Classification problems of Mount Kenya soils

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Soil sampling on the agricultural lands covering 1200 square kilometers in the Eastern part of Mount Kenya was carried out to assess the status of soil organic carbon (SOC) as a soil fertility indicator, and to create an up-to-date soil classification map. The geology of the area consists of volcanic rocks and recent superficial deposits. The volcanic rocks are related to the Pliocene time; mainly: lahars, phonolites, tuffs, basalt and ashes. A total of 28 open profiles and 49 augered profiles with 269 samples were collected. The samples were analyzed for total carbon, organic carbon, particle size distribution, percent bases, cation exchange capacity and pH among other parameters. The objective of the study was to evaluate the variability of SOC in different Reference Soil Groups (RGS) and to compare the determined classification units with the KENSOTER database. Soil classification was performed based on the World Reference Base (WRB) for Soil Resources 2014. Based on the earlier surveys, geological and environmental setting, Nitisols were expected to be the dominant soils of the sampled area. However, this was not the case. The major differences to earlier survey data (KENSOTER database) are the presence of high activity clays (CEC value range 27.6 cmol/kg - 70 cmol/kg), high silt content (range 32.6 % - 52.4 %) and silt/clay ratio (range of 0.6 - 1.4) keeping these soils out of the Nitisols RSG. There was good accordance in the morphological features with the earlier survey but failed the silt/clay ratio criteria for Nitisols. This observation calls attention to set new classification criteria for Nitisols and other soils of warm, humid regions with variable rate of weathering to avoid difficulties in interpretation. To address the classification problem, this paper further discusses the taxonomic relationships between the studied soils. On the contrary most of the diagnostic elements (like the presence Umbric horizon, Vitric and Andic properties) and the some qualifiers (Humic, Dystric, Clayic, Skeletic, Leptic, etc) represent useful information for land use and management in the area.