EGU21-13467
https://doi.org/10.5194/egusphere-egu21-13467
EGU General Assembly 2021

Application of the Vineyard Geologic Identity Concept to Two Marquette-producing Vineyards in the Champlain Valley, Vermont, USA

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The concept of "Vineyard Geological Identity" (VGI) was introduced (Ferretti, 2019: *Catena*) in recognition of the role of geologic setting in contributing to fertility, hydrology, and other important aspects of vineyard soils. This study applied the VGI concept to two vineyards in the Champlain Valley of Vermont, USA where a burgeoning wine-making industry has been catalyzed by the development of French-American hybrid grape variety capable of surviving cold winters and bringing fruit to ripeness in relatively cool summers. The vineyards studied here, "LP" and "SV", both produce the hybrid grape known as "Marquette", are at a similar elevation (~100 m), have a similar macroclimate (MAT ~7 °C, MAP ~ 850 mm, ~1400 GDD), and were inundated by proglacial Lake Vermont during deglaciation (~15,000 years ago). Notable differences between the sites are the lithology of the underlying bedrock (Ordovician carbonate at LP, and Cambrian quartzite at SV), and the fact that the SV site was located at the edge of a marine embayment at the Pleistocene/Holocene transition after Lake Vermont drained. The hypothesis tested was the prediction that despite their broadly similar physical settings and geologic histories, the VGI of the two vineyards would vary as a result of differences in their underlying bedrock and the soil parent materials at these settings. Samples were collected at depths of 25, 50, 75, and 100 cm from 10 locations within the Marquette block at in each vineyard. All samples were evaluated for grain size distribution (with the hydrometer method and a laser scattering analyzer), thermogravimetric analysis (from 25 to 1000 °C), pH, nutrient status, base saturation, and cation exchange capacity. The deepest samples were also analyzed for mineralogy (with XRD) and major element chemistry (with XRF). Results confirm the tested hypothesis. Most base cations are significantly more abundant in the samples from the LP site (reflecting the underlying carbonate bedrock), and the LP site is significantly finer grained (reflecting its former deepwater location in Lake Vermont). Conversely, at the SV vineyard Na is significantly more abundant and samples are significantly coarser, consistent with the former location of this site in the nearshore zone of a marine embayment. In future work these results could be used as a physical foundation for evaluating the possible role of terroir in controlling aspects of the flavors expressed in Marquette wines from these two vineyards.