Geophysical Research Abstracts
Vol. 14, EGU2012-779-1, 2012
EGU General Assembly 2012

Spatial and temporal changes in land cover and its relation to the wildfire risk in Montes de Zuera (NE-Spain)

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Land cover changes in a territory can be as result of the diverse human activities, and also, by the dynamic natural ecosystem. The analysis of these changes constitutes a fundamental indicator in improving the knowledge towards a potential sustainable development (OSE, 2006).
This paper analyzes the evolution of the land cover at detailed scale 1:5000, along the years 1957, 1984, and 2005, in the Montes de Zuera (UTM: 665000-680000 East /4640000-4650000 North), nearby Zaragoza city (NE-Spain). Despite they are located in the midst of the semiarid Central Ebro Basin, the area have an uncommon, extensive and dense forest cover. For these reasons, Montes de Zuera form part of the "Natura 2000 Network" of Aragon. Because this region has a high incidence of wildfires and, as a measure to prevent them, land cover changes have been analyzed in this study.
To get this objective, a methodology is developed based on GIS and Remote Sensing tools, and this makes it possible to establish the relationship between the dynamic land cover and "fire hazard". According to FAO (1986), fire hazard is the measure of risk of wildfire, which is explained by the presence of combustible materials available to burn (Chuvieco et al, 2004). It is understood that the areas with major fire hazard present a high vulnerability to suffer vast wildfires.
To develop this work, the type of vegetation, its distribution and the state of maturity of the forest masses are analyzed. Moreover, the wildfires that occurred during the last five decades have been located, and the forest masses and the processes (anthropic and natural) associated to them have been characterized in the regions affected by vast wildfires. Moreover, the cartography of fire hazard is obtained, and this is useful tool to fre prevention and to promote the sustainable management of the forest masses.
Two regions with high rate of fire hazards are differentiated (region 1 and region 2). The Aleppo pine cover occupies the majority of the surface percentage (55 % in region 1; 58 % in region 2), have being stable for the past fifty years about 1/3 of these surfaces (38 % in region 1, and 32 % in region 2). Different wildfire preventive measures are proposed at spatial scale.

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