Geophysical Research Abstracts
Vol. 14, EGU2012-1797-3, 2012
EGU General Assembly 2012

Wildland-Urban Interface evolution mapping using multi-temporal Landsat imagery. The case of forest fires in southern Swiss Alps.

R. Cere (1), M Conedera (1), G. Matasci (2), M Kanevski (1), M Tonini (1), C. Vega (1), and M Volpi (1)

(1) Institute of geomatics and risk analysis, Faculty of Geosciences and Environment - Lausanne University, Lausanne (Switzerland), (2) Swiss Forest Research Institute WSL, Insubric Ecosystems Group, 6500 Bellinzona (Switzerland)

The Wildland-Urban Interface (WUI) is a broadly used term in the context of wild and forest fires indicating areas where houses and other human infrastructures meet or intermingle with wildland vegetation, rural areas or forests. In densely populated areas where the fire regime is dominated by anthropogenic-induced fire ignitions, the coexistence of urbanization and wildland enhances both the anthropogenic ignition sources and flammable fuels. Most of the research existing on the topic refers to the WUI investigation in the United States, Australia and Mediterranean Europe. Up to now, no attempts exist for the Alpine environment where WUI shows more distinct patterns, mainly due to the different general socio-economic conditions, housing pattern and highly variable topography, as well as typical fuel type and fire behavior.
The main objective of this project is the use of multi-temporal information from space-borne remote sensing optical sensors for mapping and monitoring the evolution of the WUI in Swiss Alpine regions. The southern Swiss canton Ticino is considered as pilot area. This region is located in the most fire-prone area of the country.
To achieve this objective, multi-temporal image classification and consequent change detection were carried out using Landsat TM imagery. The method allowed characterizing the two most important factors to identify the WUI: forest/wildland areas and urban zones (including building and road network). The availability of Landsat imagery spanning a vast time period let us to characterize the spatial and temporal evolution of the WUI (including forest area evolution, vegetation cover dynamics and urbanization) in the last decades.
To this end, a supervised classification method was applied: a first step, based on the single time image classification, was implemented in order to retrieve the main land-cover classes. The parametric Maximum Likelihood classifier showed good performance in classification, since medium-resolution Landsat imagery is less prone to suffer from high within-class variances, that is naturally smoothed by the spatial resolution of the image accounting for mixed pixels. Then, a second step implementing a post-classification comparison change detection scheme was performed, to detect WUI and related land-cover changes in time. The main result of the present project is a map of the evolution of WUI starting from satellite images and ignition points datasets.

This project has been partly supported by the Swiss National Science Foundation under the project “kernelCD” 200021-126505 (www.kernelcd.org)