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# Transmission X-ray Diffraction of Undisturbed Soil Microfabrics Obtained by Microdrilling in Thin Sections

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**Abstract:** Clay mineralogical studies by X-ray diffraction performed on extracted <2- $\mu\text{m}$  fractions do not always represent all clay mineral constituents present in the soil. In this work, transmission X-ray diffraction (TXRD) was applied to undisturbed microsamples of optically homogeneous mineral soil fabrics and features. These microsamples were isolated by microdrilling their periphery in soil thin sections, then removing them, and transferring them to glass capillaries for TXRD analysis. The usefulness of this technique for supplying *in situ* mineralogical information on identification, structure, and natural orientation of soil constituents was tested on mineral microfabrics and features of primary and secondary phyllosilicates. The study demonstrated that TXRD allowed detailed, representative interpretations of undisturbed mineral features and fabrics. In particular, this technique allowed us (1) to compare mineralogical compositions at selected microlocalities, (2) to study natural preferred orientations, and (3) to detect small amounts of minor mineral interstratification phases. In addition, complementary information on crystallography and crystal chemistry may be obtained by performing analytical transmission electron microscopy on the same microsample.

**Key Words:** Clay Fabrics • Clay Minerals • Microdrilling • Micromorphology • Transmission X-ray Diffraction • Undisturbed Microsamples

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