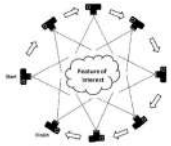
Prof. Paolo Tarolli

FONDO EUROPEO AGRICOLO PER LO SVILUPPO RURALE: L'EUROPA INVESTE NELLE ZONE RURALI

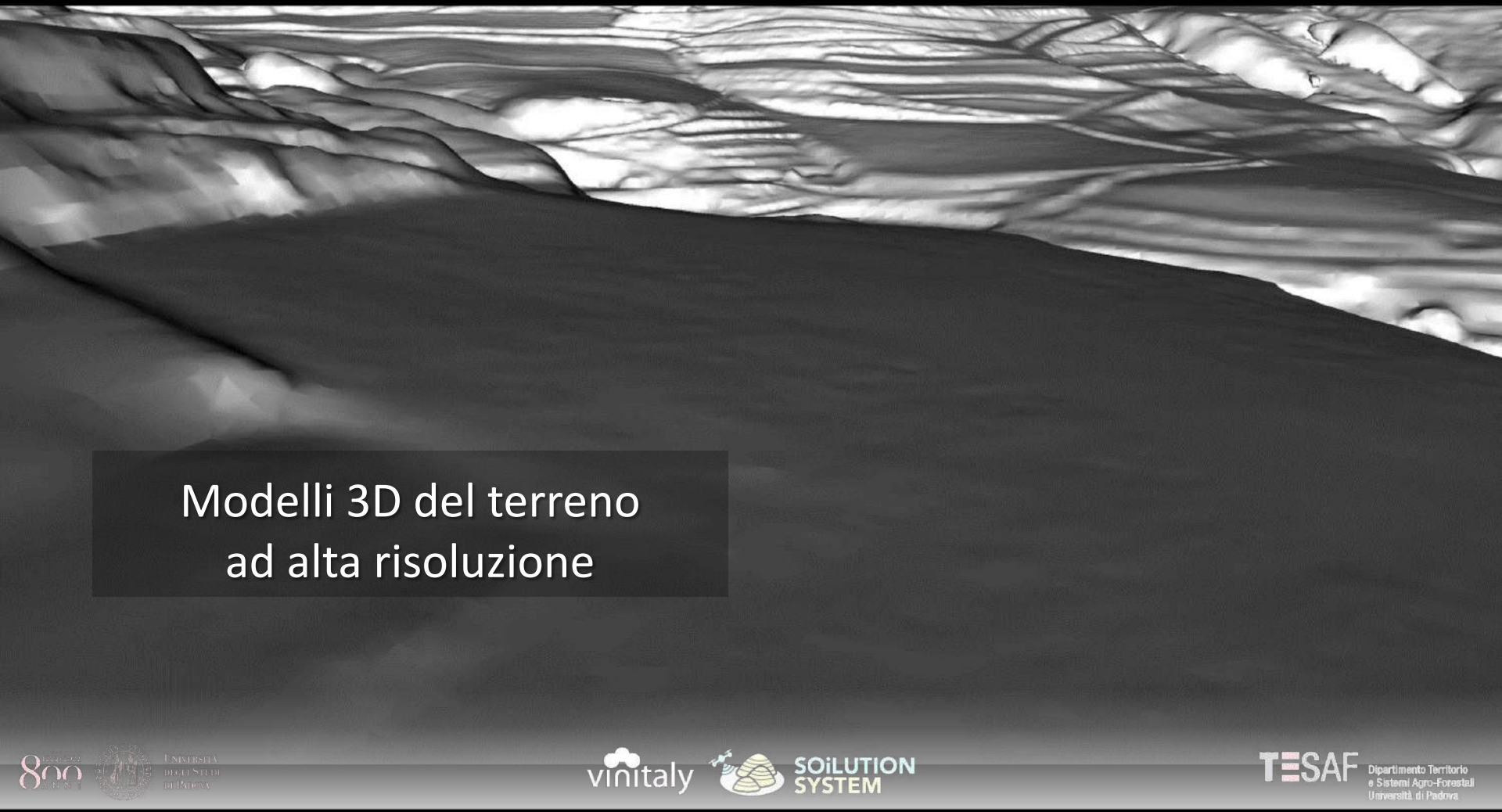
WP1
analisi digitale del terreno



