Geophysical Research Abstracts
Vol. 16, EGU2014-5405, 2014
EGU General Assembly 2014

High resolution fire risk mapping in Italy

Paolo Fiorucci, Guido Biondi, Lorenzo Campo, and Mirko D'Andrea
CIMA Research Foundation, Savona, Italy (lorenzo.campo@cimafoundation.org)

The high topographic and vegetation heterogeneity makes Italy vulnerable to forest fires both in the summer and in winter. In particular, northern regions are predominantly characterized by a winter fire regime, mainly due to frequent extremely dry winds from the north, while southern and central regions and the large islands are characterized by a severe summer fire regime, because of the higher temperatures and prolonged lack of precipitation. The threat of wildfires in Italy is not confined to wooded areas as they extend to agricultural areas and urban-forest interface areas. The agricultural and rural areas, in the last century, have been gradually abandoned, especially in areas with complex topography. Many of these areas were subject to reforestation, leading to the spread of pioneer species mainly represented by Mediterranean conifer, which are highly vulnerable to fire. Because of the frequent spread of fire, these areas are limited to the early successional stages, consisting mainly of shrub vegetation; its survival in the competition with the climax species being ensured by the spread of fire itself. Due to the frequency of fire ignition — almost entirely man caused — the time between fires on the same area is at least an order of magnitude less than the time that would allow the establishment of forest climax species far less vulnerable to fire. In view of the limited availability of fire risk management resources, most of which are used in the management of national and regional air services, it is necessary to precisely identify the areas most vulnerable to fire risk. The few resources available can thus be used on a yearly basis to mitigate problems in the areas at highest risk by defining a program of forest management interventions, which is expected to make a significant contribution to the problem in a few years' time. The goal of such detailed planning is to dramatically reduce the costs associated with water bombers fleet management and fire extinguishing actions, leaving more resources to improve safety in areas at risk. With the availability of fire perimeters mapped over a period spanning from 5 to 10 years, depending by the region, a procedure was defined in order to assess areas at risk with high spatial resolution (900 m2) based on objective criteria by observing past fire events.
The availability of fire perimeters combined with a detailed knowledge of topography and land cover allowed to understand which are the main features involved in forest fire occurrences and their behaviour. The seasonality of the fire regime was also considered, partitioning the analysis in two macro season (November- April and May-October). In addition, the total precipitation obtained from the interpolation of 30 years-long time series from 460 raingauges and the average air temperature obtained downscaling 30 years ERA-INTERIM data series were considered.
About 48000 fire perimeters which burnt about 5500 km2 were considered in the analysis. The analysis has been carried out at 30 m spatial resolution. Some important considerations relating to climate and the territorial features that characterize the fire regime at national level contribute to better understand the forest fire phenomena. These results allow to define new strategies for forest fire prevention and management extensible to other geographical areas.