

The iPot Project: improved potato monitoring in Belgium using remote sensing and crop growth modelling

I. Piccard¹, K. Nackaerts¹, A. Gobin¹, J.-P. Goffart², V. Planchon², Y. Curnel², J. Wellens, B. Tychon³, R. Cools⁴, N. Cattoor⁴

- ¹ Vlaamse Instelling voor Technologisch Onderzoek (VITO), Mol, BELGIUM
- ² Centre wallon de Recherches agronomiques (CRA-W), Gembloux, BELGIUM
- ³ Université de Liège (ULg), Arlon, BELGIUM
- ⁴ Belgapom, Berlare, BELGIUM

iPot geo-information products

Background

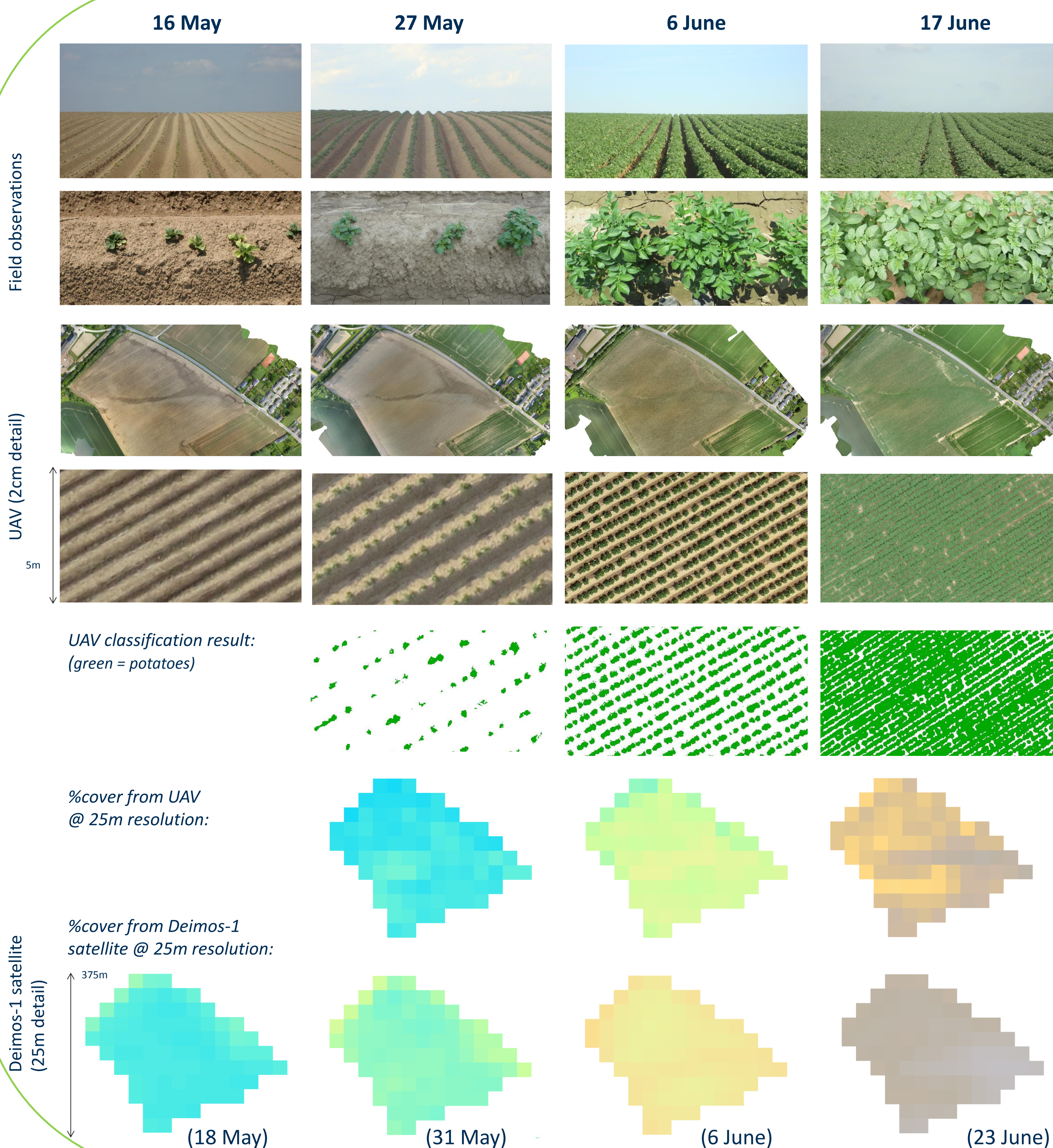
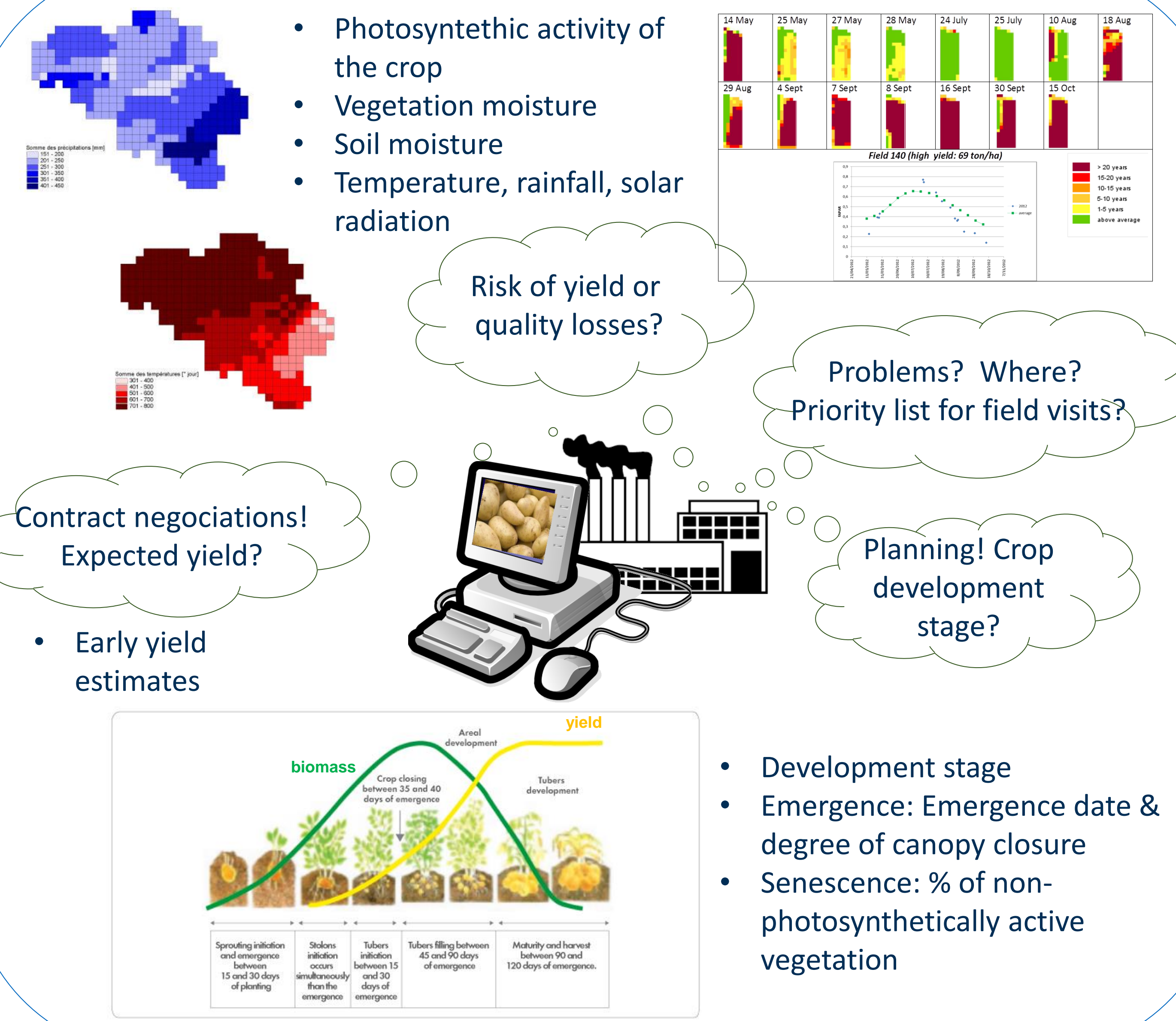
Belgian potato processors, traders and packers are increasingly working with potato contracts. The close follow-up of contracted parcels through monitoring is becoming an important tool to improve the quantity and quality of the potato crop and reduce risks of storage, packaging or processing. Monitoring strengthens the competitiveness of the Belgian potato production and processing chain in a global market.

