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Soil carbon, nitrogen, and silicon pools across a toposequence in central Ohio

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Wetlands were drained extensively in the US during the last 200 years which impacted the environment passively. Thus, it is important to preserve the remaining wetlands. This study focused on soil carbon (organic and inorganic), N, and silicon pools across a soil toposequence encompassing all landscape positions, and for pedons. A soil toposequence, derived from till parent material with an un-drained closed depression, was selected for the study. Soil samples of all horizons were analyzed for selected physical and chemical properties. Soil bulk density (ρb) generally decreased down slope from 1.21 to 0.88 Mg m^{-3} for the surface horizons at the summit and toeslope positions, respectively. Soil total carbon (STC) increased substantially down slope from 2.12% for the A horizon at the summit to 23.8% for the Oa3 horizon at the toeslope. Soil organic carbon (SOC) followed the same trend of STC across the landscape because soil inorganic carbon (SIC) was not present in these soils. Soil total N (STN) followed the same trend of STC across the toposequence and within pedons. It increased from 0.19 to 0.85% for the surface horizons at the summit and toeslope positions, respectively. Plant available Si (PASi) and amorphous Si (ASi) concentrations increased downslope across the toposequence and increased downward within pedons. PASi increased from 43 to 101 mg kg^{-1} and ASi increased from 809 to 1091 mg kg^{-1} for the surface horizons at the summit and toeslope positions, respectively. The pH was generally acidic, and it slightly increased down slope from 5.2 to 6.5 for the surface horizons at the summit and toeslope, respectively.