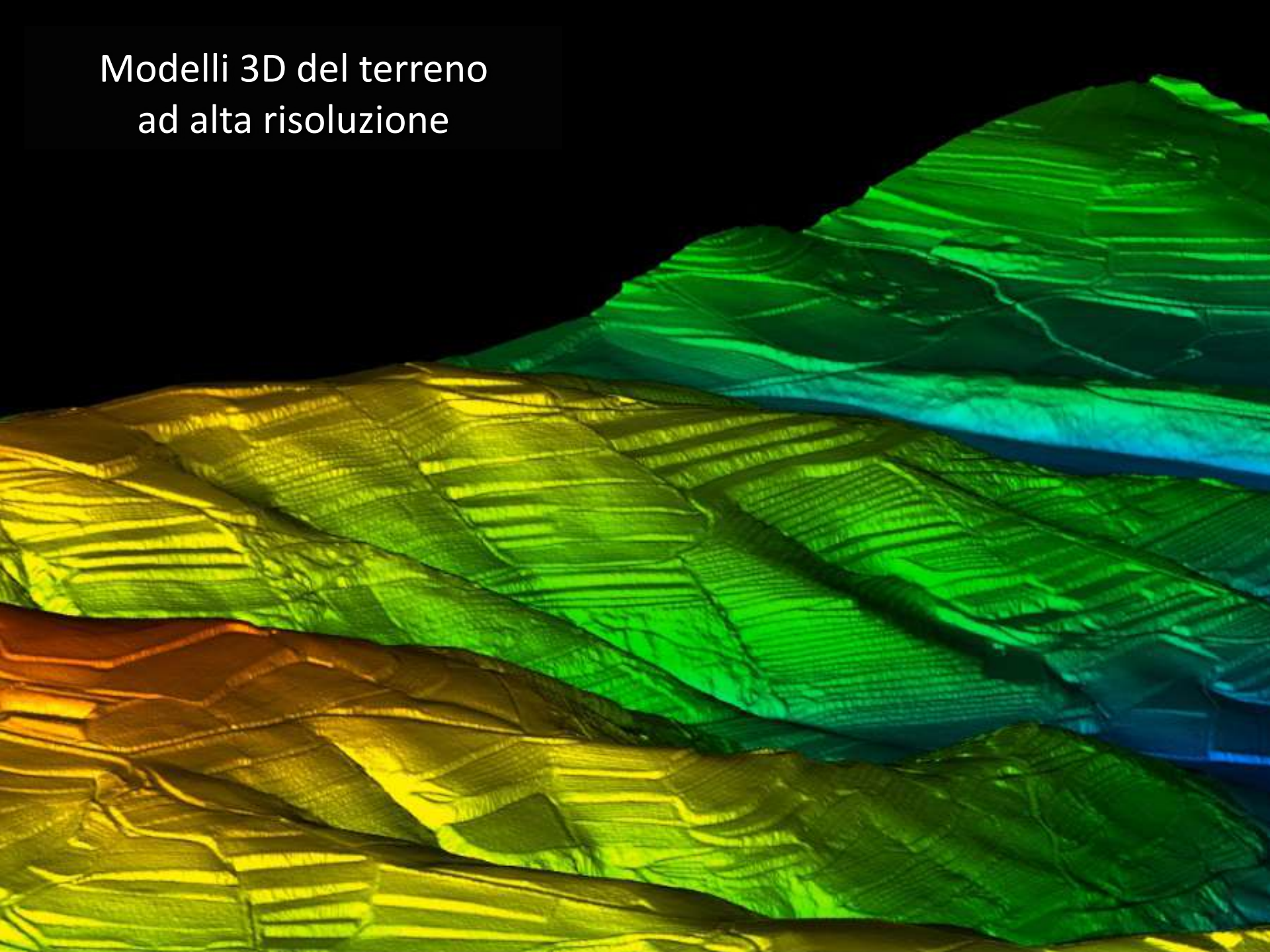
www.soilutionsystem.com

SOiLUTION SYSTEM

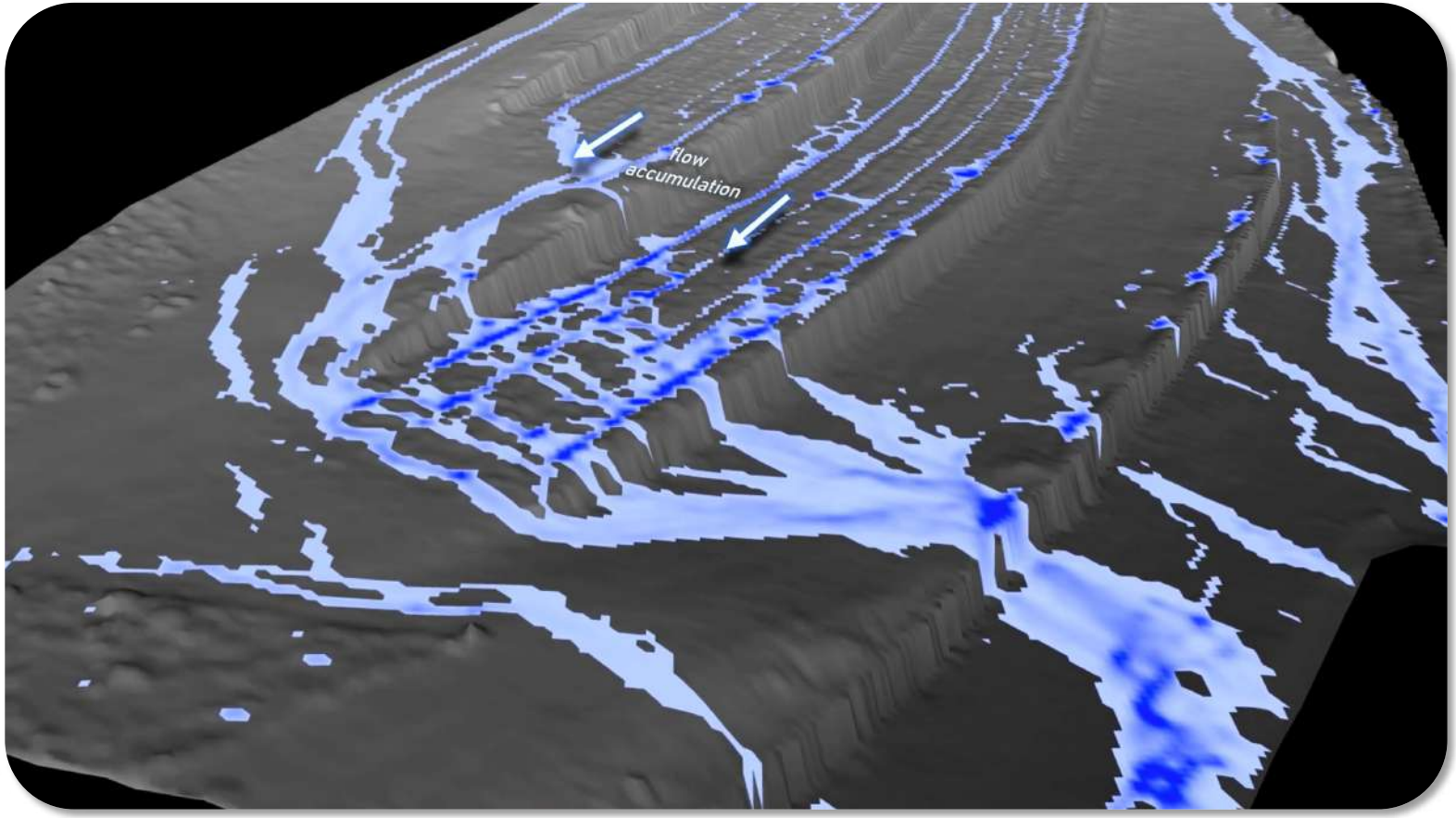
nuvola di punti 3D, rilievo fotogrammetrico con drone, con tecnica Structure from Motion (SfM)


