Geophysical Research Abstracts
Vol. 14, EGU2012-885, 2012
EGU General Assembly 2012

The use of rainfall simulations to assess land degradation and soil erosion produced by an SLM technology, Portugal

J. Soares, C. Coelho, T. Carvalho, E. Oliveira, and S. Valente

Centre for Environmental and Marine Studies (CESAM), Department of Environment and Planning, Universidade de Aveiro, Portugal (jsoares@ua.pt)

Forest fires represent the main threat to sustainable forest management in Portugal. During the last fifty years, a massive depopulation took place at rural areas, developing a landscape more prone to fire. The expansion of forest and shrubland into former agricultural areas, as well as, the rapid regeneration of vegetation after fire in some areas, highlighted the need to implement several measures to protect forest and rural areas against fires.

Mação municipality suffered massive fires in 2003 and 2005, where more than 70% of the municipality area has been burnt. The implementation of a forest fire prevention and mitigation technology as well as the vegetation regeneration rate was assessed at this location, under the framework of DESIRE project1.

Forest is the dominant land use at Mação municipality, consisting of Pinus pinaster, with some Eucalyptus globulus and residual oak forest and shrubland. An important part was burned recently and gave way to regeneration of stands and shrubs. In 2009, the municipality started to implement an SLM (Sustainable Land Management) technology, Primary Strips Network System for Fuel Management (RPFGC). This technology is integrated in the National System to Prevent and Protect Forest against Fires and it is defined by the National Forest Authority (AFN).
The RPFGC are linear strips, strategically located in areas where total or partial removal of the forest biomass is possible. This technology contributes to prevent the occurrence and spread of large forest fires and to reduce their consequences for the environment, people, infrastructures, etc . However, the removal of vegetation tends to expose bare soil to the erosive effects of rainfall. Rainfall simulations were used to assess erosive processes, such as runoff and sediment loss, in three types of land cover: pine, eucalyptus and shrubland.

The results from rainfall simulations on areas inside the RPFGC showed higher results for all studied parameters, while whether or not statistically significant, shrubland areas appear to be more sensitive to this technology and pine sites the least affected spots. Total soil loss was significant in shrubland areas, but the same did not happen in pine and in eucalyptus sites. Overall runoff production achieved no representative statistical differences in any of the studied cases, indicating its independence of either the technology or soil occupation. However, total soil loss was significantly different in shrubland areas. As for total organic matter loss, resulted to be the most affected parameter included in this study, which indicates that this SLM technology reduces the organic matter content on shrub and eucalyptus soils.

(1) DESIRE Project (037046): Desertification Mitigation and Remediation of land – a global approach for local solutions, EU-funded project (2007-2012; http://www.desire-project.eu/).