Geophysical Research Abstracts
Vol. 13, EGU2011-13382, 2011
EGU General Assembly 2011

Effects of burning and fertilization of natural herbaceous vegetation on water erosion and nutrient leaching in South Brazil highlands

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In South Brazil burning of the natural herbaceous formation called "campos", which is extensively grazed, is a common practice. After burning "campos" a rapid development of biomass occurs, which has a lower fibre content, thus more nutritive value for cattle. Fire releases nutrients, clear out soil cover and increases water erosion. Sometimes burned "campos" are fertilized, which increases nutrient losses by runoff. We conducted a field trial under simulated rainfall on an Oxisol at the Rio Grande do Sul highlands, Brazil, in order to quantify soil and water losses, as well as phosphorus and potassium exports. A rotator-boom type rain simulator was employed with a rain intensity of 75 mmh^{-1}. The studied treatments were: 1) natural vegetation "campo", 2) fertilized natural "campo", 3) burned "campo" and 4) burned and fertilized "campo". Soil losses were about 5.5 fold higher in burned than in non burned treatments. Cumulative runoff was 66% higher in the burned "campos" and peak runoff was also higher after burning. Phosphorus and potassium contents were increased both by fertilization and burning, but the burning effects were even larger than those of fertilization.