Modelli 3D del terreno
ad alta risoluzione

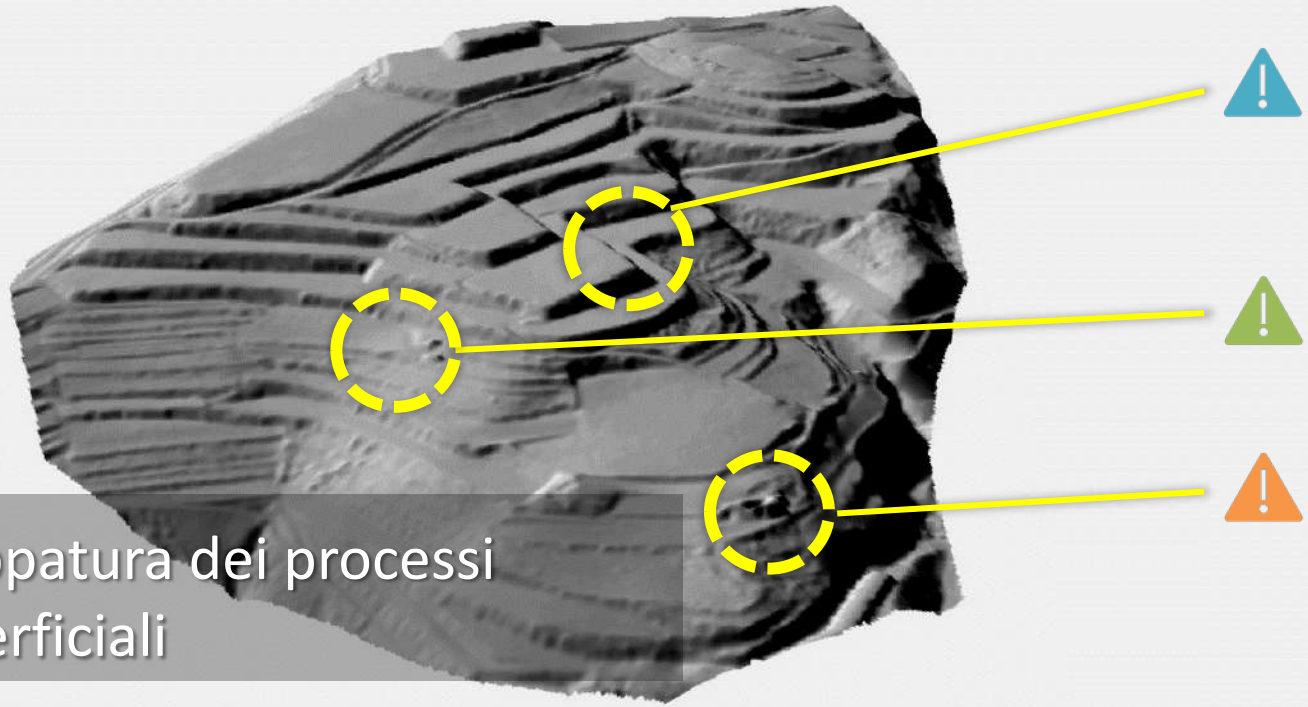
Modelli 3D del terreno ad alta risoluzione



analisi di dettaglio del deflusso a scala aziendale (20 cm dimensione pixel, DTM)



Individuazione punti critici



Mappatura dei processi superficiali

Modello 3D del terreno (1 m di cella)

una “Vaia” per i vigneti

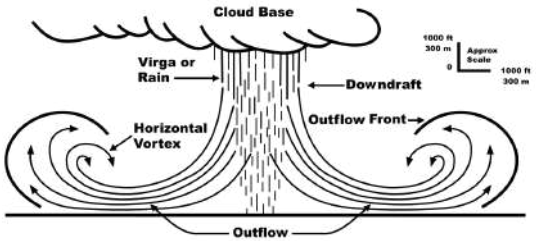
Food and Agriculture Organization of the United Nations | Globally Important AGRICULTURAL HERITAGE Systems

SOAVE TRADITIONAL VINEYARDS — Soave Traditional Vineyards Officially recognized by FAO as a Globally Important Agricultural Heritage Site

EGU BLOGS | GeoLog | Network | Divisions

Climate Change: is Viticulture under threat?

