



Errors in water retention curves determined with pressure plates and their effect on soil hydraulic properties

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Pressure plates are commonly used to measure the soil water retention curve. Low plate and soil conductance, lack of plate-soil contact, and soil dispersion, however, make this method often unreliable at low water potentials. In this paper, we investigate how errors in the determination of the water retention curve affect the soil hydraulic properties and the computation of plant available water.

We first determined soil water retention data for a silt loam soil using pressure plates only and a combination of pressure plates and a dew point meter. The two sets of soil water retention data were then analyzed using different hydraulic properties models to obtain parameters for hydraulic properties. The soil water retention curves determined with the two methods deviated at potentials less than about -20 m-H₂O, with the pressure plates data yielding larger water contents than the dew point meter at the same water potentials. These results indicate that soil water retention curves determined from pressure plates may be in error at potentials less than -20 m-H₂O, which may lead to substantial errors in water flow calculations. These errors can be eliminated by using a combination of pressure plates and dew point measurements to determine the water retention curve.