



Abstract

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Drought, Live Fuel Moisture Content, and Fire Occurrence: A Case Study in North-Western Sardinia (Italy) [†]

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According to recent projections about future climate conditions, a general decrease in annual precipitation and an increase in the risk of summer drought is likely to occur in southern Europe and across most of the Mediterranean Basin. These conditions will exacerbate wildland fires, which already represent an important disturbance in Mediterranean ecosystems. Evergreen sclerophyll shrubland, indeed, represents a relevant component of both the Mediterranean vegetation community and understory vegetation, and often constitutes the surface fuels primarily responsible for the ignition and spread of wildland fires in Mediterranean areas. The water content of live fuel plays a critical role in determining fire occurrence and spread, especially in Mediterranean shrubland, where live fuel is often a large fraction of the available fuel which perpetuates the fire. A more severe and/or prolonged drought season could therefore influence the water fuel status and the length of the fire season, and, consequently, cause a general increase in fire danger conditions in the Mediterranean area.

The main aim of this work is to understand the effects of prolonged drought seasons on the fuel water status, fire occurrence, and the fire season length.

The study was carried out in north-western Sardinia (Italy). The moisture content of live fuel (LFMC) was determined periodically over 15 consecutive years on several shrub species. Meteorological variables and the fire occurrence were also recorded over the same period. Relationships between live fuel moisture content dynamics, weather, and different lengths of the drought season and fire season were analyzed.

Our results highlighted that the distribution and amount of rainfall affected the live fuel moisture content. More prolonged drought seasons caused a longer period in which the LFMC was below the critical thresholds for fire ignition and spread. In addition, the years characterized by prolonged summer drought saw a greater number of fires in early autumn.

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