

CALIBRATION OF TDR FOR MOISTURE CONTENT MONITORING IN MOORSH LAYER

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Peatlands are forms of landscape whose existence is strongly dependent on water conditions. Drainage and intensive use of peatlands caused the moorshing process, which lead to the formation of a new material called moors in the top soil layers. Moorshing of organic soils comprises biological, chemical and physical changes caused by a decrease in the water content and, consequently, by increased content of air in the soil. The basic feature differentiating the moorsh level from the parent layer is the structure of the soil formation: in the moorsh it is usually grainy; in the parent formation it ranges from fibrous to amorphous, depending on the degree of humification of plant remains. The knowledge of soil water conditions of particular peat-moorsh site is very important for restoration, conservation and management of the peat resources. Determination of soil water content using Time Domain Reflectometry (TDR) method is recently modern and widely used. The practical application of TDR requires its calibration i.e. determination of the relationship between dielectric constant and volumetric moisture content of the soil. The aim of this study is to determine the contribution of bulk density to the function that relates dielectric constant to moisture content for different types of moorsh. The paper presents the development of calibration equations for the range of different moorsh types from Biebrza river valley. The undisturbed soil samples were used in the calibration procedure. The volumetric moisture content and dielectric constant were measured simultaneously during the calibration. The measurements performed on undisturbed moorsh samples from Biebrza river valley showed that bulk density of moorsh soils substantially affects the relation between dielectric constant and moisture content. The relationship between dielectric constant and moisture content in moorsh layer can be represented by square-root equation and it was proven that the values of intercept and slope of this equation are strongly depended on bulk density. The proposed calibration equation relating moisture content with dielectric constant and bulk density for TDR moisture measurements in moorsh layers from Biebrza river valley was tested under the field conditions by comparison of moisture content measurements using TDR and gravimetric methods.