# APPLICATION OF DESDynI TO WATER RESOURCE DECISION SUPPORT

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The need for accurate assessments of water resources in view of various global climate change scenarios is well documented. Several satellites scheduled to be launched in the next 5 years will add significantly to the data available to address this critical issue. The groundwork has been laid by the international community to begin thinking in terms of comprehensive assessments of water resources on global, regional, and local scales, all of which are required to have a systematic approach to monitoring, forecasting, and potentially regulating water usage, treatment, recharge, etc. This paper describes the importance of synthetic aperture radar (SAR) in water resource decision support tools by providing both high-resolution soil moisture information as well as information about sub-surface aquifers. Sample data products include maps of aquifer characteristics (e.g. size, depth, etc.) that are required for aquifer-system response and resource management. These products are based on interferometric SAR (InSAR) data with an initial focus on the southwestern United States and extension of these techniques to northern Africa.

The use of SAR for soil moisture measurements is a mature field with examples dating back more than two decades. In most cases L-band polarimetric data provide the best results. Less mature, but well documented are examples of InSAR data used to measure subsidence associated with pumping of ground water [e.g. 1,2,3]. The NASA Deformation, Ecosystem Structure and Dynamics of Ice (DESDynI) mission will provide L-band polarimetric data with a repeat cycle optimized for interferometric measurements, thus providing a significant source of data for water resource management. When combined with other satellite and suborbital data, *in situ* measurements, models, and cost benefit/risk analyses, these data will become an important component of an information system that can be used at spatial and temporal scales that are relevant for planning and policy development.

Work is already underway that will provide much of the needed capability for water resource decision support that can be tailored to the needs of African countries prior to the launch of DESDynI. For example, efforts to develop decision support capabilities have begun that enable integration across management and government sectors, bridging the gap between natural and human systems, and integrating climate change forecasts with risk management tools. In addition, the Soil Moisture Active-Passive (SMAP) Science Team is actively engaging social scientists and other beneficiaries to help identify relevant soil moisture information needs and ensure SMAP data will be used as input to their decision processes. This information will be expanded to include applications that require products with higher spatial resolution such as those that will be provided by DESDynI. Finally, SERVIR-Africa system will integrate satellite resources into a Web-based Earth information system to put information related to natural disasters, disease outbreaks, biodiversity and climate change into the hands of local scientists, government leaders, and communities.

## REFERENCES


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