EGU2020-7384
https://doi.org/10.5194/egusphere-egu2020-7384
EGU General Assembly 2020

Pedoclimatic comparison of three viticultural areas of Italy devoted to high-quality Aglianico and Cabernet Sauvignon production

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In the Mediterranean area, the expected increase in temperature coupled with the decrease in rainfall, as well as the increase in the frequency of extreme events (heatwaves and drought, IPCC, 2019), will severely affect the survival of current vineyard areas. Cultivar thermal requirement and soil water availability could be not satisfied, leading to a limitation in yield and berry quality also due to constraints in the achievement of optimal grape maturity.

In this context, the understanding of how the spatial viticultural suitability will change under climate change is of primary interest in order to identify the best adaptation strategies to guarantee the resilience of current viticultural areas. Moreover, the improvement of knowledge of climate, soil, and their interaction for each specific cultivar will be fundamental because the terroir system is based on this interaction able to influence the plant status (e.g., water).

In this study, different pedo-climatic conditions (past, present, and future) in three Italian sites at different latitudes (from center to southern), were compared for two red varieties of grapevine: Aglianico (indigenous cv) and Cabernet Sauvignon (international cv).

Grapevine adaptation to future climate in each experimental farm in Campania, Molise, and Sicily Italian regions has been realized through the use of bioclimatic indexes (e.g., Amerine & Winkler for Aglianico 2110 GDD). The climatic evaluation was performed using Regional Climate Model COSMO-CLM at high-resolution (8km x 8km) climate projections RCP4.5 and RCP 8.5 (2010-2100) and Reference Climate (RC, 1971-2005).

Results have shown how climate change will affect the cultivation of Aglianico and Cabernet Sauvignon, considering both the climate and bioclimatic needs of cultivars themselves in the current viticultural areas.

Finally, coupled with the climatic evaluation, a pedological survey to characterize the soils, and the analysis of satellite images (Sentinel2) coupled with stemwood anatomical analysis has been performed to reconstruct the past eco-physiological behavior.

How to cite: Monaco, E., De Mascellis, R., Barbato, G., Mercogliano, P., Buonanno, M., Brook, A., De Micco, V., and Bonfante, A.: Pedoclimatic comparison of three viticultural areas of Italy devoted to high-quality Aglianico and Cabernet Sauvignon production, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-7384, https://doi.org/10.5194/egusphere-egu2020-7384, 2020.