Visual assessments and model estimations of soil erosion and relations to soil organic carbon Hakan Djuma, Adriana Bruggeman, Marinos Eliades Energy, Environment and Water Research Center, The Cyprus Institute

Objective:

 to assess the relation between sampled soil organic carbon (SOC) concentrations and two different soil erosion estimates: (1) visual assessment (WOCAT) and (2) a process-based model (PESERA)

Study-site:

Peristerona watershed, Cyprus





Methodology (2/2):

WOCAT questionnaire application (visual estimation):

Questions to be answered per mapping unit	Explanation	
What is the areal extent of soil erosion?	% of mapping unit	
What is the current degree of the soil erosion?	Light, Moderate, Strong, Extreme	
What are the major types of soil erosion?	Top soil loss, gully erosion, mass movements, riverbank erosion, offsite degradation effects	

WOCAT assessment PESERA model application (processed based erosion model):

-Process-based erosion model (t h⁻¹ yr⁻¹) for hill slopes (visual-basic with excel).
-Division of a slope transect into 10 segments with different sizes and view the model outcomes for the SOC sampled segment.



ta	Source
il Textural Class	Soil Map of Cyprus and field visits
nd Cover Type	Refined CORINE map (based on Büttner et al., 2007)
oography	DEM (25m x 25m) (Geological Survey Department)
mate	Closest meteorological stations (Cyprus Meteorology
	Department)



Paired-sites and PESERA application segments (left: productive, right: abandoned vineyard)

Results (1/3): Improved land-use and WOCAT erosion classes



Results (2/3): Grid-sampled SOC versus WOCAT assessment





Results (3/3): Paired-site SOC versus PESERA model





Conclusions, discussions and outlook:

- 1. Both grid sampled SOC (%) versus WOCAT assessments and pairedsite SOC versus PESERA model estimations indicate that higher erosion rates mean lower SOC levels or lower SOC means higher erosion.
- 2. For better assessing such relations per land use, WOCAT assessment can be extended to a wider area, covering more land use and SOC data (using Geochemical Atlas of Cyprus (Cohen et al., 2011)).
- 3. To integrate the presented methods, paired-sites (light erosion and strong erosion) with representative land use (not only vineyards) can be identified in the extended WOCAT assessment, soil samples can be collected and the PESERA model can be applied to these paired-sites.
- 4. PESERA model sensitivity analysis could identify sensitive parameters for field observations and better representation of the slopes (see Djuma et al., 2017).

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