS model climatologies on drought monitoring, and will explore the advantages of ensemble simulations versus single model simulations in drought monitoring activities. We have produced a NARR-

and observation-based high quality 27 year, 1/8th degree, 3-hourly, land surface and meteorological forcing data set. An investigation of the best way to force an LDAS-type system will also be made, with traditional NLDAS and NLDASE forcing options explored.

This presentation will focus on an overview of the drought monitoring project, and will include a summary of recent progress. Developments include the generation of forcing data sets, ensemble LSM output, and production of model-based drought indices over the entire NLDAS domain. Project forcing files use 32km NARR model output as a data backbone, and include observed precipitation (blended CPC gauge, PRISM gauge, Stage II, HPD, and CMORPH) and a GOES-based bias correction of downward solar radiation. Multiple LSM simulations have been conducted using the Noah, Mosaic, CLM3, HYSSiB, and Catchment LSMs. These simulations, along with the NARR-based forcing data form the basis for several drought indices. These include standard measures such as the Palmer-type indices, LDAS-type percentile and anomaly values, and CLM3-based vegetation condition index values.