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Variation of physical and mechanical properties with depth in Alfisols

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abstract Physical and mechanical properties (particle and aggregate size distribution, aggregate stability, bulk density, pores size distribution, air-capacity, water retention, saturated hydraulic conductivity, shrinkage, plastic and liquid limit and drop-cone penetration) influence soil productivity and determine soil management practices and land use planning. These properties have being determined in situ or on samples collected from depths of 0-10, 25-35 and 50-60 cm of three Alfisols from the Northern Greece. The soils differed both in particle size distribution and clay mineralogy. These differences have being reflected in changes of the physical and mechanical properties studied, both between and within soils. These changes could not be explained by particle size distribution and clay mineralogy alone. A high content of Al oxides and hydroxides, found in these soils contributing to aggregate formation and stabilisation, may also affect most of the properties studied. Some of the physical and mechanical properties were found to be interrelated to one another. For most of the cases, close correlations were obtained between these properties and some soil constituents, such as clay, sand, organic matter, CEC and Al oxides and hydroxides. The effect of various physical and mechanical properties on plant root development and soil genesis and degradation was discussed.

keywords Alfisols, physical properties, mechanical properties

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