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## The influence of temperature on soil complex dielectric permittivity in the 0.02 – 3 GHz frequency range

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Dielectric properties of soil are often utilized for the purpose of soil moisture measurement. However, the relations between soil complex dielectric permittivity and volumetric water content depend also on other factors, such as the operating frequency of the sensor, soil texture, and temperature. The goal of the presented work is to examine the impact of temperature in the 0.5 – 40°C range on the complex dielectric permittivity spectrum of two soils of silt loam and loamy sand textures. The permittivity spectra were measured in a coaxial transmission-line cell system with the use of a Copper Mountain R60 one-port vector-network-analyzer in the frequency range from 20 MHz to 3 GHz. The relations between the real part of dielectric permittivity and soil volumetric water content were modeled at each examined frequency and the temperature dependence of the applied model parameters was determined. In the future research steps, the obtained relations will be applied and tested with the use of a prototype field soil moisture probe operating in a broadband frequency range.

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