PA23B-0373: Applications of Satellite Data to Support Improvements in Irrigation and Groundwater Management in California

Tuesday, 12 December 2017
13:40 - 18:00
New Orleans Ernest N. Morial Convention Center - Poster Hall D-F

In agricultural regions around the world, threats to water supplies from drought and groundwater depletion are driving increased demand for tools to advance agricultural water use efficiency and support sustainable groundwater management. Satellite mapping of evapotranspiration (ET) from irrigated agricultural lands can provide agricultural producers and water resource managers with information that can be used to both optimize ag water use and improve estimates of groundwater withdrawals for irrigation. We describe the development of two remote sensing-based tools for ET mapping in California, including important lessons in terms of system design, partnership development, and transition to operations.

For irrigation management, the integration of satellite data and surface sensor networks to provide timely delivery of information on crop water requirements can make irrigation scheduling more practical, convenient, and accurate. Developed through a partnership between NASA and the CA Department of Water Resources, the Satellite Irrigation Management Support (SIMS) framework integrates satellite data with information from agricultural weather networks to map crop canopy development and crop water requirements at the scale of individual fields. Information is distributed to agricultural producers and water managers via a web-based interface and web data services. SIMS also provides an API that facilitates integration with other irrigation decision support tools, such as CropManage and IrriQuest. Field trials using these integrated tools have shown that they can be used to sustain yields while improving water use efficiency and nutrient management.

For sustainable groundwater management, the combination of satellite-derived estimates of ET and data on surface water deliveries for irrigation can increase the accuracy of estimates of groundwater pumping. We are developing an OpenET platform to facilitate access to ET data from multiple models and accelerate operational use of ET data in support of a range of water management applications, including implementation of the Sustainable Groundwater Management Act in CA. By providing a shared basis for decision making, we anticipate that the OpenET platform will accelerate implementation of solutions for sustainable groundwater management.

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