Current capabilities and potential deficiencies of NASA Energy and Water cycle Study (NEWS)
Product, Discovery and other water cycle related proposals
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Requirements

- Focus on water and energy processes and dynamics in the climate system
- Global scale objective
- Specific NEWS strategic elements: Observation, Understanding, Models, Predictions and Consequences
- Progress toward NEWS challenge
- End to end program

Overarching long-term NEWS grand challenge
Documenting and enabling improved, observationally-based, predictions of water and energy cycle consequences of Earth system variability and change

Aerosol effects on cold season orographic precipitation
Integrated A-train aerosol, cloud and radiation product

Land atmosphere coupling & its impact on water & energy cycles

Validation and scaling remotely-sensed observation of the water cycle

Evaluation of NASA’s global water cycle data, surface energy fluxes, top of atmosphere radiative fluxes and modes of variability
Integrated assessment of models and observations that control global water & energy budgets

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Land-surface, boundary layer, cloud and radiative coupling processes
Using observation, data sets & reanalysis to close the water and energy budget
Latent heating distributions over global oceanic regions

Products to study interactions between atmospheric hydrology and radiation budget
Global analysis of ocean surface fluxes of heat and freshwater
Surface evaporation & moisture transport over global oceans

Current water & energy cycle capabilities covered by funded NEWS Product and Discovery and other related proposals

Multiscale vegetation modeling system
Causes and predictability of multi-year droughts

Expected long-term outcomes of NEWS
Enhanced data sets documenting the global distribution and variability of key water and energy cycle parameters and improvements to the nation’s global water- and energy-cycle prediction systems that can be used to quantify the hydrologic consequences of given climate change scenarios and produce seasonal and longer-range hydrologic predictions based on relevant initial value data from global observation systems.

NEXT Steps
There are large dependencies of NEWS on MAP (Modeling, Analysis, and Prediction Climate Variability and Change), requiring explicit ties to be established
NEWS integration team has worked to identify gaps and recommendations for ROSES
NEWS integration team is working to identify potential partner links to fill gaps (NEWS could be the main interface between NASA water & energy cycle activities and the scientific community, i.e. GEWEX, NOAA, NCAR and others)

Challenges for the Water & Energy focus area
Snowfall and mixed precipitation
Whole-system, global water & energy cycle balance & variability and quality assessments
Fine scale water & energy cycle assessments
New multivariate retrieval methods
Predictability analysis
Observationally-driven water & energy cycle model physics improvement
Developing high-resolution coupled cloud-radiation-hydrology models
Water & energy cycle coupled assimilation
Establish observation-based water & energy cycle prediction performance metrics
Identify currently available water & energy cycle data and analysis products

Visit the following websites for additional information:
NASA Energy and Water cycle Study (NEWS): http://wec.gsfc.nasa.gov/

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