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Wildfires and post-fire erosion risk in a coastal area under severe anthropic pressure associated with the touristic fluxes

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In the last decades a rapid and intense development of the tourism industry led to an increasing of anthropic pressure on several coastal areas of Sardinia. This fact not only modified the coastal aesthetics, but has also generated an increase of risk for the environment. This phenomenon affected also the ancient structure of the landscape with a negative impact mainly caused by the following factors: land abandonment, wildfire occurrence, post-fire erosion, urbanization. These regional changes can be analyzed in detail by considering the geo-diachronic dynamics. The main objectives of this work were i) to perform a diachronic analysis of land use and land cover dynamics, ii) to analyse the recent dynamics of wildfires, and iii) to predict the soil erosion risk in relation to land use change occurred between the 1950s and the 2000s.
The study was realized in a coastal area located in North-East Sardinia where the geo-historical processes were summarized and organized in a geographic information system that has been employed to examine the landscape variations at three different time steps: 1954, 1977 and 2000. In addition, different scenarios of wildfire propagation were simulated by FlamMap in order to estimate the spatial pattern of fire danger factors in the study area. Afterwards, maps of post-fire soil erosion were produced to identify the temporal and spatial variations of the erosion risk. The results show how the changes in land use and the significant and rapid increase of the residential areas affect the risk of both wildfires and post-fire soil erosion. The study reveals the capabilities of this type of approach and can be used by management agencies and policy makers e in sustainable landscape management planning. This approach can be extended to other regions of the Mediterranean basin characterized by complex interactions among landscape and anthropic factors affecting the environmental risk.