



Determining the spatial variability of crop yields of two different climatic regions in Southwest Germany

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Assessing the spatial variability of soil physical properties is crucial for agricultural land management. We determined the spatial variability within two agricultural fields in the regions of Kraichgau and Swabian Jura in Southwest Germany. We determined soil physical properties and recorded the temporal development of soil mineral nitrogen (N) and water content as well as that of plant variables (phenology, biomass, leaf area index (LAI), N content, green vegetation fraction (GVF)). The work was conducted during the vegetation periods of 2015 and 2016 in winter wheat, and winter rapeseed in Kraichgau and winter barley and silage maize on Swabian Jura. Measurements were taken in three-weekly intervals. On each field, we identified three plots with reduced plant development using high-resolution (RapidEye) satellite images ("cold spots"). Measurements taken on these cold spots were compared to those from five established (long-term) reference plots representing the average field variability. The software EXPERT-N was used to simulate the soil crop system at both cold spots and reference plots. Sensitivity analyses were conducted to identify the most important parameters for the determination of spatial variability in crop growth dynamics.