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Spatial and temporal diversification of crops dynamics in soil erosion modelling. A case study in the arable land of the upper Enziwigger River, Switzerland.

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Accelerated soil erosion by water is a widespread phenomenon that affects several Mediterranean and Alpine landscapes causing on-site and off-site environmental impacts. Recognized in the EU Thematic Strategy for Soil Protection as one of the major threats to European soils (COM(2006)231), accelerated soil erosion is a major concern in landscape management and conservation planning (UN SDG 2.4).
Agriculture and associated land-use change is the primary cause of accelerated soil erosion. This, because the soil displacement by water erosion mainly occurs when bare-sloped soil surfaces are exposed to the effect of rainfall and overland flow. The Revised Universal Soil Loss Equation (RUSLE) and other RUSLE-based models (which account for more than 90% of current worldwide modelling applications) describe the effect of the vegetation in the so called cover and management factor (C). The C-factor is generally the most challenging modelling component to compute over large study sites. To run a GIS-based RUSLE modelling for a study site greater than few hectares, the use of a simplified approach to assess the C-factor is inevitably necessary. In most of the cases, the C-factor values are assigned to the different land-use classes according to i) the C-values proposed in the literature, and ii) through land-use classifications based on vegetation indices (VI).
In previous national (Land Use Policy, 50, 408–421, 2016) and pan-European (Environmental Science & Policy, 54, 438–447, 2015) studies, we computed regional C-values through weighted average operations combining crop statistics with remote sensing and GIS modelling techniques. Here, we present the preliminary results of an object-oriented change detection approach that we are testing to acquire spatial as well temporal crops dynamics at field-scale level in complex agricultural systems.