



### **Soil tillage:**

### **Does mineralogy impact soil organic carbon stabilization in soils subject to tillage?**

#### **Context:**

Tillage intensity has been widely implicated in promoting the mineralization of soil organic carbon, consequently leading to an increase in atmospheric carbon dioxide concentrations. However, conflicting findings from a limited number of studies exist. Most of the existing research has primarily focused on aggregate turnover, with a lack of a systematic approach to assessing soil organic carbon stabilization in relation to mineralogical properties across various soil types and depths, particularly under different tillage practices.

#### **Goals:**

We propose to collect samples from topsoils and subsoils, which exhibit variations in soil mineralogy and are subjected to different tillage practices -namely, conventional, reduced, and non-tillage- in long-term tillage trials conducted in Switzerland, Italy, and Cameroon. Through the utilization of soil fractionation techniques, routine mineralogical analyses, and nanoscale methodologies, the student will investigate the impact of tillage intensity on the crystallinity of soil minerals. Ultimately, we aim to establish a systematic link between soil mineral composition and properties with the stabilization of soil organic carbon.

#### **Knowledge and skills required:**

- Broad interest in soil biogeochemistry.
- Good organisation skills.
- Enthusiasm for soil sampling and soil lab analyses.
- Strong base training in mineralogy.
- Reasonable proficiency with written English.
- Willingness to participate in the scientific publication process.

**Collaboration:** This project will be co-supervised by Orly Mendoza ([orly.mendoza@unil.ch](mailto:orly.mendoza@unil.ch)), Stephanie Grand ([stephanie.grand@unil.ch](mailto:stephanie.grand@unil.ch)) and Meret Aeppli ([meret.aeppli@epfl.ch](mailto:meret.aeppli@epfl.ch))

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