Paolo Tarolli · December 21, 2020 · Agriculture, Atmospheric hazard, Climate Change, Climate extremes, Cost of natural hazards, Environment, Geomorphology, Hazard management, Hydrogeology, Hydrology, Landslide hazard, Natural hazard, Soil erosion, Sustainability · 1 Comment



concentrazione deflusso dell'acqua (colore rosso) – aree con maggiore propensione all'erosione

SOiLUTION SYSTEM

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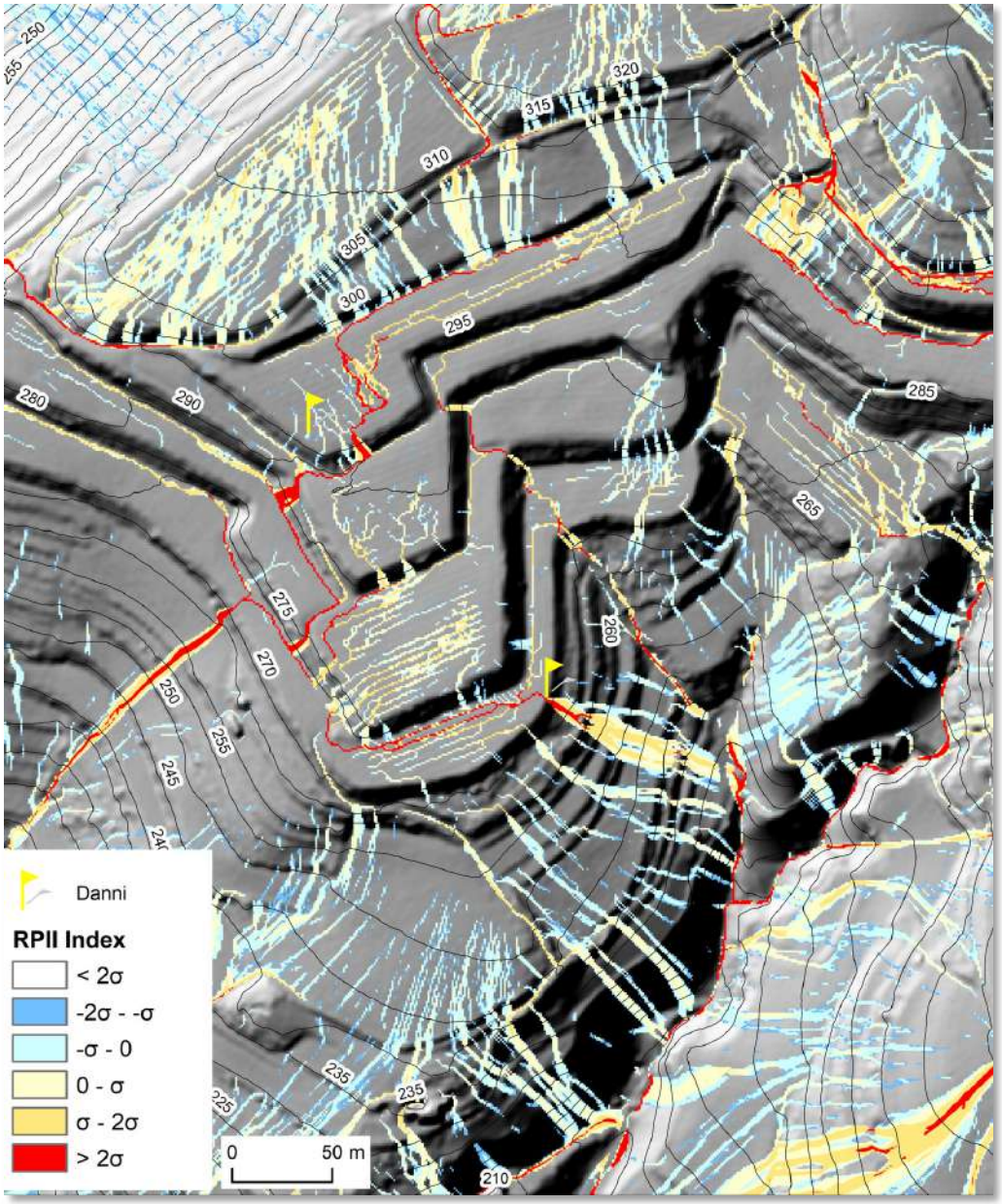

