



Spatio-temporal effects of soil and bedrock variability on grapevine water status in hillslope vineyards.

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Hillslope vineyards show various and complex water dynamics between soil and plants, and in order to gain further insight into this phenomenon, 8 grapevine plots were monitored during three vintages, from 2010 to 2013, on Corton Hill, Burgundy, France. Plots were distributed along a topolithosequence from 330 to 270 metres a.s.l. Grapevine water status was monitored weekly by surveying water potential, and, at the end of the season, by the use of the $\delta^{13}\text{C}$ analysis of grape juice. Soil profile of each plot was described and analysed (soil texture, gravel content, organic carbon, total nitrogen, pH, CEC). Soil volumetric humidity was measured weekly, using TDR probes. A pedotransfer function was developed to transform Electrical Resistivity Imaging (ERI) into soil volume wetness and therefore to spatialise and observe variation in the Fraction of Transpirable Soil Water (FTSW). During the three years of monitoring, grapevines experienced great variation in water status, which ranged from low to considerable water deficit (as expressed by pre-dawn leaf water potential and $\delta^{13}\text{C}$ analysis of grape juice). With ERI imaging, it was possible to observe differences in water absorption pattern by roots, in different soils, and at different depth. In addition, significant differences were observed in grapevine water status in relation to variations in the physical characteristics of the terroir along the hillslope (i.e. the geo-pedological context, the elevation etc.). Grapevine water behaviour and plant-soil water relationships on the hillslope of Corton Hill have been extensively characterised in this study by ultimate technologies, allowing to present this terroir as a very interesting example for future generalisation and modelling of the hillslope vineyard water dynamics.