Performance of moisture release curves created using *in situ* measurements for estimating infiltration and runoff

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The moisture release curve (MRC) has been described as the most critical information about an unsaturated soil and can be thought of as a soil’s fingerprint. It provides key information like water availability, infiltration, unsaturated hydraulic conductivity, and soil type. Despite the desirability of knowing the MRC, often it is simply estimated from soil type parameters. In the past, actually making an MRC was limited by long and sometimes complicated laboratory processes. While recent developments like the Wind Schindler method have improved this, it is still impractical to evaluate every soil of interest in the lab. The objective of this study was to investigate the quality of *in situ* MRCs created in-part using a newly-released, accurate soil matric potential sensor. Soil water content and matric potential sensors were collocated at multiple depths in three actively managed landscapes with different soils: loamy sand, sandy loam, and clay loam. An entire season of data was collected to include multiple drying and wetting events. Results were compared to MRCs created in the lab using a Wind Schindler method combined with a chilled mirror instrument. Curves showed good agreement between the two approaches. *In situ* -generated curves also provided good estimates of soil type as well. Roots in the loamy sand samples clearly shift moisture release curves and appear to be responsible for the largest disparity between lab (with roots dead or removed) and field data. *In situ* MRCs cannot substitute for the quality of curves generated in the lab, but they will produce good approximations that will help fill the MRC knowledge gap and be much improved from those estimated from soil type. Using this approach, it may be possible to partition infiltration and runoff in marginal areas like the contaminated forested areas around Iitate Village.

Keywords: Moisture release curves, water content, water potential, infiltration, sensors

