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Phyllosilicate weathering pathways in chlorite-talc bearing soil parent materials, D.R. Congo: early findings.

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The study of the formation and transformation of clay minerals is of the upmost importance to understand soil formation and to adjust land-use management to the land surface conditions. These clay minerals determine to a large extent the soil physical and chemical properties. It is commonly observed that over time the mineralogy of any parent material is transformed to a simple assemblage composed mostly of Al and Fe oxides and low-activity clays, e.g. kaolinite. This is especially obvious in the humid tropics, which have been protected from glacial erosion, allowing deep, highly weathered soils to form. Despite the abundant presence of kaolinite in these soils, its formation pathways are still under debate: either neoformation by dissolution-crystallisation reactions or solid-state transformation of 2:1 phyllosilicates.

To elucidate this, weathering sequences in a unique 40 m core taken below a termite mound, reaching a talc-chlorite bearing substrate in the Lubumbashi area, Katanga, DR Congo are being investigated in detail using a.o. quantitative X-ray diffraction analysis, chemical characterization, micromorphology and μXRF-scanning with the main objective to improve the understanding of the formation pathways of kaolinite subgroup minerals in humid tropical environments.

Based on an initial characterization of the core, two zones of interest were selected for more detailed analysis, for which the early findings will be presented. The first zone extends from ca. 9 m to 11 m below the surface is dominated by kaolinite but shows early traces of primary talc and micas. The second zone extends from 34 to 36 m below the surface and contains large amounts of chlorite, with smaller amounts of talc, micas and kaolinite.