Chemico-geomechanical sensitivities of tropical peat to pore fluid pH related to controlling electrokinetic environment

ABSTRACT

Peat is an accumulation of partially decayed vegetation with high noncrystalline content (humus), which is formed in wetland systems. Chemico-geomechanical sensitivities of a fibrous (very slightly decomposed) and a sapric (highly decomposed) peat to peat-water pH gradients in terms of resulting effects on cation exchange capacity (CEC), zeta potential (ɕ), particle density, liquid limit (LL), particle size distribution, dry densityï moisture content relationship, permeability, and undrained shear strength (Su) have been investigated. The specimens were treated for a 20-day period under acidic and basic conditions. It was found that in both fibrous and sapric peat, the CEC and ɕ decreased; the LL, permeability, Su, and the optimum moisture content (OMC) increased, and the grain size distribution became skewed toward larger particles because of acidic conditions, while basic conditions had a contrary effect. The sensitivities of the fibrous peat to peat-water pH gradients were not of such intensity as were observed in the sapric peat because of the naturally inherited peat structure, degree of decomposition, ion change capacity, particle size, surface charges, and specific surface area. Our results are important, in that they confirm the link between the degree of peat humification and the chemico-geomechanical sensitivities of the peat to peat-water pH gradients.

Keyword: Fibrous peat; Sapric peat; Optimum moisture content; Undrained shear strength; Zeta potential