



Analysis of gytija soils volume changes during drying process

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The volume changes of the gytija soils that accompanies the soil moisture changes is an important feature of such soils and has strong influence on their physical attributes and soil water management. The relationships between soil moisture and volume are often described using shrinkage characteristic curves by relating specific volume (volume of soil per unit mass of solids) to gravimetric moisture content (mass of water per mass of solids). The shrinkage characteristic curve translates changes in moisture content of the soil matrix into changes in volume. For the conversion of volume changes of the soil matrix into crack volume and subsidence, a dimensionless shrinkage geometry factor is applied. The paper presents analysis of the shrinkage processes in soil layers of three different type of gytija soil profiles located in Poland. Undisturbed core samples with volume of 498.7 cm^3 were collected from characteristic layers in three replications. Soil volume changes during drying process (from saturation to oven-dry) were determined using electronic micrometer. Based on performed measurements shrinkage characteristic curves and shrinkage geometry factor, as functions of soil moisture content, were determined. Analysis of the shrinkage characteristic curves for gytija shows that normal and residual shrinkage phase can be distinguished. During the normal shrinkage phase volume of air in the gytija soil is equal to zero. Volume changes of gytija start immediately at the first water extraction at saturation and anisotropic shrinkage is observed. At moisture content near to saturation gytija soil subsidence is observed.