

Influence of soil surface treatments on wind erosion rates

***Fister W., Ries J.B., Schmidt R.-G.**

Department of Physical Geography – Trier University (Germany)

*Corresponding author (email: w.fister@gmx.de; tel: +49 (0)651 201-4512; fax +49 (0)651 201-3976)

Wind tunnels have been used in aeolian research for many years to examine the influence of different factors on wind erosion. For reasons of easier and better analysis, factors as vegetation cover or soil surface roughness are usually investigated in laboratory wind tunnels under isolated conditions. Through this kind of research a good understanding of existing effects on wind erosion by single parameters has been developed. Still an important issue are the interactions between different factors and their dominance under natural conditions. The aim of this field survey was to determine the relative importance of different factors on wind erosion rates.

The experimental investigations were carried out in autumn 2005, spring 2006 and autumn 2006. In total 88 wind tunnel test runs from different soil surfaces in the Central Ebro Basin were used for this analysis. The test sites are situated at María de Huerva, near Zaragoza (NE-Spain). A small portable wind tunnel (tunnel length 3 m, diameter 0.7 x 0.7 m) was used. Five different soil surfaces treatments were examined: (1) undisturbed, (2) sheep grazing, (3) ploughing, (4) harrowing and (5) rolling. For each test run the surface parameters a) vegetation cover, b) stone and aggregate cover (non erodible fraction), c) soil surface roughness and d) soil crust coverage were acquired. The used methods were optical estimation (crust, stone and vegetation cover), laboratory sieving (aggregate size) and the chain method (soil roughness).

The results of this study show that the main controlling factor for wind erosion is the type of soil surface treatment, whereas most other investigated parameters show minor or no influence at all. This leads to two possible conclusions. Either the less important parameters like vegetation cover or soil roughness do have no significant influence on wind erosion under field conditions, or the commonly used data acquisition methods are not detailed enough and have to be improved.

Key-words: wind erosion; wind tunnel; soil treatment.