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Climate effect on forest fire static risk assessment

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The availability of a long data series of fire perimeters combined with a detailed knowledge of topography and land cover allow to understand which are the main features involved in forest fire occurrences and their behaviour. In addition, climate indexes obtained from the analysis of time series with more than 20 years of complete records allow to understand the role of climate on fire regime, both in terms of direct effects on fire behaviour and the effect on vegetation cover. In particular, indices of extreme events have been considered like CDD (maximum number of consecutive dry days) and HWDI (heat wave duration index: maximum period > 5 consecutive days with Tmax >5°C above the 1961–1990 daily Tmax normal), together with the usual indices describing rainfall and temperature regimes.

As a matter of fact, based on this information it is possible to develop statistical methods for the objective classification of forest fire static risk at regional scale. Two different case studies are presented in this work: Regione Liguria and Regione Sardegna (Italy). Both regions are in the center of the Mediterranean and are characterized by a high number of fires and burned area. However, the two regions have very different fire regimes. Sardinia is affected by the fire phenomenon only in summer whilst Liguria is affected by fires also in winter, with higher number of fires and larger burned area. In addition, the two region are very different in vegetation cover. The presence of Mediterranean conifers, (Pinus Pinaster, Pinus Nigra, Pinus halepensis) is quite spread in Liguria and is almost absent in Sardinia. What is common in the two regions is the widespread presence of shrub species frequently spread by fire. The analysis in the two regions thus allows in a rather limited area to consider almost all the species and the climate conditions that characterize the Mediterranean region. More than 10000 fire perimeters that burnt about 800 km2 were considered in the analysis. The analysis has been carried out at 20 m spatial resolution. Some important considerations relating to climate and the territorial features that characterize the fire regime in the considered regions contribute to better understand the forest fire phenomena. These results allow to define new strategies for forest fire prevention and management extendable to other geographical areas.

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