Temporal and spatial heterogeneity of soil cover management in austrian vineyards – how does it affect soil loss modelling?

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Abstract

Vineyards traditionally are considered to have a high risk of soil erosion by water, due to their late biomass development and the wide inter row spaces of vines. Conceptually three different sectors of soil cover and management contribute to an overall soil loss risk, biomass development of vine, soil management directly below the vine and management of the inter row area between vines. Despite the importance of wine growing for the European agriculture, little information on heterogeneity of the different management conditions and their influence on soil loss risk estimated by modelling is available. In many cases, single factor values such as one C-Factor (in the case of USLE modelling) for regions or even countries are used. To obtain a distributed picture of the heterogeneity of management in Austrian vineyards, we mapped management activities for more than 1000 sites in different landscape units of Eastern Austria in 2016. Vineyards were classified into six different types of cover and management. Soil cover and plant cover development was evaluated using a new software tool which enabled us to estimate the percentage of living and dead biomass and to define the management categories of each parcel once per month. We then transformed this information into USLE C-Factor calculations to evaluate the effect of vineyard management on heterogeneity of soil loss risk. We observed a wide range for the different sectors of soil cover management from permanently bare soil in about 20 % of vineyards to permanently covered (25 % of vineyards) with all distinctions in between possible. The complexity of vineyard management was further increased by farmers' decisions to switch from one type of soil cover management to another one within the vegetation period. All these changes exert a strong influence on the heterogeneity of soil loss risk as indicated by C-Factor values. This has to be considered for analysis of local or regional soil loss risk.

Keywords: Vineyard, C-Factor, Austria, Heterogenity

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