



NEWS Challenge:

Document and enable improved, observationally-based, predictions of water and energy cycle consequences of Earth system variability and change.

The overarching goal of NEWS investigations is to integrate Earth Science components to make decisive progress towards the NEWS challenge. To achieve this objective, NEWS investigations integrate and interpret past, current, and future space based and in situ observations into assimilation and prediction products and models that are global in scope. These activities serve efforts to improve understanding, modeling, and information for global prediction systems.

2011 NEWS projects

Joel Norris/Observed Tropical Expansion: Impact on the Hydrological and Energy Cycles

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This project will examine the expansion of the tropics using NASA NEWS and re-analysis (MERRA) data for the period 1979 to present to quantify the extent of the changes in the tropics.

Ralf Bennartz/The Role of Boundary Layer Clouds in the Global Energy and Water Cycle: An Integrated Assessment Using Satellite Observations

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The primary objective of this work is the development of a new dataset giving cloud droplet number concentration, cloud geometrical thickness, and rain water path for stratiform boundary layer clouds using MODIS and AMSR-E data. The proposed work will also study cloud changes to anthropogenic sources of aerosol and provide retrieval uncertainty analysis.

Bill Olson/Characterizing Uncertainties in Large-Scale Atmospheric Heating Distributions Derived from TRMM Observations and Reanalysis Datasets

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The primary objective of this research is to estimate the uncertainty in TRMM large-scale heating estimates. The differences between TRMM and reanalysis heating estimates would be examined in terms of these uncertainties. This proposal specifically addresses just the uncertainties in latent+eddy sensible heating (Q1-QR).

Rachel Pinker/Integration of satellite radiative fluxes in support of hydrological modeling

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This project aims to perform an in depth evaluation of current satellite (mostly NASA-sponsored) radiative flux products (shortwave (SW) and longwave (LW)) against ground observations, other products, and numerical model outputs. One of the objectives is to identify regions where satellite products disagree most, and where models have problems and could benefit from the satellite observations. The study will focus in particular on understanding scale issues of the validation process for generating informative error metrics.

Xun Jiang/Investigation of the Recycling Rate of Moisture in the Atmosphere From Observation and Model

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This project aims to address the recycling rate of moisture in the atmosphere using a number of remote sensing observational data sets to examine the precipitation recycling rate (and precipitation and atmospheric water vapor) and the suggested increase (decrease) of recycling in areas of high (low) precipitation on a decadal time .

Judith Curry/Integrated analysis of atmospheric water cycle in intense marine storms

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The project builds on earlier work by the investigators with NEWS funding and focuses on evaporation, latent heating, and on tropical cyclones and storms in the Southern Ocean. The research will target the following two research questions: 1) What is the role of surface evaporative flux and atmospheric latent heating in the life cycle of integrated kinetic energy, precipitation, and intensification of hurricanes? 2) How does the hydrological cycle of the high latitudes of the Southern Ocean influence the variability of Antarctic sea ice?

Joseph Santanello/Investigating the Impact of Land-PBL Coupling on the Water and Energy Cycle in NASA Model and Observation Products

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The focus of this project is to evaluate land-PBL coupling in several models and observational data products using diagnostics of local coupling

Dennis Lettenmaier/Assessment of the role of surface water storage in the terrestrial water budget

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This research aims to develop monthly time series of global surface water storage change at 1/4 degree resolution for the period 1950 to 2010.

Hui Su/Using NEWS Water and Energy Cycle Products to Investigate Processes that Control Cloud Feedback

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The objective of this work will be to provide a comprehensive characterization of the spatial and temporal variations of clouds and related fluxes and thermodynamic and dynamic variables, with a focus on the tropical oceanic regions in the past decade. A high-level objective is to provide insight into physical processes responsible for discrepancies between models and observational data (mostly from satellite) that describe cloud feedback and energy fluxes.

Siegfried Schubert/Warm-Season Short-term Climate Extremes in the Northern Hemisphere in a Changing Climate: The Role of Stationary Rossby Waves

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This proposal seeks to further investigate the role of stationary Rossby waves in warm-season short-term climate extremes including how that role might change in a changing climate.

Michael Bosilovich/Quantifying observation influence on regional water budgets in reanalyses

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The initial focus of the project will be evaluating the observations assimilated in MERRA over North America, where a strong dipole structure in the vertically-integrated moisture increments during the warm season signifies a discrepancy between E-P from the model physics compared to that derived by moisture transport.

Shih-Yu Wang/Identifying extreme precipitation "hot spots" in the changing tropical-midlatitude interaction using MERRA and satellite data

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This project will conduct a focused data analysis in the study of extreme precipitation threat and identify vulnerable regions in a changing climate.

Robert Brakenridge/Accelerating Changes in Arctic Ocean River Discharge Using Coupled Satellite- and Ground-based Measurements, 2002-Present

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The objective of this project is to quantify the accelerated change in Arctic Ocean river discharge using both satellite and ground based measurements since 2002. Based on the proposed work, the team also aimed to provide a website for near real time river discharge at the validated high latitude NASA AMSR-E measurement sites.

Anita Rapp/Quantifying the water and energy budgets of marine subsidence regions

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This project seeks to study the water and energy cycles in three marine subsidence regions, namely, those off the west coasts of North America, South America, and southern Africa.

Carol Anne Clayson/Characteristics of and Relationships between Surface Heat and Moisture Fluxes and Ocean-Atmosphere Variability

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The objective of this project is to use long term satellite (SSM/I) and model (MERRA) data to study the temporal and spatial variability of the distributions of heat and moisture fluxes over the global oceans and to relate these distributions to associated weather parameters, such as near surface.

Robert Oglesby/Quantifying the Relative Roles of Local Versus Remote Effects on North American Summertime Drought

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This focus of this project is to investigate the impact of local and remote effects on North American summer time drought especially over Central USA. Secondly, we want to understand the weakness and predicting local effects for example how evapotranspiration flux affect land-atmosphere feedback.

Seiji Kato/Investigation of Earth radiation budget variability by cloud object analysis

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This proposed investigation focuses on understanding the variability of top-of-atmosphere (TOA) and surface radiation budget. The objective is to identify processes that affect TOA radiation budget by investigating cloud types (cloud objects) frequency of occurrence change and cloud property change within a cloud type. The result of our investigation offers a direct path to test climate models. Our investigation also sets requirements for climate models to properly model energy flows.

Patrick Taylor/Towards an Improved Understanding of the Diurnal Cycle Influence on Earth's Energy and Water Cycle Variability and Prediction

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Proposed is a set of studies designed to illuminate the controls on monthly, tropical diurnal cycle amplitude and phase and the physical mechanisms linking the diurnal cycle to E&WC variability. These studies focus around answering a simple science question: what are the consequences of misrepresenting cloud, precipitation, and radiation diurnal cycles for seasonal-to-annual E&WC prediction

For more information go to

<http://www.nasa-news.org/>

or

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