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Maize root effects on soil water and hydraulic properties

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Plants may directly affect soil hydraulic properties by altering the present porous system or by creating new pores during root growths. The root growth induced dynamics of pore systems are mostly not considered when determining hydraulic parameters and describing flow and transport in soils. Moreover, the fractions of water in pores and in biomass can usually not be distin-guished. Based on detailed 3D- maize root and soil data, this presentation discusses the follow-ing effects. One objective was to estimate the contribution of the fraction of root to soil water content in order to evaluate possible errors for different soil moisture instruments and for calcu-lating flow and water retention or suction-based irrigation techniques. Another objective was to estimate the temporal and spatial root variability effects in order to evaluate spatial schemes for soil sampling or moisture probe instrumentation. Close to plant rows, the water content fraction in biomass was up to 50 % of the bulk water content while between rows it was less than 5 %. TDR and Tensiometer will apparently give different results. Effects can be significant (i.e., when most of the bulk soil water is in root biomass) under relatively dry summer conditions.