



An extended range, maintenance free sensor for in situ monitoring of water potential

Doug Cobos (1,2), Colin Campbell (1,2), and Brody Teare (1)

(1) Decagon Devices, Research and Development, Pullman, United States (doug@decagon.com), (2) Washington State University Department of Crop and Soil Sciences

Since well before the initial development of the field tensiometer by L.A. Richards in the early 1920s, engineers, hydrologists, and soil and plant scientists have desired a maintenance-free sensor for continuous in situ monitoring of water potential. Subsequent sensor development efforts by university and private sector researchers have produced several generations of new sensors, but each still has limitations in range of measurement, field robustness, and/or measurement accuracy. After more than a dozen years of continuous development effort, and three separate generations of porous matrix sensors, we now have a sensor that more closely approaches the ideal than previously possible. This paper will discuss a new, automated calibration procedure allowing individual calibration of large batches of sensors simultaneously. The accuracy resulting from the new calibration procedure will be discussed, as will other in situ measurement considerations including robustness, maintenance requirements, range of measurement, soil type dependence, and hysteresis, among others.