

Table 1 Six algorithms to determine the thermal diffusivity k

No.	Name	Formula	References
1	Amplitude algorithm	$k = \frac{\omega(z_1 - z_2)^2}{2 \ln(A_1/A_2)^2}$	Horton et al. (1983)
2	Phase algorithm	$k = \frac{\omega(z_1 - z_2)^2}{2(\Phi_1 - \Phi_2)^2}$	Horton et al. (1983)
3	Arctangent Algorithm	$k = \frac{\omega \Delta z^2}{2 \left\{ \arctan \left[\frac{(T_1 - T_3)(T_2' - T_4') - (T_2 - T_4)(T_1' - T_3')}{(T_1 - T_3)(T_1' - T_3') + (T_2 - T_4)(T_2' - T_4')} \right] \right\}^2}$	Nerpin and Chudnovskii (1967)
4	Logarithmic Algorithm	$k = \left\{ \frac{0.0121 \Delta z}{\ln \left[\frac{(T_1 - T_3)^2 + (T_2 - T_4)^2}{(T_1' - T_3')^2 + (T_2' - T_4')^2} \right]} \right\}^2}$	Seemann (1979)
5	Harmonic algorithm	See section 2.1.5	Horton et al. (1983)/ Heusinkveld et al. (2004)
6	Conduction-convection algorithm	$k = - \frac{(z_1 - z_2)^2 \omega \ln(A_1/A_2)}{(\Phi_1 - \Phi_2) [(\Phi_1 - \Phi_2)^2 + \ln^2(A_1/A_2)]}$	Gao et al (2003)