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## SCALING SNOW OBSERVATIONS FROM THE POINT TO THE GRID ELEMENT: SUPPORTING NOHRSC'S NATIONAL SNOW ANALYSIS SYSTEM

*PROPOSAL TO THE DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION AND THE NATIONAL WEATHER SERVICE: HYDROLOGIC RESEARCH – CFDA #11.462*

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Proposed Duration: 04/01/07 - 03/31/10 | Proposed Cost: \$405,138

### **Abstract**

In the western U.S., mountain river basins sustain the water demand of over 60 million people. Operational water supply outlooks in these supply-limited systems are based, in part, on historical relationships between snow observations and observed runoff. These empirical models perform best near mean conditions but perform poorly during conditions not represented in the historical record. Changes in mountain climate, and associated changes in snow accumulation and melt patterns, suggest that such anomalous conditions may be occurring with increased frequency and intensity with local to regional signatures. In response, the National Operational Hydrologic Remote Sensing Center (NOHRSC) has developed the National Snow Analysis system (NSA) which produces spatial estimates of snowpack states, providing water managers with site-specific snowpack information using all available data. These snowpack products are used operationally by NOAA's National Weather Service field offices when issuing hydrologic forecasts including river and flood forecasts, water supply forecasts, and spring flood outlooks for the Nation. A critical component of NOHRSC's operations is an evaluation of residuals between the NSA-derived snow water equivalent (SWE) estimates and observed SWE at over 700 SNOwpack TELemetry (SNOTEL) stations across the western U.S. Based on these residuals, a decision is made to update NSA SWE to the observed SNOTEL SWE value. The use of SNOTEL data for evaluating and updating the NSA system assumes that SWE at a given SNOTEL station is representative of the corresponding 1-km<sup>2</sup> NSA grid-element. This project will evaluate this assumption by defining the continuum of SWE within grid elements encompassing SNOTEL stations. This project will also improve the ability to scale SNOTEL data to NSA grid elements, providing NOHRSC with information that can be used to interpret NSA residuals and efficiently update model states.

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