The Homework1 of Environmental Biophysics

LongYan

2022-9-29

1. Please derive the calculation fromula of D with soil temperature observation at two depths.
   $D = \frac{z_1 - z_2}{\ln(T_{z2} - T_{ave}) - \ln(T_{z1} - T_{ave})}$
   Answer:
   $T = T_{ave} \pm A(0) exp(-z/D)$
   $\Rightarrow \frac{-z}{D} = \ln \frac{T - T_{ave}}{\pm A(0)}$
   $\Rightarrow \frac{-z_1}{D} - \frac{-z_2}{D} = \ln \frac{T_1 - T_{ave}}{\pm A(0)} - \ln \frac{T_2 - T_{ave}}{\pm A(0)}$
   $\Rightarrow \frac{-z_1 + z_2}{D} = \ln \frac{T - T_{ave}}{T_2 - T_{ave}}$
   $\Rightarrow D = \frac{z_1 - z_2}{\ln(T_{z2} - T_{ave}) - \ln(T_{z1} - T_{ave})}$

2.1 Using the midday temperature data in the following table:

   (a) Plot height as a function of mean temperature
   Answer:

   (b) Plot $\ln(z - d)/z_H$(Eq.(2.1)) as a function of mean temperature;