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Title: Collapsibility and Volume Change Behavior of Unsaturated Residual Soil

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Abstract: Residual soils occur in most countries of the world but the greater areas and depths are normally found in tropical humid areas. In these places, the soil forming processes are still very active and the weathering development is much faster than the erosive factor. Most residual soil exhibit high suctions for most of the year. The absence of positive pore water pressure except immediately after rain, makes conventional soil mechanics for saturated soil not so relevant. Ignorance or lack of understanding of the geotechnical behavior of soil in the partially or unsaturated state has caused a lot of damages to infrastructures, buildings and other structures. For instance, the collapsibility and volume change of partially saturated soils in connection with the drying or wetting causes a lot of damage in foundation, roads and other structures. It is also observed that many shallow slope failures involve a slumping (collapse) type of failure. As such, the development of extended soil mechanics, which embraces the soil in the unsaturated state or subjected to soil suction, is essential. This study examines the collapsibility and volume change behavior specifically of an unsaturated residual soil under various levels of applied matric suction (ua-uw) and net mean stress (s -ua) in a predetermined stress path. The volume change of the soil is found to be sensitive to both the applied matric suction and net mean stress. The soil is found to exhibit a collapsibility behavior upon a reduction in applied matric suction at constant net mean stress.