



Soil erosion under extreme rainfall events: detecting and modelling using a radar-runoff-nowcasting-system

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Soil erosion by water is one of the most widespread forms of soil degradation in Europe, where the relevant annual cost for agricultural productivity loss is estimated to be around 295 million euros. Under climate changes, soil erosion due to rainfall is dramatically increasing, for the most part because of an increasing of the frequency of extreme, localised events.

Here, we present the MSCA-Horizon2020 project, focused on understanding and quantifying extreme rainfall effects on soil erosion, by means of ground-based weather-radar observations and hydrological modelling at regional scale (namely in Tuscany, central Italy).

In critical hydrological phenomena, such as intense surface runoff, flooding and soil erosion, the spatiotemporal extent is crucial in the development of the processes. This feature significantly affects the impact and the evolution of critical phenomena, especially during extreme events. Therefore, an approach directed to refine as much as possible the knowledge of these dynamics is recommended both at the monitoring and the modelling level.

Using an approach based on statistical analyses of rainfall data from ground-based radar and modelling, this project aims to: 1) Quantify on historical data the spatiotemporal distribution of extreme rainfalls / runoff and soil erosion over the last years, 2) Build a platform to model runoff and soil erosion during extreme events in real-time, 3) Simulate in real-time runoff and soil erosion behaviours related to extreme rainfalls, integrating the current regional-warning-system for the extreme weather events.