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Fire selectivity and land use: what, when and why do wildfires burn?

C. Ricotta (1), S. Bajocco (1), and S. Mazzoleni (2)

(1) Dept. of Plant Biology, University of Rome 'La Sapienza', Rome, Italy (carlo.ricotta@uniroma1.it), (2) Dept. of Arboriculture, Botany and Plant Pathology, University of Naples 'Federico II', Portici, Italy

Because of the increasing anthropogenic fire activity, understanding the role of land use in shaping wildfire regimes has become a major concern. In the last decade, an increasing number of studies has been carried out on the relationship between land use and wildfire patterns, in order to analyze land use types where fire behaves selectively. The aim of this work is to identify land cover types where fire incidence is higher (preferred) or lower (avoided) than expected by a random null model. Fire selectivity in a given land cover class may be characterized by the number of expected fires, by the mean surface that each fire will burn and by the mean day of ignition during the year. These three components of fire pattern are usually independent of each other and connected to different controlling factors. Therefore, based on available fire history data in Sardinia (Italy) for the period 2000-2006, we analyzed fire selectivity of given land cover classes keeping all these variables separate from each other. The study highlighted a close relationship between the fire spatio-temporal patterns and land cover that is primarily governed by two complementary processes: human pressure that directly influences fire incidence, and climatic factors that act indirectly on the timing of wildfires determining the spatial distribution of land use types. From a practical viewpoint, understanding the wildfires regime within the different land use classes can be an effective decision-support tool for fire agencies in managing fire risk and for producing provisional models of fire behaviour under changing climatic scenarios and evolving landscapes.