

Automated environment controllable stress-controllable 7D soil column for measuring transient hydraulic properties



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- ◆ SDPFs SDSWCCs
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- ◆ , K_0 SDPF
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- ◆ SDSWCC
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Geo-Experts

IPM
SDPF

h_{z_i,t_j}
and D)

t_j ($j = 1, 2$)

z_i ($i = A, B, C$

VWC

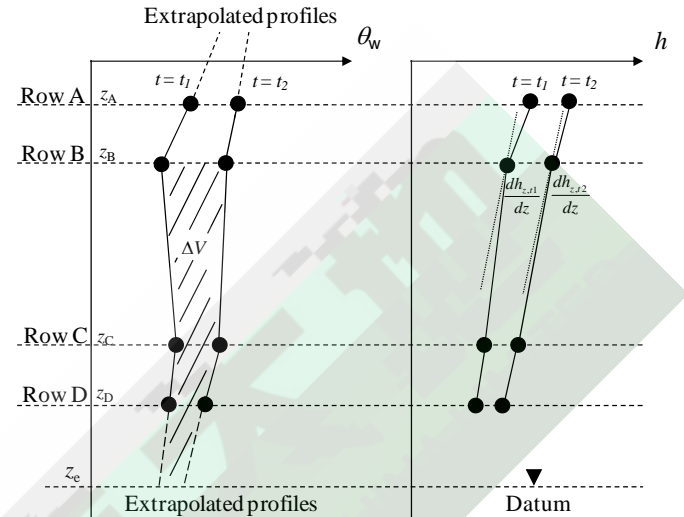
PWP

SDSWCC

PWP

LVDT

VWC



- IPM

1.

$t = t_1 \quad t_2,$
(Ng & Leung 2012)

$$k_{zB,tave} = - \frac{v_{zB,tave}}{i_{zB,tave}} \quad (3)$$

1
h

$t_1 \quad t_2$
 z_A, z_B, z_C, z_D

$t_{ave} = (t_1 + t_2)/2$

$$v_{zB,tave} = - \frac{\Delta V}{t_2 - t_1} + v_{ze,tave} \quad (1)$$

ΔV
 $t = t_1 \quad t_2 \quad \theta_w(z, t)$

$v_{ze,tave} = v_{ze}$
 $t_{ave} = (t_1 + t_2)/2$

Geo-Experts

(Mariotte's bottle.)

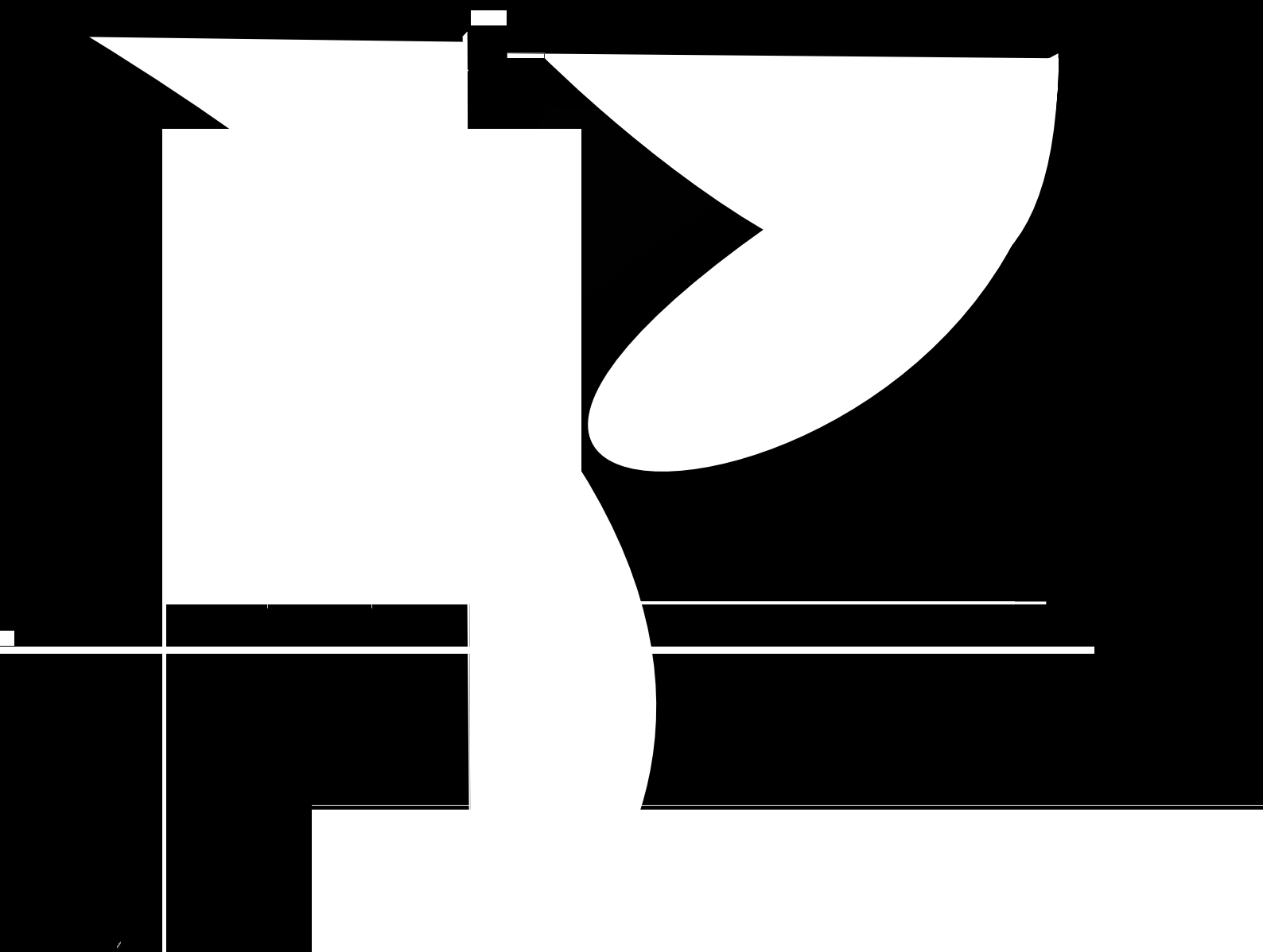
1 $v_{ze,tave}$

$i_{zB,tave},$

:\

$$i_{zB,tave} = \frac{1}{2} \left(\frac{dh_{zB,t1}}{dz} + \frac{dh_{zB,t2}}{dz} \right)$$

$$= \frac{1}{4} \left[\left(\frac{h_{zA,t1} - h_{zB,t1}}{z_A - z_B} + \frac{h_{zB,t1} - h_{zC,t1}}{z_B - z_C} \right) + \left(\frac{h_{zA,t2} - h_{zB,t2}}{z_A - z_B} + \frac{h_{zB,t2} - h_{zC,t2}}{z_B - z_C} \right) \right] \quad (2)$$



1	*		
		:	150 mm
		:	190 mm
		:	1000 mm
2	VWC	:	60 mm
3		:	5 mm
4	()		
i	k	:	150 mm
		:	200 mm
ii		:	5 kg
		:	0.01 g
5		:	10 kN
		:	50 mm
		:	0 – 450 kPa
		:	0 – 1000 kPa
6	()		
		:	2 MPa
		:	0.5 mV/V
		:	2 % RO
		:	1 channel, 4 dig

*) ()
 ** VWC PWC 6.

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