Geophysical Research Abstracts,
Vol. 10, EGU2008-A-05337, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-05337
EGU General Assembly 2008

Mechanical erosion in forest management following wildfires

C. Martín (1), A. Lucía (1), S. de Alba (1), J.F. Martín-Duque (1), A. Pérez-González (1), F. Barbero (1), M. Malvar (2), C. Coelho (2) & J. Keizer (2)

(1) Dpt. Geodinâmica, Facultad de Ciencias Geológicas, Universidad Complutense de Madrid, Ciudad Universitaria S/N, 28040 Madrid. (2) Centro de Estudos do Ambiente e do Mar, Dept. de Ambiente e Ordenamento, Universidade de Aveiro, 3810-193 Aveiro. Corresponding author: Sdealba@geo.ucm.es

The present work concerns a pilot-study on erosion caused by mechanical forest management practices, more specifically dealing with terraces and recently burnt areas. Worth stressing in this respect is that the use of heavy machinery has regularly been observed in burnt forest areas, and that terraces, as most extreme expression of mechanical ground operations, are increasingly dominating the landscapes of the north-central Portuguese “serras”.

From various studies in agricultural lands, mechanized ploughing is well known to potentially provoke intense soil degradation by mechanical erosion: tillage erosion. Soil redistribution due to conventional tillage practices represents *per se* a process of intense transformation of the geomorphology and soils of agricultural lands and, on the medium-to-long term, may strongly modify the soil profiles and the spatial patterns in soil properties as well as the topography of the terrain, with far-reaching consequences for hydrological and erosional processes. Mechanical erosion in forestry areas, however, has hardly been studied, also not in a context of post-fire management, thus amply justifying the present pilot-study.

So far, the work has comprised two main components. In the first place, two neighbouring terraced eucalypt plantations were studied along a transect running from the bottom to the top of the hill slopes in order to describe the current land form and try

to reconstruct the original one. To this end, a topographic survey was carried out of the terraces (height and width), and of the original soil surface as observable at the terrace sides in particular. This approach proved suitable to quantify *ad posteriori* the extent of soil redistribution and the variation therein along the slope. The proposed presentation will detail the approach, and show and discuss the obtained results.

The second component of this work involves a direct comparison of terrain shape and soil characteristics before and after terracing. The original and final situations at the one study site that has so far been selected, was described in considerable detail, including with respect to spatial patterns in topsoil moisture content, water repellency, torsion and penetration resistance, and, using a mini-disc infiltrometer, hydraulic conductivity. In addition to a description of the situation immediately following terracing, an experimental set-up has been implemented to monitor the evolution of selected terraces. This set-up comprise various sets of erosion stakes, organised in transects or grids at the bottoms of the terrace sides, to be complemented by small-scale Digital Terrain Models obtained using terrestrial photogrammetry. In addition, sediment fences may well be used for monitoring erosion by overland flow in areas that appear specifically prone to runoff generation.