

Managing agricultural fields: from observation to prediction

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Presentation Abstract

Climate change and especially hydro-meteorological extremes, such as droughts, are affecting the land surface of the Earth and socioeconomic well-being. Current analyses and projections indicate that the frequency of extremes will increase in the next decades, and that drought events like the years 2003, 2015 and 2018 in Europe will occur more regularly and might be more disruptive as terrestrial ecosystems will have no time to recover. Heat waves in combination with longer drought periods caused a loss in agricultural productivity but also impacted the availability of water resources (e.g. low water levels in rivers) and led to a decrease of the storage capacity of grass- and agricultural lands for carbon storage. Forecasting methodologies based on the combination of observations and integrated models provide a unique opportunity to inform farmers and stakeholders in order to better adapt to extreme drought events. New sensor technologies such as hydrogeophysical techniques and Unmanned Aerial Systems (UAS) equipped with multispectral and thermal infrared cameras, Lidar systems and smart sensors to determine soil and crop canopy properties. In addition, new developments such as remotely sensed solar-induced fluorescence (SIF) at high spatial and temporal resolution and new satellite missions will allow to better inform land surface and crop growth models in order to adjust irrigation management before crops are being severely damaged by droughts. In this presentation, we will highlight the value of continuous observations in constraining predictions of hydrological states and fluxes as well as vegetation parameters.