Geophysical Research Abstracts
Vol. 16, EGU2014-1013, 2014
EGU General Assembly 2014

Using closed plots to study runoff and soil loss after controlled-fire. Short-term response in South of Spain.

Juan Francisco Martínez-Murillo, Paloma Hueso-González, Francisco Aranda-Gómez, and José Damián Ruiz-Sinoga

Physical Geography and Land Management Research Group (RNM279), Department of Geography, University of Málaga, Campus de Teatinos, 29071 Málaga, Spain.

Plots have been widely used to study runoff and soil loss worldwide in many different ecosystems and land uses. Also, this method have been applied in ecosystems affected by natural fires. Likewise, in some studies, plots with natural vegetation were burnt in controlled fires to evaluate their response in runoff generation and soil loss. It is well-known that fires generally reduce the soil organic matter content; increase the soil water repellency; reduce the infiltration rates; modify the soil structure; and disturb the soil aggregate stability. The removal of vegetation and the degradation of soil structure, results in an increase in soil erodibility. These changes mainly result in a reduction in soil infiltration rates and an increase in soil erosion, which have been reported throughout the different Mediterranean areas after forest fires. This study deals with the runoff generation and soil loss processes from closed plots after a controlled-fire at short-term.

The El Pinarillo experimental area is located in South of Spain. Two set of closed plots were installed (24 m2: 12 m length x 2 m width). One of them was remained as control with the original vegetation cover, and the other one was burnt in a controlled-fire in 2011 May. After this, runoff and sediment were collected in every rainfall events using 200 litres collectors. The study period is from 2011 May to 2013 November. Also, a meteorological station and soil moisture probes (5, 10 and 25 cm depth) were installed in every closed-plot. After every rain event, runoff was measured in the collectors and an aliquot sample was taken to calculate the soil loss in laboratory by heating at 105 ºC.

In summary, results indicate that runoff were generated during the same rain events in both set of plots. However mean runoff rate was higher in the burnt set (0.46 mm h-1) than in the control one (0.34 mm h-1). Differences in runoff generation between both of them were not observed for the extreme rainfall events. In the case of soil loss, the burnt plots (mean soil loss = 2.2 Mg ha-1) showed one order of magnitud higher than the control ones (mean soil loss = 0.9 Mg ha-1).