

[Home](#)

[Online Library HESS](#)

- [Recent Final Revised Papers](#)
- [Volumes and Issues](#)
- [Special Issues](#)
- [Library Search](#)
- [Title and Author Search](#)

[Online Library HESSD](#)

[Alerts & RSS Feeds](#)

[General Information](#)

[Submission](#)

[Review](#)

[Production](#)

[Subscription](#)

[Comment on a Paper](#)

Journal Metrics

 **IF 2.462**

 **5-year IF 2.670**

 **SNIP 0.856**

 **SJR 0.099**

[Definitions](#)

ARCHIVED IN



PORTICO

[Volumes and Issues](#) [Contents of](#)

Hydrol. Earth Syst. Sci., 14, 1787-1799, 2010
www.hydrol-earth-syst-sci.net/14/1787/2010/
[doi: 10.5194/hess-14-1787-2010](https://doi.org/10.5194/hess-14-1787-2010)

© Author(s) 2010. This work is distributed under the Creative Commons Attribution 3.0 License.

Polymer tensiometers with ceramic cones: direct observations of matric pressures in drying soils

M. J. van der Ploeg¹, H. P. A. Gooren¹, G. Bakker², C. W. Hooger C. Huiskes⁴, L. K. Koopal³, H. Kruidhof⁴, and G. H. de Rooij^{1,5}

¹Dept. Environmental Sciences, Soil Physics, Ecohydrology and Groundwater Management Group, Wageningen University, The Netherlands

²ALTERRA, Wageningen, The Netherlands

³Laboratory for Physical Chemistry and Colloid Science, Wageningen University, The Netherlands

⁴Faculty of Science and Technology, Twente University, The Netherlands

⁵Dept. Soil Physics, Helmholtz Centre for Environmental Research – UFZ, Germany

Abstract. Measuring soil water potentials is crucial to characterize zone processes. Conventional tensiometers only measure until approximately -0.09 MPa, and indirect methods may suffer from the uniqueness in the relationship between matric potential and measured properties. Recently developed polymer tensiometers (POTs) directly measure soil matric potentials until the theoretical wilting point (-1.6 MPa). By minimizing the volume of polymer solution inside the tube while maximizing the ceramic area in contact with that polymer solution, response times drop to acceptable ranges for laboratory and field conditions. Contact with the soil is drastically improved with the use of cone-shaped solid ceramics instead of flat ceramics. The comparison between measured potentials by polymer tensiometers and indirect methods obtained potentials with time domain reflectometry highlights the advantages of using the latter method at low water contents. By combining POT and time domain reflectometry readings in situ moisture retention curves can be measured over the range permitted by the measurement range of POT and time domain reflectometry.

[Final Revised Paper](#) (PDF, 8006 KB) [Discussion Paper](#) (HESSD)

Citation: van der Ploeg, M. J., Gooren, H. P. A., Bakker, G., Hoogendamp, C. W., Huiskes, C., Koopal, L. K., Kruidhof, H., and de Rooij, G. H.: Polymer tensiometers with ceramic cones: direct observations of matric pressures in drying soils, Hydrol. Earth Syst. Sci., 14, 1787-1799, doi: 10.5194/hess-14-1787-2010, 2010. [Bibtex](#) [EndNote](#) [Reference Manager](#) [XML](#)