NASA Water Resources Program role in climate change and water applications

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Climate and environmental change are expected to fundamentally modify the water cycle with profound changes for water management. Satellite observations with modeling and in situ data provide an effective means for researchers, resources managers and decision makers to address issues from changes to the water cycle. Satellite observations provide a synoptic and repetitive capability that is well-calibrated and consistent data quality of the Earth system. These observations provide a huge volume of valuable data in both near-real-time, extended back nearly 50 years, with predictive capability about the water cycle on information such as precipitation, snow, soil moisture, water levels, land cover type and vegetation properties. NASA's Applied Sciences Program works with other groups including end users to transition NASA and other Earth science observational capabilities for possible operational implementation and decision making. The NASA Water Resources Program is one of eight elements within the Applied Sciences Program. The Water Resources program element objective is to provide NASA products for the primary goal to provide sustainable water resources. Water Resources organizes its projects under five functional themes: 1) stream-flow and flood forecasting; 2) consumptive water use (includes evapotranspiration) and irrigation; 3) drought; 4) water quality; and 5) climate impacts on water resources. NASA Water Resources funds several projects to provide improved hydrological cycle and land surface observation primarily from satellite data for decision making. These projects and related program activities provide a mechanism for evaluating and possible implementation to impact decision making. To maximize these activities NASA Water Resources Program works closely with other government agencies (e.g., the National Oceanic and Atmospheric Administration (NOAA), the U.S. Department of Agriculture (USDA) Foreign Agricultural Service (FAS), the U.S. Geological Survey (USGS), the Air Force Weather Agency (AFWA), universities, non-government organizations (e.g., the World Bank), and private sector organizations both domestically and internationally. Examples of the types of NASA contributions to the water management community include possibilities such as: 1) Using satellite observations to estimate hydrologic variables, i.e., snow water equivalent, soil moisture, aquifer volumes, reservoir storages, etc. 2) Model derived products, i.e., evapotranspiration, precipitation, runoff, ground water recharge, and other data assimilation products, etc. 3) Water quality, i.e., improved inputs from NASA models and satellite observations to nonpoint source models, turbidity, temperature, etc. The emphasis is to evaluate and incorporate the remote sensing technology in to decision making for broad and effective implementation.