Geophysical Research Abstracts
Vol. 12, EGU2010-11550-1, 2010
EGU General Assembly 2010

Fire regime in Mediterranean ecosystem

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The analysis of burnt areas time series in Mediterranean regions suggests that ecosystems characterising this area consist primarily of species highly vulnerable to the fire but highly resilient, as characterized by a significant regenerative capacity after the fire spreading. In a few years the area burnt may once again be covered by the same vegetation present before the fire. Similarly, Mediterranean conifer forests, which often refers to plantations made in order to reforest the areas most severely degraded with high erosion risk, regenerate from seed after the fire resulting in high resilience to the fire as well. Only rarely, and usually with negligible damages, fire affects the areas covered by climax species in relation with altitude and soil types (i.e, quercus, fagus, abies). On the basis of these results, this paper shows how the simple Drossel-Schwabl forest fire model is able to reproduce the forest fire regime in terms of number of fires and burned area, describing whit good accuracy the actual fire perimeters. The original Drossel-Schwabl model has been slightly modified in this work by introducing two parameters (probability of propagation and regrowth) specific for each different class of vegetation cover. Using model selection methods based on AIC, the model with the optimal number of classes with different fire behaviour was selected. Two different case studies are presented in this work: Regione Liguria and Regione Sardegna (Italy). Both regions are situated 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 limited 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 study almost all the species that characterize the Mediterranean region.
This work shows that the fire regime in Mediterranean area is strongly related with vegetation patterns, is almost totally independent by the cause of ignition, and only partially dependent by fire extinguishing actions.