A framework to predict and manage soil water and plant status for the next weeks (by combining models, measurements, and satellite information)

WATERAGRI

PRACTICE ABSTRACT

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Sudden droughts are becoming more common, making reliable information products with long forecast horizons increasingly necessary for the weather- and climate-resilient agriculture. We combine physically-based models, in situ measurements, and satellite information for the best possible forecasts of conditions like soil moisture content, groundwater levels, crop status, and expected yield, among others. Water flow in streams, in the unsaturated zone (i.e., in the soil), and in the saturated zone (i.e., in an aquifer) is simulated in a spatially distributed manner using the Terrestrial System Modeling Platform (TSMP) developed at FZJ. TSMP can account for spatially varying inputs such as precipitation, other meteorological variables like global radiation, land use, crop types, and hydro(geo)logical properties. Not only short-term weather forecasts but also long-term climate change and land-use scenarios can be considered to drive simulations with TSMP. Measurements from online sensor networks and the remote sensing pipeline can be used in the data assimilation step for continuous model calibration and forecasting. Forecasts for the next 9 days can be made available online in the form of tables and diagrams (e.g., www.wasser-monitor.de). A local model for the WATERAGRI pilot site Selhausen, as a demonstration case, is currently being developed with TSMP. Forecasts for agricultural plots will provide a good basis for planning agricultural activities (e.g., irrigation). The effectiveness of drought measures will be evaluated.

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