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Long-term erosion and the impact of wildfires: two different approaches.

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Abstract

Mediterranean countries, such as Portugal, are often associated with land degradation risks, which in association with water erosion puts an increasing pressure on ecosystem services (Grift, 2021). On those countries erosion is often driven by heavy rainfall events, steep slope angles and in some cases lack of vegetation cover (Grift, 2021). Mostly of the wildfires in Portugal occurred in forests and shrublands (Mateus and Fernandes, 2014) during the drier and warmer summer, which usually are followed by rainfall events that easily provoke runoff and erosion. In fact, generally after a wildfire three main erosion contribution processes happen: i) a reduction of interception and evapotranspiration; ii) a decrease in infiltration and soil water retention; iii) a reduction in obstacles (Grift, 2021). From a connectivity perspective, burnt areas tend to increase sediment connectivity by changing vegetation cover and physico-chemical soil properties (Grift, 2021). Connectivity indices have been proposed as a simple and fast way tool to identify erosion hotspots and prioritize soil restoration, but it is difficult to validate those indices due to the lack of spatially distributed erosion data. Taking this in mind, this study aims to assess sediment connectivity using two different approaches. The methodology comprises i) a physically based model that is able to investigate long-term and large-scale spatial landscape evolution, namely Landscape Process Modelling at Multi-dimensions and Scales; and (ii) an index that can be calculated in a geographic information system environment and represents a connectivity assessment based on local landscape's information (Borselli et al., 2008) . Results include (i) the connectivity description in the context of specific events using two different approaches; and (ii) comparison between the approaches used. The authors believe that assessing the spatial-temporal evolution of connectivity in the actual landscape with the right tool is extremely important to estimate the probability that a given part of the landscape transfer its contribution elsewhere in the catchment.

Keywords: Erosion, Sediment connectivity, post-fire, Connectivity indices, modelling approach

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