



Anthropogenic control on sediment budget: preventing vineyard degradation from long term soil erosion in Burgundy

Mathieu Fressard (1), Etienne Cossart (2), Brian Chaize (2), Kristell Michel (3), and Aurélien Christol (2)

(1) UMR 5600 CNRS-Environnement City Societies, University Lumière Lyon 2, Lyon, France (mathieu.fressard@univ-lyon2.fr), (2) UMR 5600 CNRS-Environnement City Societies, University Jean-Moulin Lyon 3, Lyon, France, (3) UMR 5600 CNRS-Environnement City Societies, ENS, Lyon, France

Among agricultural activities, vineyards are known to undergo the most substantial soil loss in the world. Bare interrows with chemical weeding, slope-oriented rows, and very superficial tillage are the dominant agricultural practices that increase intrinsic soil erosion susceptibility, especially on steep slopes. In burgundy, winegrowers developed management strategies to mitigate soil erosion, that mainly consist in collecting eroded sediments in specific infrastructures downslope to backfill upslope plots. As a result, even if current measured soil erosion rates range from 14 to 25 t.ha.yr⁻¹, this type of agriculture has been possibly maintained over this area since the middle age.

This research aims at describing/understanding the burgundy vineyard erosive system and specifying the role of human practices within the sediment cascade functioning. Therefore, we focused on a 250 hectares sub-catchment of the Mercurey terroir (south Burgundy), with the objective of assessing the sediment budget at the catchment scale (including human practices).

The methodology is based on 4 main steps : (i) geomorphological mapping of sediment pathways, (ii) soil erosion measurement on selected plots using the vine graft union botanical indicator (SUM method), (iii) erosion measurements in sediment traps and (iv) measurement of suspended load at the catchment outlet.

The results show a wide range of specific erosion rate over the catchment that can be related to local agricultural practices and management strategies. Even if soil erosion rates on young vines plots (i.e. 10-15 years) are very high, measurements conducted on older vines (i.e. 50-80 years) show lower specific erosion rates. This shows that the backfilling management strategies are more likely to be observed on moderate timescales (i.e. 50-80 years or more). At the catchment scale, the influence of linear features (such as roads and hedges) and artificial sinks is of a prime importance to assess the sediment dynamics and to provide an effective sediment collecting system. More generally, this research allows discussing the role of human practices on sediment connectivity at the catchment scale that has to be accounted to manage soil resource in modern agricultural systems.