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QUANTIFICATION OF LESSIVAGE IN SOILS: AN EXPERIMENTAL APPROACH

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Lessivage, understood as the vertical transfer of fine particles from a horizon, called eluviated, to another horizon, called illuviated, was never measured to our knowledge due to obvious technical difficulties. Two laboratory experiments focusing respectively on eluviation and on illuviation were designed. Eluviation was experienced on an undisturbed loamy soil column (called L1). Illuviation was experienced on a column made of undisturbed loamy horizon (L1) lying on a second undisturbed monolith of a loamy horizon (called L2) having contrasting mineralogical and physico-chemical properties. For both experiments, rain events of 30 mm were applied with two different intensities: 20 mm/h and 6mm/h. The lower boundary was free drainage during the rain event, and constant pressure head during the infiltration phase. Between two rain events, the soil columns were allowed to dry up in order to recover their initial water content. The water content in the column, the chemistry of the soil solution and the release of particles into the drainage water were monitored. These experiments allowed quantifying eluviation and relating it to preferential drainage, or to the suction applied at the base of the columns and to chemical composition of the soil water. The contribution of these different processes was most probably related to the structure of the soil column. We also determined that 20 to 80 % of the particles released by the L1 horizon were trapped into the L2 horizon allowing for the first time to our knowledge to quantify the intensity of particles fixation in natural soils.