



HAL
open science

Structural stability of soil crusts. Consequences for soil erodibility assessment

Frédéric Darboux, Yves Le Bissonnais

► **To cite this version:**

Frédéric Darboux, Yves Le Bissonnais. Structural stability of soil crusts. Consequences for soil erodibility assessment. 2. International Symposium on Soil Erosion and Dryland Farming, Oct 2006, Yangling, China. hal-01166490v2

HAL Id: hal-01166490

<https://hal.science/hal-01166490v2>

Submitted on 23 Jun 2015

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Structural stability of soil crusts. Consequences for soil erodibility assessment

F. Darboux (1) and Y. Le Bissonnais (2)

(1) Orléans - Science du Sol, BP 20619, F-45166 Olivet Cedex, France.

(Frederic.Darboux@orleans.inra.fr). (2) INRA LISAH, Campus AGRO - Bat. 24, 2 place

Viala, F-34060 Montpellier Cedex 1, France (Yves.Le-Bissonnais@ensam.inra.fr)

Erosion and sediment transport processes depend on the soil surface properties. Because of water flow and other processes (climate, agricultural practices, biological activity, etc.), the properties of the soil surface can undergo significant changes that affect erosion. As a consequence, understanding of the transport processes and improvement in soil erosion prediction involve a better assessment of soil surface characteristics. Structural stability has been used to evaluate the sensitivity of soils to erosion. This methodology reproduces the processes responsible for particle and fragment production, the initial step leading to erosion. Structural stability measurements are usually carried out on soil materials sampled inside the plough layer. Since the material at the soil surface, i.e. the soil interacting with the overland flow, is usually discarded at sampling, structural stability measurements do not assess the properties of the most relevant material.

The goal of this study was to evaluate the range of structural stability for a given soil placed under different conditions. First, soil aggregates were placed under a laboratory rainfall simulator to produce a coherent layer and a sediment layer (two ubiquitous states of the soil surface). Second, the samples were sprayed with deionised water or nutrients (to stimulate biological activity) and incubated in a climatic chamber. A set of structural stability measurements was done over a 20-days period.

Results show the material at the soil surface can have a sensitivity to erosion very different from the initial material. This is due to particle rearrangement at the soil surface and biological activity. An alternative methodology to evaluate soil sensitivity to erosion is proposed.