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Title: The DOE Water Cycle Initiative

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Abstract: The DOE Water Cycle Initiative is founded firmly in the objectives of the U.S. Global Change Research Program water cycle initiative, but tailored to critical interests of the Department of Energy. The primary questions defining the scope of the program are "To what extent are variations in the regional water cycle predictable?" and "How to take advantage of DOE talents, facilities and capabilities." The DOE plan for the water cycle initiative was developed as a three step process: the conduct of a pilot study, using the results of that study to confirm feasibility and to draft a plan, and finally the implementation of a full scale program to instrument and model three regional water basins across the United States. The Pilot Study was initiated in the Walnut River Watershed within the boundaries of the DOE ARM site in the Southern Great Plains. An excellent data set was acquired and is currently being investigated. Early results show that the NCAR MM-5 model represents precipitation well if the scale of measurements and the predictive scale are matched and that extrapolating or interpolating results across scales in either direction can be misleading. Isotope studies conducted to trace water from specific sources within the atmosphere-terrestrial water system are indicating that it is feasible for water to be followed as it flows through hydrologic processes and that model predictions of water movement can be validated against measured data. ARM site capabilities to support water cycle research are outstanding, benefiting from several years of evaluation and validation of different measurement techniques. Additionally, site capabilities are likely to be expanded substantially through collaborations with related programs. The NASA Global Precipitation Climatology Project is considering, for example, placing a scanning precipitation radar at the SGP site in order to exploit the foundation of data that already is acquired there. The DOE has the mission, talent and capabilities to pursue this Water Cycle program and anticipates approving a strategy document mapping the future of the program.