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Soil water and transpirable soil water fraction variability within vineyards of the Penedès DO (NE Spain) affected by management practices

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This work investigated the variability in soil water recorded within the vineyard plots related to soil properties and management practices and its influence on the transpirable sol water fraction. The study was carried out in vineyards in the Penedès Designation of Origin, planted with Chardonnay, with different disturbance degree and with compost treated and untreated areas within the plots. The response in years with different rainfall distributions, included years with extreme situations were evaluated. The main soil types are Typic Xerorthent and Calcixerollic Xerorthent and soil is bare most of the time. Soil water content was measured at different depths using TDR probes. The transpirable soil water fraction was estimated as the ratio between available soil water (ASW) at a given date and the total transpirable soil water (TTSW). TTSW was estimated as the soil water reserve held between an upper and lower limit (respectively, the soil water content near field capacity and soil water content at the end of a dry summer) and integrated over the estimated effective rooting depth.
Both minimum and maximum soil water values varied within the plot at all depths. On the surface the minimum values ranged between 4.45 to about 10%, while on deeper layers it ranged between 7.8 and 17.8%. Regarding the maximum value varied between 17.45 and 24.8%. The transpirable soil water fraction for a given year varied significantly within the plot, with differences greater than 20% between the treated and untreated areas. The results were more exacerbated in the driest years an in those with more irregular distribution. Water available has a significant effect on yield. The results indicate the need of using different strategies for water management within the plots.