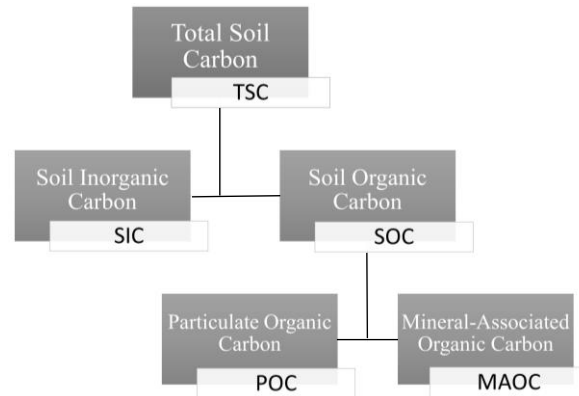


Not All Soil Carbon is Created Equally

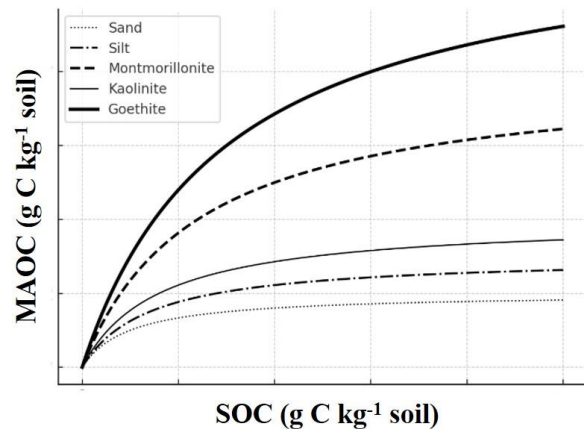
→ Different fractions of soil organic carbon behave differently and perform different functions

- ⇒ **Particulate organic carbon (POC)** is fast cycling, vulnerable carbon –it is easily degraded by microbes and thus easily lost from the soil as CO_2 (lifetime is 1 - 50 years in soil).
- ⇒ **Mineral-associated organic carbon (MAOC)** is slow cycling, protected carbon bonded to the surfaces of soil minerals, which is often considered sequestered (lifetime is 10 - 1000 years in soil).



→ Not all soils are created equally in their ability to store carbon as MAOC

- ⇒ Carbon storage in the mineral fraction is limited by the surface area and reactivity of soil particles. The MAOC component of soil organic carbon can thus become **saturated** when organic carbon binds to all available surfaces of the mineral, at which point no more carbon can be sequestered into the MAOC fraction.
 - Finer-textured soils and minerals with higher surface reactivity can store more carbon as MAOC (i.e., the saturation threshold is higher for finer-textured soils and high-reactivity minerals).



→ Rate of MAOC accrual depends on carbon saturation and deficit

- ⇒ Soils further from carbon saturation (larger deficit) accumulate MAOC faster than soils closer to carbon saturation (smaller deficit).
 - We do not know how carbon saturation changes across different soil types. This makes it difficult to systematically evaluate management intended to sequester carbon into MAOC.

