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Buried black soils surrounding the white roof of Africa as regional carbon storage hotspot

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Mt. Kilimanjaro, the at least still "white roof" of Africa, attracts much attention because of its dramatically shrinking ice caps. By contrast, it was discovered only recently that intriguing paleosol sequences with buried and often strikingly black soils developed along the slopes of Mt. Kilimanjaro during the Late Quaternary. In our study we investigated in detail the soil organic carbon (SOC) contents and SOC stocks of soil profiles which are situated along two altitudinal transects; one along the humid southern slopes and the other one along the more arid northern slopes.
We found up to 3 m thick paleosol sequences occurring almost area-wide particularly in the montane forest zone. SOC contents are remarkable high with values of up to more than 10%, indicating high preservation of soil organic matter (SOM). We suggest that the SOM preservation is favoured by several factors, such as (i) the burial by aeolian deposition, (ii) lower temperatures and (iii) more resistant Erica litter during glacial periods, (iv) formation of stable organo-mineral complexes and (v) high black carbon (BC) contents. The SOC-rich buried black soils account for mean SOC stocks of $\sim$82 kg m-2 in the montane rainforest. Extrapolating this SOC storage and comparing it with the SOC storage achieved by the surrounding savannah soils of the Maasai Steppe highlights that the buried black soils are a prominent regional carbon storage hotspot.