



Determination of soil degradation in argentine semi-arid environments from remote sensors: case department of patagones, province of buenos aires

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Summary

The continental territory of the Argentine Republic owns 75% of its surface under arid and semiarid conditions to the west of the meridian of 64°. Wind erosion is the main physical cause of desertification. In the Pampeña area, studies showed that the sandy loam soils were more pronounced than the sandy loam with significant losses of organic matter, decreases in the cation exchange capacity and modification of the mineral composition of the very fine sand fraction (From 73 to 100 μm), with increases in the proportion of heavy minerals (magnetite) relative to light (quartz). In the Patagones department, Buenos Aires province, the soils with a sandy-loamy texture, which are transported by wind and deposited on calcium carbonate (tosca), with little moisture retention and susceptible to wind erosion.

In the 1980s and 1990s, increases in rainfall above the historical average led to a shift of the isohyets towards the southwest, leading to agricultural intensification that caused greater pressure on the soil and native vegetation. This advance on the native vegetation within the Patagones produced a reduction between 1975 and 2009 of 432,280 ha, leaving only 31% of the area covered by native forest - shrub xerophyte today. Between 2005-2009, the call "agricultural drought" caused losses in crops, wheat - oats and natural pastures associated with the native forest, causing a significant deterioration of the soil, exposing them to wind erosion.

Remote sensors represent a very valuable technology for the mapping and evaluation of soil erosion. The availability of multispectral images allows the mapping and monitoring of changes in the dynamics of the erosion process. The objective of this work was to make an expeditious diagnosis of the surface affected by wind erosion and to evaluate the degree to which the soils destined for agriculture and livestock were affected.

For this purpose, Terra's MODIS (Moderate-Resolution Imaging Spectroradiometer) sensor information was used with a temporal resolution of 1 to 2 days, 36 spectral bands, spatial resolution of 250m and Improved Vegetation Index (EVI). The period was covered from July 2007 to July 2009 by analyzing 47 images of the EVI product. The phenological curves of the soil cover were obtained. Of 1,360,717 ha it was estimated that there are a total of 393,511 hectares of eroded soils: 47,337 ha from mild to moderate, 219,204 ha moderate to severe and 126,970 ha severe to severe