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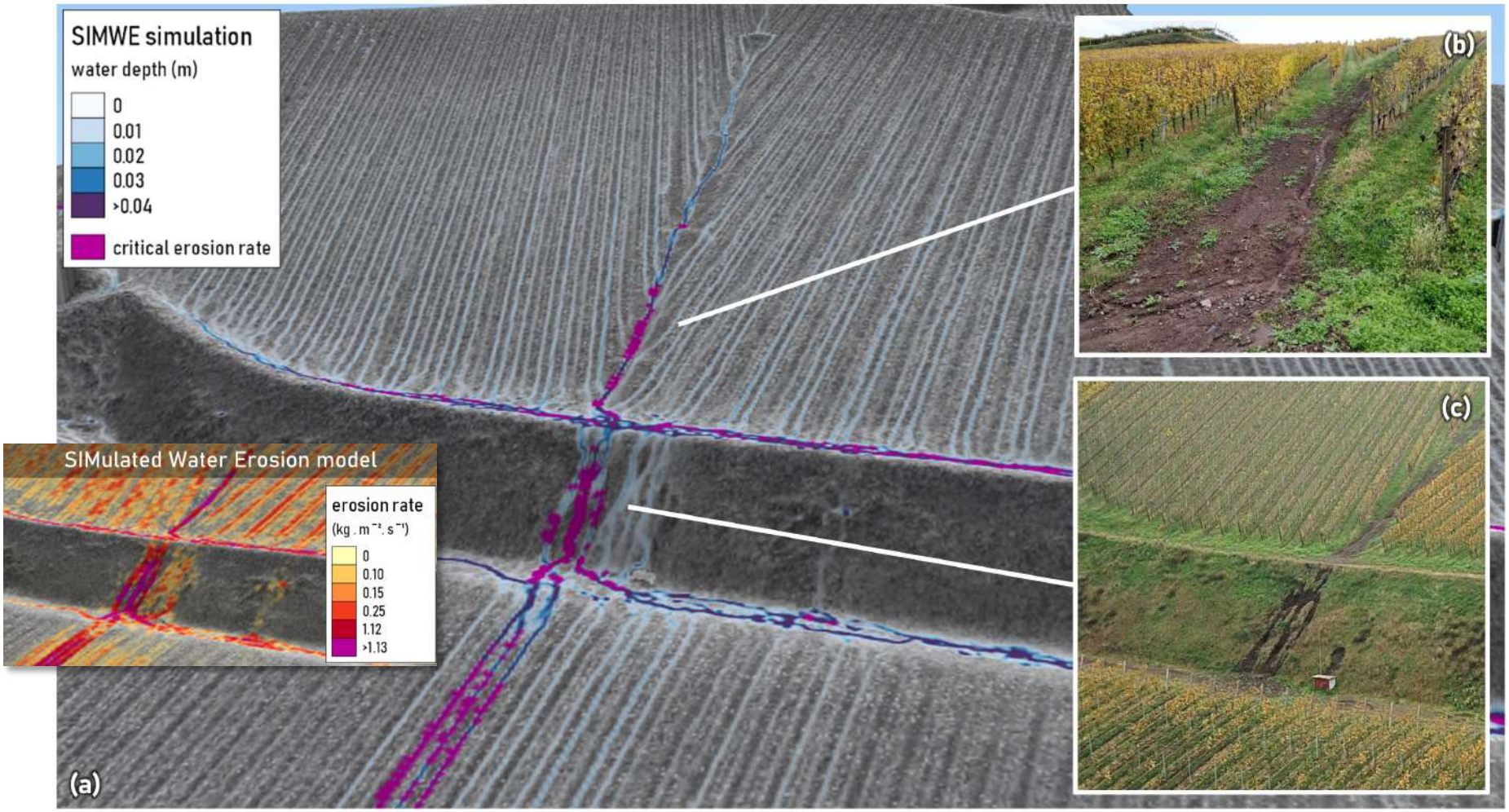
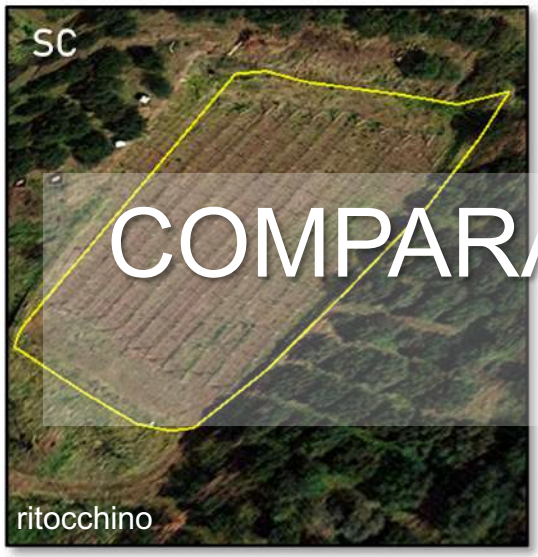
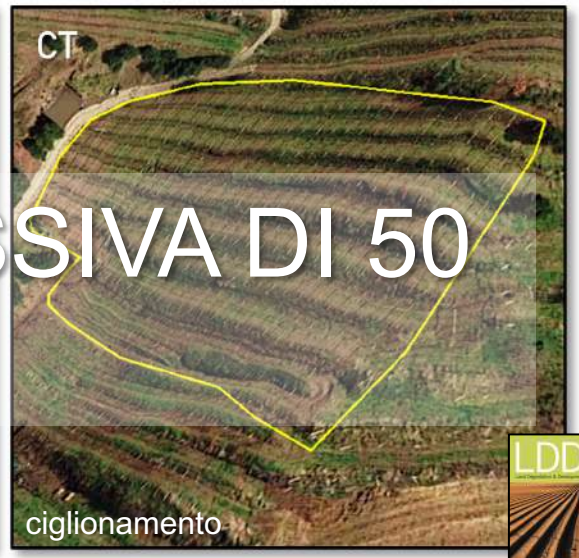
analisi di dettaglio dell’erosione



