



Kubiëna's heritage: worries and hopes about micropedology (Philippe Duchaufour Medal Lecture)

Georges Stoops

Department of Geology and Soil Science, Ghent University, Belgium (Georges.Stoops@UGent.be)

Kubiëna's book "Micropedology" (1938) is considered as the start of soil micromorphology, providing the first concepts allowing a systematic description and comparison of soil thin sections as a central tool for understanding soil genesis and for soil classification. The aim of this contribution is to evaluate the impact and the role of micromorphology in different fields of application, and to evaluate its progress as a discipline.

The most important application in soil science has always been in the field of *soil genesis*. This is however affected by the declining interest (and sponsoring) for genesis nowadays. It remains however a must for studies on pedogenesis and weathering.

After a strong impulse early in the nineteen sixties, caused by the study of many exotic soils and the development of new soil classification systems (7th Approximation, later Soil Taxonomy) the role of micromorphology declined together with the general interest in *soil classification*. Its break through as an instrument in classification did not realise. Several causes can be mentioned.

On the base of experience gained in the fields of pedogenesis and classification, micromorphology became for geologists and geomorphologists an important instrument in *palaeopedology*, *Quaternary geology and environmental reconstruction*.

The last two decades an enormous expansion of micromorphological studies has been noticed in the field of *archaeology*, not only related to ancient soils, but also to many anthropogenic materials. Archaeologists are probably the most intense users of this discipline now.

Since the end of the nineteen sixties *quantitative micromorphology* (micromorphometry) was developed as a response to the demand for numerical data. It expanded mainly since the development of personal computers, but its wider use is essentially restricted to porosity studies related to soil physics. The complete absence of standardisation of methods and parameters hinders however its use and further expansion.

Micromorphology proved also to be precious tool in *monitoring experiments*, both in the laboratory and in the field, often using quantitative data. Changes become visible in thin sections before they can be detected by other methods. Examples are studies on surface crust formation, effects of freezing, gypsum crystallisation and land management. Last years especially archaeologists contributed in these fields. It is also an excellent tool for controlling and interpreting data obtained by other methods.

Analysis of literature and abstracts of congresses show that the last two decennia very few contributions were made related to development of micromorphological concepts and techniques. There are several causes for this situation.

The bottleneck hindering use and expansion of micromorphology are both technical and theoretical. The main factors are the difficulty to acquire the necessary basic knowledge of optical techniques and micromorphological interpretation, and the difficulty to prepare good thin sections. Solutions are discussed, even as new opportunities for this discipline, at the benefit of different earth sciences.