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HWRS 482
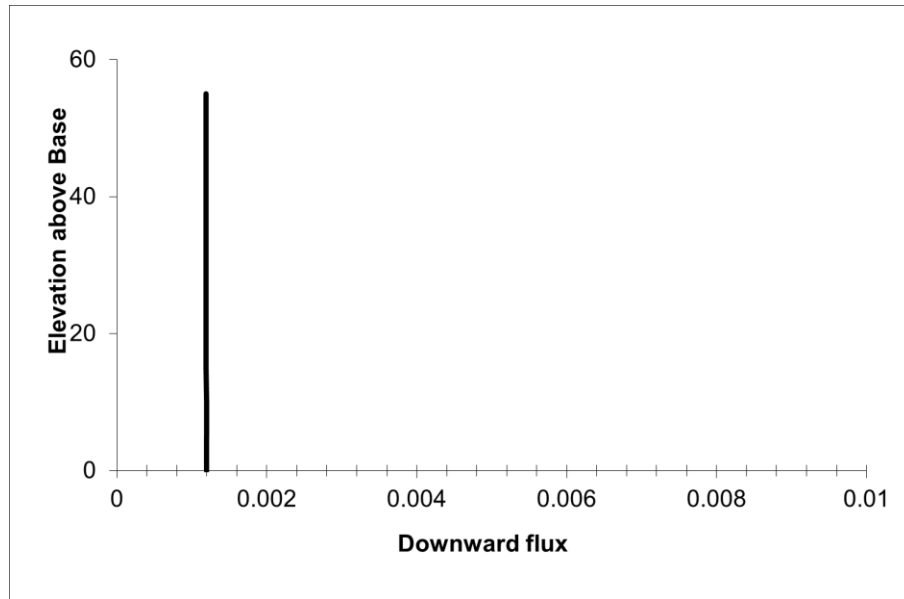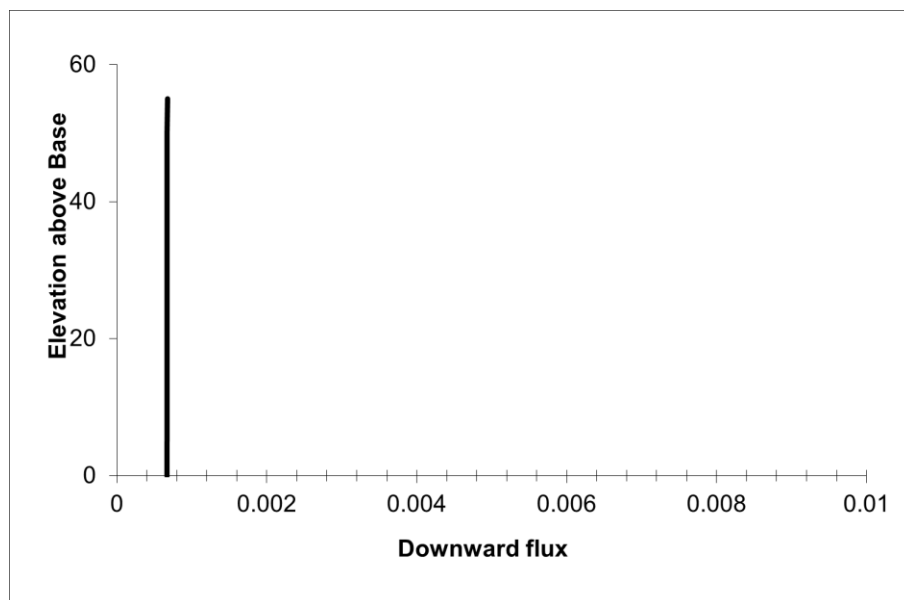
Assignment 1

1. Show, based on the flux with depth, that the model is steady state. Repeat this for a homogeneous and for a heterogeneous column.
   a. In the homogenous and heterogenous K profiles, flux is consistent throughout the depth, just as it is in a homogenous profile where K is equal everywhere.

Homogenous

Heterogenous

     b. While flux can change over time, the storage must stay consistent by equal fluxes going in and going out. Between cases, flux is different, yet equal across elevation.
2. Show that the steady state flux agrees with the direct calculation based on the harmonic mean average K.
     a. In the homogenous profile, each flux equals that of the direct measurement, despite their inconsistent hydraulic conductivities.
     b. This is because flux at each cell is dependent upon the hydraulic conductivities across ALL cells.
3. Show the steady state head profile for a column with approximately equal-thickness layers with different K values. Use this profile to explain why the equivalent hydraulic conductivity, Keq, is closer to the lower of the K values.
     a. Keq uses a harmonic mean to derive a single hydraulic conductivity value. The method gives greater weight to lower values to represent how less conductive media slows down flux across the profile.