MICROWAVE REMOTE SENSING-BASED MACHINE LEARNING METHOD FOR IRRIGATION ESTIMATION IN FLORIDA

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Florida, located within the humid region of the United States, stands as a significant consumer of water resources, with agriculture representing the largest component of freshwater usage. However, determining the precise amount of irrigation water use (IWU) and its timing at a field scale remains a challenging task. Recently, various soil moisture-based methods have explored the potential of microwave remote sensing data to address this issue. Unlike optical and infrared observations, microwave signals are unattenuated by clouds and light rain, and can sense soil through the growing crop. In addition, they are highly sensitive to soil moisture because of the large contrast between electro-magnetic properties of water and soil and crop components. Recent satellite-based microwave missions, such as NASA-SMAP and ESA-Sentinel, have demonstrated the potential for irrigation estimation. Furthermore, when combined with upcoming missions like NISAR, soil moisture information may be obtained at unprecedented spatial and temporal resolutions. This study is conducted to support algorithm development for the utilization of these datasets in Florida. A machine learning (ML)-based framework was developed for estimating irrigation during the growing seasons of corn in Florida. We utilized multiyear datasets from the Florida Automated Weather Network (FAWN) and from a series of season-long Microwave, Water, and Energy Balance Experiments (MicroWEX), as benchmark datasets for training and testing the framework. This study offers a remote sensing-based ML approach for efficient water management and provides valuable insights into the application of microwave remote sensing for irrigation estimation in Florida.

PRESENTER BIO: Dr. Almendra-Martín holds a PhD in applied physics, specializing in European soil moisture analysis. She's received international honors, with a bachelor's in physics and a master's in remote sensing. Her research interests are focused on remote sensing soil moisture and machine learning, with various publications in these fields.