

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



- ◆ /
- ◆
- ◆ SDPFs      SDSWCCs
- ◆ SDPFs      SDSWCCs
- ◆ ,  $K_0$       SDPF
- ◆
- ◆ SDSWCC
- ◆



Geo-Experts

IPM  
SDPF

$h_{z_i,t_j}$   
and D)

$t_j$  ( $j = 1, 2$ )

$z_i$  ( $i = A, B, C$

VWC

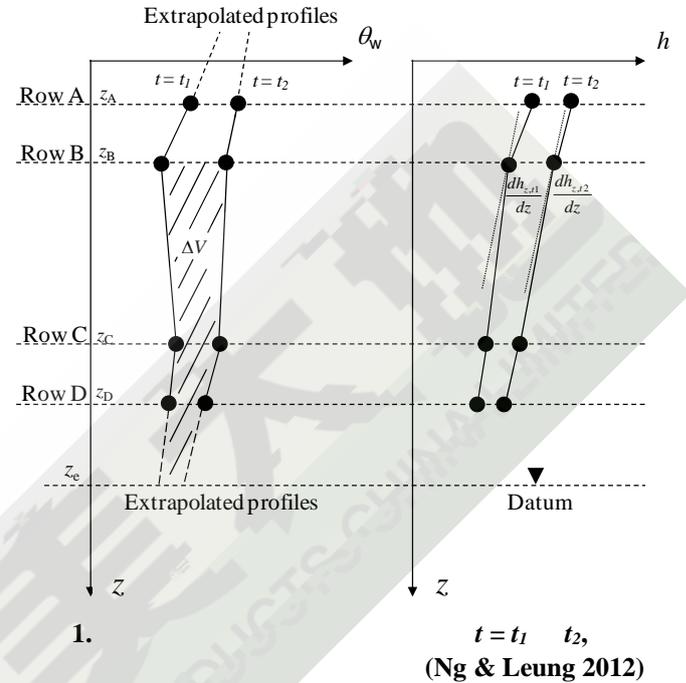
PWP

SDSWCC

PWP

VWC

LVDT



- IPM

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

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

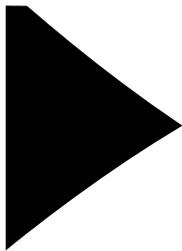
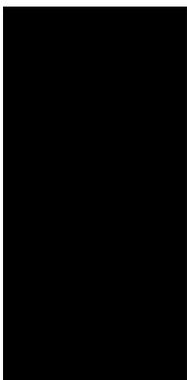
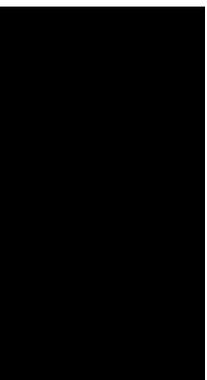
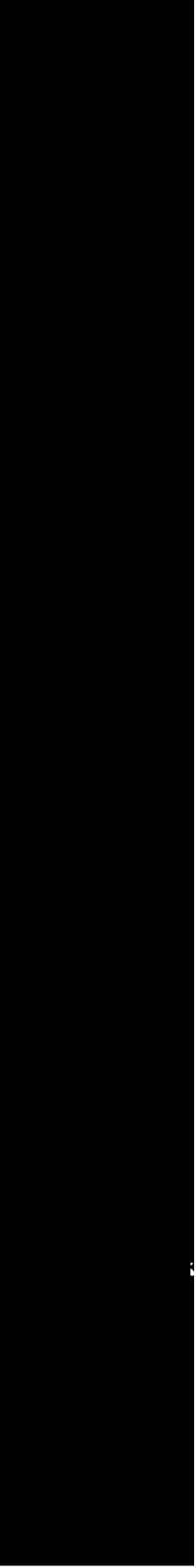
$t_{ave} = (t_1 + t_2)/2$   
 $\Delta V = \int_{z_A}^{z_B} \theta_w(z, t) dz$   
 $v_{ze,tave} = v_{ze} \cdot \frac{t_1 + t_2}{2}$

Geo-Experts

(Mariotte's bottle.)

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

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



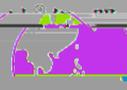
:

1	*		
		:	150 mm
		:	190 mm
		:	1000 mm
2	<b>VWC</b>	:	60 mm
3		:	5 mm
4	( )		
i	<i>k</i>		
		:	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

\* ) 6. ( )  
 \*\* ) VWC PWC

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