INHERITANCE OF DIOCTAHEDRAL MICAS IN A SOIL CHRONOSEQUENCE

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From a soil science perspective, changes occurred in clay composition and crystallochemistry can reflect, in many cases, the complex processes that soil undergoes along its formation (Allen and Hajek, 1992). This is especially clear in chronosequences. Dioctahedral micas are one of the most abundant minerals in Mediterranean-type soils, and mica inheritance, probably, the commonest process among these affecting the micas (Martín-García et al., 1998). In this paper, we studied two selected horizons from a soil chronosequence over fluvial terraces of Guadalquivir river (Spain), with a terrace age range from 70-600 kyrs (preholocenic terraces) to less than 7 kyrs (holocenic terraces) (Calero, 2005). Our aim here was to study compositional and crystallochemical changes in micas with age, by means of the inheritance processes. In order to do this, we compared a Bwk horizon from a holocenic profile (T4, *Typic Calcixerepts*) with a Btg horizon from a preholocenic one (T2, *Calcic Haploxeralf*).

Mineralogical composition of clay samples was analyzed with X-ray diffraction (XRD), while structure, lattice features and chemical composition of clays was established by transmission electron microscopy (TEM). XRD confirm that dioctahedral micas (illite, muscovite) were the most abundant phyllosilicates in the chronosequence, and also, revealed the presence of small amounts of other phases as 2:1 mixed layers (illite-smectite and/or illite-vermiculite) etc. Most of the micaceous particles analyzed showed sharp SAED patterns, with periodicities of 1.00 nm in (*00l*) and 2.00 nm in (*02l*) reflections, that characterize a 2M polytype. In spite of this, we could distinguish two kinds of micaceous stacking in high-resolution images: 1) The more crystalline domains (Bwk from T4) showed straight, parallel and well defined lattice fringes with 2.0 nm spacing and relatively constant image contrast along layers. They were classified as muscovites according to their EDX spectra (Rieder et al., 1999); and 2) less crystalline domains (Btg from T2) -where the fringes are ill–defined and the (*02l*) spots in diffraction patterns were fuzzier and weaker- suggest an increase of disorder in three-dimensional stacking sequence. The latter phases were illites (Rieder et al., 1999) and had less R^{XII}, Al^{IV}, R^{VI} and x^{VI} than the micaceous phases from the younger soil.

REFERENCES

Allen, B.L. y Hajek, B.F. (1992). Mineral occurrence in Soil environments, In: "Minerals in Soils Environments", J.B. Dixon y S.B. Weed, eds. SSSA Book Series nº 1, Madison, 199-264.

Martín-García, J.M., Delgado, G., Párraga, J.F., Bech, J. y Delgado, R. (1998). Eur. J. Soil Sci. 49:253-268.

Calero, J. (2005). Tesis Doctoral, Universidad de Granada, 768 pp. (inédito).

Rieder, M., Cavazzini, G., D'Yakonov, Y.S., Frank-Kamenetskii, V.A., Gottardi, G., Guggenheim, S., Koval, P.V., Müller, G., Neiva, A.M, Radoslovich, E.D., Robert, J.L., Sassi, H.T., Takeda, H., Weiss, Z. y Wones. P. (1999). Clays and Clay Minerals, 46, 586-595.