

Measurement of Soil Minerals Weathering Rate using "Test Minerals" Method. Expected Results and Limits of the Method

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Soil minerals weathering rate measurement is a stake in extensive managed ecosystems durability understanding like forested ecosystems. Several methods lead to nutrients from mineral weathering fluxes estimations : 1) input-output balances, 2) use of a soil invariant (isoquartz, isoelement) methods which allow flux measure if we know soil age, 3) geochemical models, 4) isotopic methods, 5) soil columns experiments. In this poster, we propose to describe a method based on pure minerals introduction in forested soils, and to present some results. This method consist of introducing pure commercial minerals in soils. These minerals naturally exist in soils: plagioclases, micas, phosphates, vermiculites, feldspars. Minerals are introduced in soil with well known mass under different forms: crystals with polished surfaces or ground minerals (size:100-200 μm for example) in nylon bags. Minerals are weighed after incubation in soils (several years). From weight loss, we can determine minerals dissolution rate.

Moreover, this method allow to observe the evolution of their surface and structure. Different ecosystem parameters can be tested like soil depth, soil type, specie influence, liming effect. This method is quite easy to install, cheap (only mineral and cloth to buy) and it need only few technical materials (scale). The major problem is the experiment duration. Weathering rate are very slow, so it is necessary to leave the minerals in the soil for several years. But on the another hand, this long time permits to reduce the impact of annual climatic variations. Ground minerals or with polished surface are far from real soil minerals but these minerals permit to follow the evolution of the surface state. The results for different mineral types (Labrador, apatite, vermiculite, phlogopite.) in acid soils under temperate climate show that the most important factors controlling the weathering rate are:soil solution pH, soil pH and introduction depth. About the tree specie, it is only a secondary factor.