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How valuable are citizen science data for a space-borne crop growth monitoring? – The reliability of self-appraisals

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Space-borne Earth Observation (EO) data depicting vegetation covered land surfaces contain insufficient information for an unambiguous interpretation of the spectral signal in terms of variables that characterize the vegetation state (e.g., leaf area index, leaf chlorophyll content and proportion of senescent material). For the retrieval of vegetation properties from EO data, an optimal estimate of the state variables needs to be found. The uncertainty of such an estimate can be reduced by combining EO data and in situ data. Information provided by citizens represents a valuable and mostly inexpensive source for in situ data. Since the quality of such data can be diverse, the consideration of uncertainties is of great importance.

In this contribution, we present a concept for the elicitation of local knowledge from citizens with respect to the application of management practices (e.g., sowing and harvesting date, irrigation) and the instantaneous state of crops. The concept includes the acquisition of in situ data as well as an uncertainty assessment (precision and/or accuracy). The latter involves a profiling in which inherent uncertainties are quantified for individual citizens. This concept was tested for agricultural fields of the Durable Environmental Multidisciplinary Monitoring Information Network (DEMMIN) test site in Northeast Germany. Within the frame of several field seminars, students were requested to assess management practices and the instantaneous state of crops. Furthermore, they assessed their own ability to create valid data. They filled in pseudonymized questionnaires from which we created corresponding datasets. At the same day, field data were collected with appropriate equipment and can be used as reference against which student estimates can be compared. The level of compliance between estimated and measured data was determined on an individual basis.

The results of this analysis will be presented. Conclusions will be drawn regarding the ability of the students to evaluate their own skills. In addition, we will demonstrate an approach for a digital ascertainment of in situ data. In the future, this approach will be used to collect in situ data for the setup of refined prior information within the frame of the Earth Observation Land Data Assimilation System (EO-LDAS).