



Voracious urbanization as accelerator of soil degradation. (Spain South). Techniques for the assessment of soil degradation processes.

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The use of determined tools at the disposal of users and /or students can be an undoubted instrument for the eco-geomorphological processes detection. These, joint to some scientific techniques can show us for understanding silent processes such as soil erosion.

Using different viewers of aerial photographs has been monitoring of urban action in the South of Spain (Malaga), and also by placing a series of needles of erosion identified the consequences of such actions in the recess of the soil profile.

In October 2008, approximately 100 nails of 25 cm were installed into the soil in the field site, as well as in the witness area. Such erosion needles were removed two years later, at the end of December 2010.

The main findings were:

- a.- Some erosion probes were missing(13).
- b.- In the witness area, 11 probes, located on the eastern slope occurred in an average of 1.6 cm recess which would mean very high soil displacement. FAO considers that of 200 ton per year (2 cm/year-1), they would be catastrophic.
- c.- 7 probes occurred approximately 13 mm of media accumulation.
- d.-The 69 other probes had a lower average of 4.7 cm., i.e. they lost over two years about 470 tons / ha., which would lead to an average rate of 235 Ton, catastrophic according to FAO.

Even more significant is soil loss along modified hillslopes, with progressive increases from upper to the bottom of the hillslope and in some cases exceeding 10 cm between the two measurements. In soil conservation, it is normal to plan for a rate of 0.2 to 1 mm year-1 erosion from the surface, this would amount to approximately 10 Ton / ha. It is assumed that this rate will remain in balance with the rate of chemical weathering that forms a new soil.

Some conclusions:

1. The witness area of the field site (Limonar hills) shows degradation processes of soil erosion rates.
2. Soil mobilization action fires these processes. Firstly due to runoff, once the soil compacting was decreases. Secondly as consequence by the rupture of natural balance. And finally, the little protection of the soils in the previous state, disappears with the cited acting, and therefore increases soil vulnerability before intense rainfall events.
3. In absence of a bathymetric survey of the coast of a small river "Arroyo de la Caleta", this has behaved like a mere transmitter soils deposited in an alluvial fan. Even can be seen in some kind of remote sensing images.
4. Facing to urban costs of such action, the environmental and socio-economic cost of the action can be higher, even irreversible.
5. Soil erosion is a slow crisis, except in very exceptional circumstances, it is not catastrophic processes. Unless there are references as the nails probes, nobody is set in a recess of the soil surface, so everything seems apparently equal. However, not so.
- 6 If already in other studies we have shown (by analyzing the olives stumps) the existence of erosion rates in the montes de Malaga 1 cm/year, equivalent to 100 ton/has/year, the results obtained in this study show as an irresponsible human intervention contributes to increase the erosion status close to catastrophic situation.