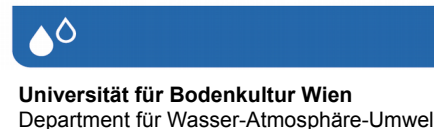


# Saturated hydraulic conductivity as parameter for modeling application – comparison of determination methods



## Supplementary information to poster presentation



### Applied models and equations

Why did we choose the Gardner-model (Gardner, 1958) for comparison of methods? Due to its simplicity with only one more fitting parameter in addition to  $K_s$  and because it is used as a standard for tension infiltration experiments. Original literature says it is applicable in a small but undefined range of pF. Another model (e.g. Mualem) would be maybe more appropriate for the full range but as this is a comparison study, we decided for Gardner.

Known equations for dual-permeability conductivity were published by Ross & Smettem as formulated in Romano and Nasta (2016) (combination of van Genuchten-Mualem model for matric and a simple exponential function for macropore flow, was used in this study) and Jarvis (2008). To find the optimal set of parameters, we used a SCE-algorithm and minimized RMSE of measured conductivity values against simulated ones.

#### Gardner model:

$$K(h) = K_s \exp(-\alpha |h|)$$

#### Ross-Smettem model:

$$K(h) = K_s S_e^r \left[ \frac{(B1+B2)}{w \beta + (1-w) \alpha} \right]^2$$

$$S_e(h) = w [(1+\beta |h|) \exp(-\beta |h|)] + (1-w)[1+(\alpha |h|)^n]^{-m}$$

$$B1 = w \alpha \exp(-\beta |h|)$$

$$B2 = (1-w) \alpha \{1 - [(\alpha |h|)^{n-1}] [1+(\alpha |h|)^n]^{-m}\}$$

$$m = 1 - \frac{1}{n}$$

### The framework

This study is part of the work on an international research project which focuses on the formal description of management-driven alterations of hydraulic soil properties of arable soils. Collection of a comprehensive data set on field sites in Eastern Austria and Eastern Germany builds the basis and different tillage strategies as well as land-use changes (e.g. afforestations, fallows) are examined.

As the project runs until 2018, we will also extend this study on additional data. Hence, if you have similar data and no resources for such an analysis, we would be happy to cooperate. Contact data see below.

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