



Sub-parcel terroir mapping supported by UAV-based hyperspectral imagery

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There is a greater need to better understand the regional-to-parcel variations in viticultural potential. The differentiation and mapping of the variability of grape and wine quality require comprehensive spatial modelling of climatic, topographic and soil properties and a “terroir-based approach”. Using remote and proximal sensing sensors and instruments are the most effective way for surveying vineyard status, such as geomorphologic and soil conditions, plant water and nutrient availability, plant health.

UAV (Unmanned Aerial Vehicle) platforms are ideal for the remote monitoring of small and medium size vineyards, because flight planning is flexible and very high spatial ground resolution (even centimeters) can be achieved. Using hyperspectral remote sensing techniques the spectral response of the vegetation and the bare soil surface can be analyzed in very high spectral resolution, which can support terroir mapping on a sub-parcel level.

Our study area is located in Hungary, in the Tokaj Wine Region, which is a historical region for botrytized dessert wine making. The area of Tokaj Wine Region was formed mostly by Miocene volcanic activity, where andesite, rhyolite lavas and tuffs are characteristic and loess cover also occurs in some regions. The various geology and morphology of this area result diversity in soil types and soil properties as well.

The study site was surveyed by a Cubert UHD-185 hyperspectral camera set on a Cortex Octocopter platform. The hyperspectral images were acquired in VIS-NIR (visible and near-infrared; 450–950 nm), with 4 nm sampling interval. The image acquisition was carried out at bare soil conditions, therefore the most important soil properties, which has dominant role by the delineation of terroir, can be predicted. In our paper we will present the first results of the hyperspectral survey.