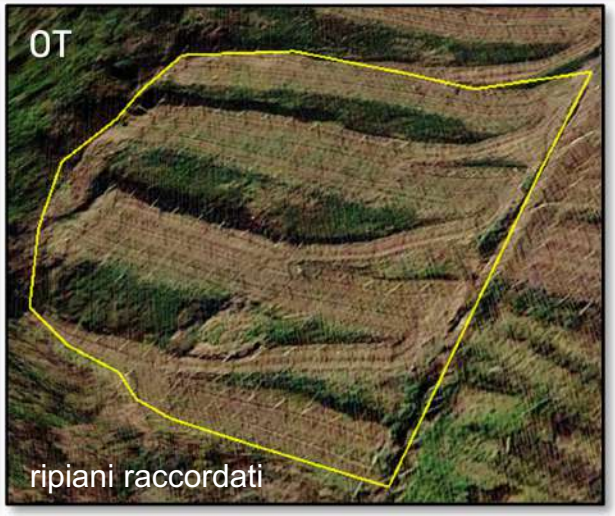
Pijl, A., Reuter, L.H.E., Quarella, E., Vogel, T.A., Tarolli, P. (2020). GIS-based soil erosion modelling under various steep-slope vineyard practices. ***Catena***

classificare le sistemazione agrarie più opportune sulla base del trasporto di sedimento durante eventi meteo molto intensi



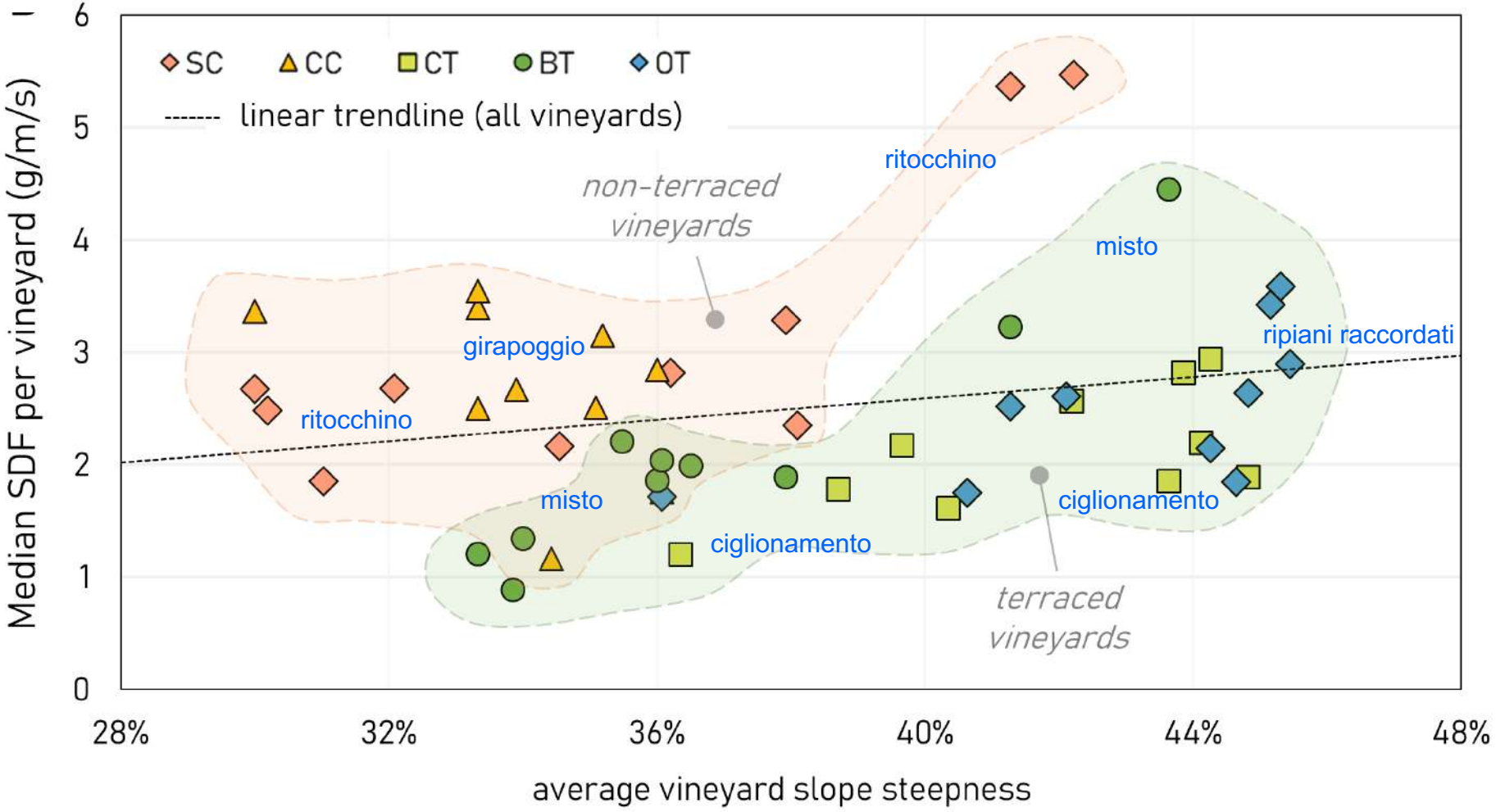


COMPARAZIONE MASSIVA DI 50 VIGNETI



Pijl, A., Wang, W., Straffelini, E., Tarolli, P. (2022). Soil and water conservation in terraced and non-terraced cultivations: an extensive comparison of 50 vineyards. ***Land Degradation & Development***

