Evaluating sleep-slope cultivation practices through a grand comparison of 50 vineyards

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**Abstract.** Agricultural hillslopes typically show diverse terraced and non-terraced cultivation systems. Effective Soil and Water Conservation (SWC) performance is increasingly important to cope with climate impacts such as extreme rainfall or drought, both common threats in Italian agriculture. Whereas past research has illustrated the SWC impact of several cultivation techniques (<https://doi.org/10.1016/j.catena.2020.104604>), we provide a first-time extensive analysis of 50 vineyards cultivated by 5 different terracing and non-terracing techniques in the cultural landscape of Soave, northern Italy: Slope-wise Cultivation (SC), Contour Cultivation (CC), Contour Terracing (CT), Broad-base Terracing (BT) and Oblique Terracing (OT). Through a systematic workflow of high-resolution topographic analysis, physical erosion modelling, and statistical analysis, a set of SWC indicators are computed for the 50 vineyards. The processes and patterns of surface water flow and erosion occurring in the different systems are visualised and quantified. In this analysis, a distinction is made between uphill and downhill zones inside each vineyard, in order to distinguish between detachment and deposition hotspots. Our findings provide novel and relevant insights about the SWC effectiveness of common Italian terraced and non-terraced cultivation practices, providing practical guidelines for sustainable landscape planning based on extensive and systematic analysis.