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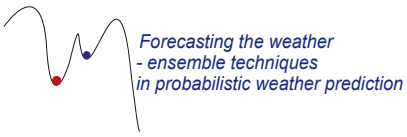

Use of ASCAT derived soil moisture data for spatial crop model application – a case study from Austria

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Crop simulation models are often used to describe the impact of weather conditions and management strategies on crop growth and yield at field scale. Problems are mainly evident for spatial application at regional scales where model input parameters have to be gathered from scattered point locations such as weather stations. The most promising method to overcome this problem is combining crop growth models and remote sensing data.

Weak quality or representativity of input data are a main source of uncertainty in simulated outputs (beyond the representation of significant natural processes in the model) such as the spatial representation of the weather and soil input data. Especially soil input data and related soil water content variations need to be considered critically, because of its importance for soil water storage and availability for crops.

Since most crop models integrate at daily time steps, daily weather data as input data are required, consisting at least of maximum and minimum temperature, solar radiation as well as precipitation. Crop phenology and development are estimated as a function of temperature, day length, and genetic characteristics. Leaf development, growth, and expansion define the amount of light intercepted, which is supposed to be proportional to biomass production. Depending on the crop development status the biomass is split to different growing parts in the plant. Optional water and nitrogen submodels provide feedback, which influences the development as well as growth processes.

Soil water content at different soil layers is calculated by the crop model and represents a main growth limiting factor. It is however often affected by uncertainties from severel sources. Therefore the spatial-temporal simulated surface water contents are critical for high resolution crop modelling, which could be improved by remote sensed soil moisture data.

In the frame of the Global Monitoring of Soil Moisture for Water Hazards Assessment (GMSM) Project procedures for better spatial-temporal crop model initialisation and calibration were investigated. The dynamic crop growth and yield model DSSAT was used in the case study region of “Seewinkel”, which is one of the driest and warmest regions in Austria.