182 mm/h 5-min ⇨ stazioni ARPAV, San Giovanni Ilarione e Chiampo, 29 agosto 2020



Pijl, A., Wang, W., Straffelini, E., Tarolli, P. (2022). Soil and water conservation in terraced and non-terraced cultivations: an extensive comparison of 50 vineyards. ***Land Degradation & Development***

Soil & Tillage Research 222 (2022) 105418

Contents lists available at ScienceDirect

Soil & Tillage Research

journal homepage: www.elsevier.com/locate/still

A high-resolution physical modelling approach to assess runoff and soil erosion in vineyards under different soil managements

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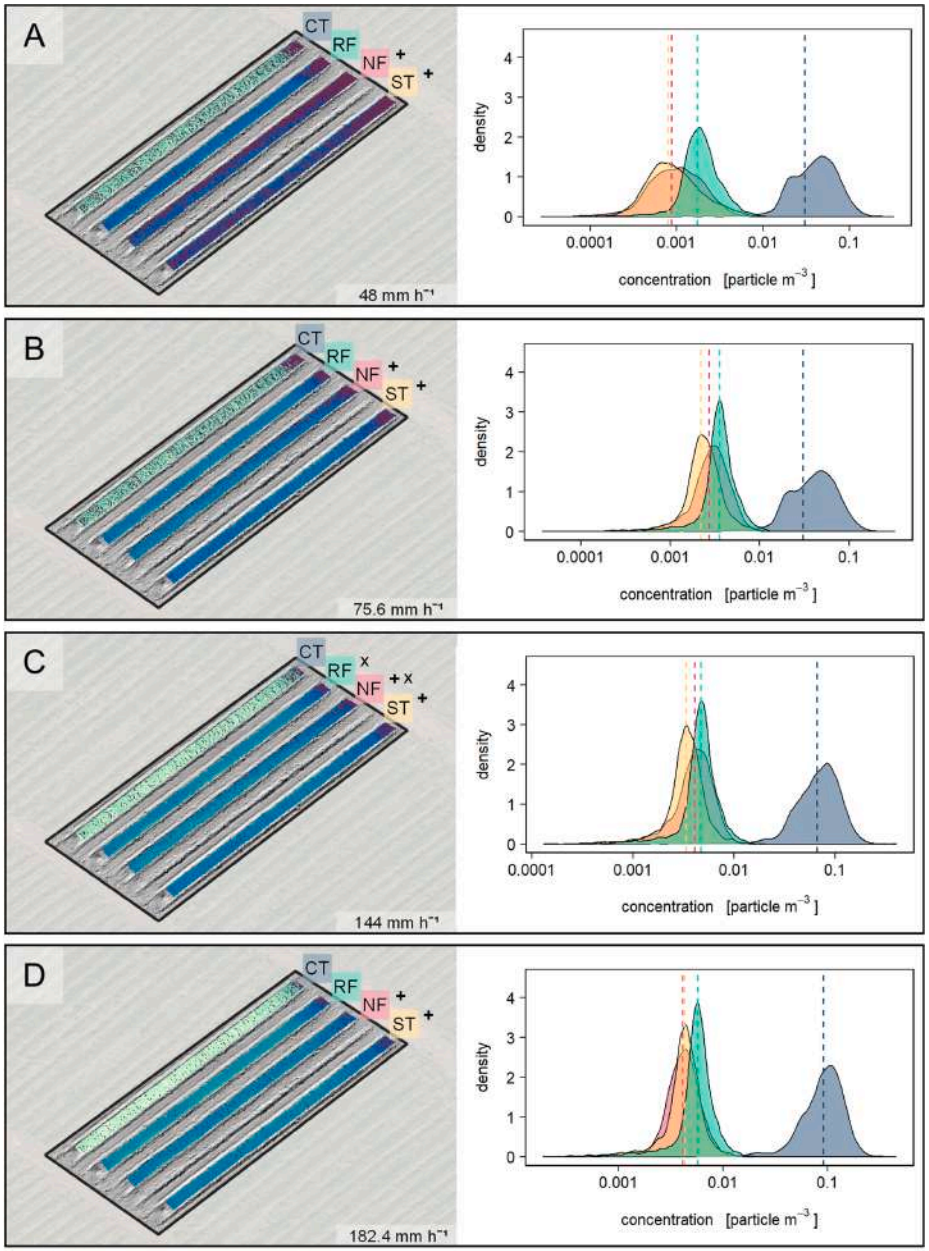
ARTICLE INFO

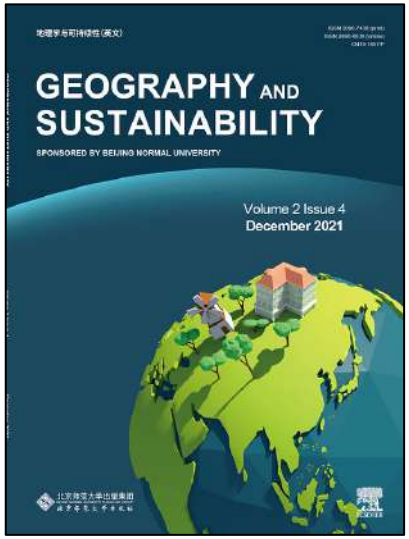
Keywords:
Vineyard
Soil management
Runoff
Soil erosion
Modelling
UAV-SfM

