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Spatial patterns of vineyard landscape evolution and their impacts on erosion susceptibility: the case of Mercurey, Burgundy (France) since the mid-20th century

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Since the rise of vine growing in the Middle Ages, winegrowers in the Mercurey terroir (Burgundy, France) have been aware of the soil preservation issues and developed several mitigation strategies. However, since the end of the Second World War, viticulture practices have changed: international exports, increased production of quality wine. The profitability of this economic model stimulated a continuous increase in the surface area of the vineyard (from 500 hectares in 1936 to 650 hectares in the 1980's) to the detriment of pastures. In addition, new practices emerged such as mechanical tillage, increase of vine plot size and destruction of hedges. Collectively, these changes are known to increase soil erosion susceptibility.

In this research, we evaluate such exacerbation through a modeling approach. From historical survey (historical maps and aerial photographs) the spatial patterns of vineyard landscape evolution are reconstructed since 1945. Such data are implemented in a RUSLE modeling procedure to map the evolution of erosion susceptibility.

On the one hand, the examination of the modeling results exhibit that the general level of erosion susceptibility has only slightly changed. On the other hand the spatial patterns in terms of erosion susceptibility have significantly changed. First, a general trend of a greater spatial homogeneity in terms of erosion susceptibility is observed until 1990s: high levels of erosion susceptibility are widespread. Second, a higher heterogeneity in erosion susceptibility is observed since two decades: many hot spots of soil erosion remain but are located in more specific plots. Such recent evolution is explained by new strategies that have broken up sediment connectivity at the catchment scale.