Soil calorimetry in a non-steady thermal regime

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ABSTRACT

Usually a non-steady thermal regime described by an analytical solution of the equation of heat propagation is used for measuring the thermal diffusivity of the soil. But knowing the thermal diffusivity and the amount of heat delivered by the source which creates the non-steady thermal regime the some analytical solution offers a way to find out the heat capacity of the unit of volume of soil. The author is implementing this calorimetric method in the case of a thermal regime induced by a heat pulse on a plane source in a sandy soil, finding $\rho \cdot c = (2.3 \pm 0.2) \times 10^6 \text{J} \cdot \text{m}^{-3} \cdot ^\circ\text{C}^{-1}$.

Keywords: calorimetry, least squares method, soil physics.