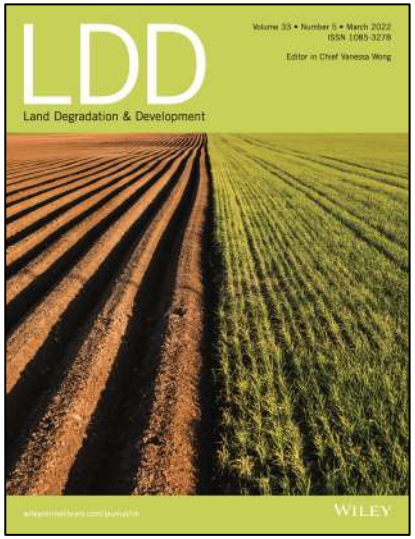
ABSTRACT

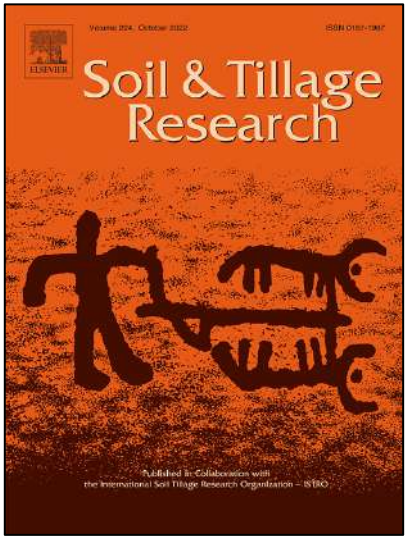
Steep-slope viticulture is a common practice in the Mediterranean basin, and provides landscapes of considerable socio-economic value. However, these complex agricultural systems are intrinsically fragile. One of the main problems is soil erosion due to extreme rainfall events. This may cause a progressive reduction in soil fertility and the occurrence of instabilities and land degradation phenomena. To worsen this condition there is the increasing mechanisation of agricultural management causing soil compaction, and the pressure of climate change, with an intensification of extreme weather events. In this context, vineyard soil management plays a key role, as it can accelerate or mitigate overland flow and soil erosion phenomena. There are various techniques for quantifying these processes, often based on field measurements through prolonged data collection using experimental plots. However, the advent of new technologies in remote sensing opens new frontiers in the acquisition of high-resolution spatial data. Indeed, they could be used in runoff/erosion simulation models and integrated with site-specific data.

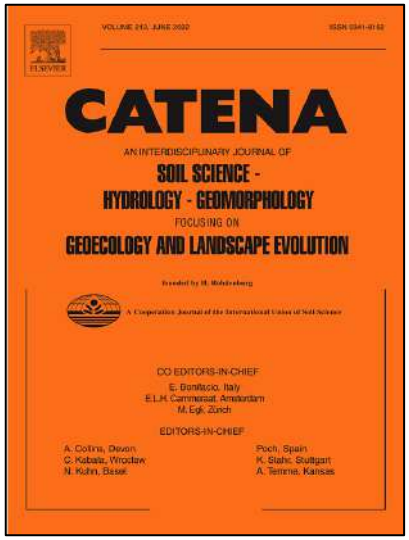
The aim of this paper is to assess runoff and soil erosion processes in vineyard under four different soil managements. Specifically, four practices were tested: (1) Reference (inter-row managed with standard farm grass cover; RF); (2) Continuous Tillage (bare soil obtained by continuous mechanical weeding using roto-tiller; CT); Nectariferous (a mix of herbaceous species capable of attracting insects favouring inter-row biodiversity; NF); (4) Single Tillage (inter-row weeding once a year using roto-tiller; ST). The research proposes a modelling approach using a physically-based model (SIMWE) using samples of runoff and sediment as an assessment, collected with a low-cost methodology. In particular, a cost-effective approach easily replicable in different contexts (such as developing countries) is sought. In addition to cultivation specifics, areas of soil compacted by the passage of agricultural vehicles were also analysed using the connectivity index. In general, results show an interesting capacity of ST in mitigating soil erosion, as well as for NF. Furthermore, the negative role of wheel tracks as preferential pathways for surface runoff and sediment is highlighted. Finally, the work shows that CT aggravated soil erosion as compared to RF.

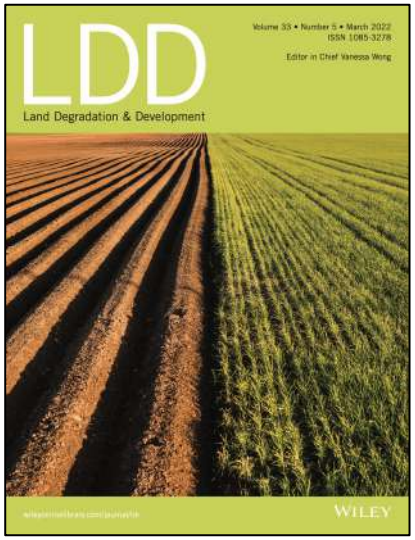

A
CT
RF
NF
ST
48 mm h⁻¹
density
concentration [particle m⁻³]
B
75.6 mm h⁻¹
C
144 mm h⁻¹
D
182.4 mm h⁻¹
Sed.Con. [particle m⁻³]
0
0.20
0 10 m











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