# Soil Water Content Measurements with the Ground Wave of Ground-Penetrating Radar. (S01-huisman085733-Oral)

**Authors:**

- J.A.Huisman - *IBED-FG, Universiteit van Amsterdam*
- W.Bouten - *IBED-FG, Universiteit van Amsterdam*

## Abstract:

We compared the capability of ground-penetrating radar (GPR) and time domain reflectometry (TDR) to assess the temporal development of spatial variation of surface soil water content (SWC). In case of GPR, we measured SWC with the ground wave, which is a direct wave between sender and receiver through the top of the soil. Spatial SWC variation was measured on 18 days with GPR and TDR in a 30-day monitoring period. Large fluctuations in the spatial SWC variation were created by heterogeneous irrigation on two days. The temporal development of the spatial variation was studied by means of the variogram and interpolated SWC maps. To compare GPR and TDR variograms, we estimated confidence intervals of the variograms and the variogram model parameters with a jackknife approach and a first-order approximation of model parameter uncertainty. The results showed that the uncertainty in the GPR variogram was much lower than the uncertainty in the TDR variogram due to the larger number of GPR measurements. Consequently, the uncertainty in the model parameters was also much lower for GPR and, therefore, the temporal development of the fitted GPR model parameters was easier to interpret.

**Corresponding Author Information:**

Sander Huisman
Universiteit van Amsterdam
Nieuwe Achtergracht 166
Amsterdam 1018 WV
Netherlands

phone: ++31-20-5257450
fax: ++31-20-5257431
e-mail: s.huisman@science.uva.nl

## Presentation Information:

Presentation Date: Wednesday, November 13, 2002
Presentation Time: 4:00 pm

## Keywords:

Soil water content, Ground-penetrating radar, Time domain reflectometry