iPot objective

Today the use of geo-information by the (private) agricultural sector in Belgium is limited, notwithstanding the great benefits this type of information may offer, as recognized by the sector. The iPot project, financed by the Belgian Science Policy Office (BELSPO), aims to provide the Belgian potato processing sector, represented by Belgapom, with near real time information on field condition (weather-soil), crop development and early yield estimates, derived from a combination of satellite images and crop growth models. An web-based geo-information platform is developed to allow the Belgian potato industry and research centres to access, analyse and combine the data with their own field observations for improved decision-making.

Methodology

A multi-scale approach is used for potato monitoring and yield estimation, integrating field observations and close range sensing measurements with UAV and satellite images and crop growth models.



Results and conclusion

Between mid-May and the end of June 2014 potato fields in Gembloux were monitored from emergence till canopy closure. UAV images (RGB) and digital photographs were taken at ten-daily intervals.

Crop emergence maps show the time (date) and degree of crop emergence and crop closure (in terms of % cover). For three UAV flights during the growing season RGB images at 3 cm resolution were processed using a K-means clustering algorithm to classify the crop according to its greenness. Based on the greenness, %cover and daily cover growth were derived for 5x5m pixels and 25x25m pixels. The latter resolution allowed for comparison with high resolution satellite imagery. Vegetation indices such as %Cover and LAI were calculated with the Cyclopes algorithm (INRA-EMMAH) from high resolution satellite images (DMC/Deimos, 25m pixel size). DMC based cover maps showed similar patterns as compared with the UAV-based cover maps, and confirms the application of satellite derived data for the follow-up of contracted potato parcels.

