

Conceptual Model

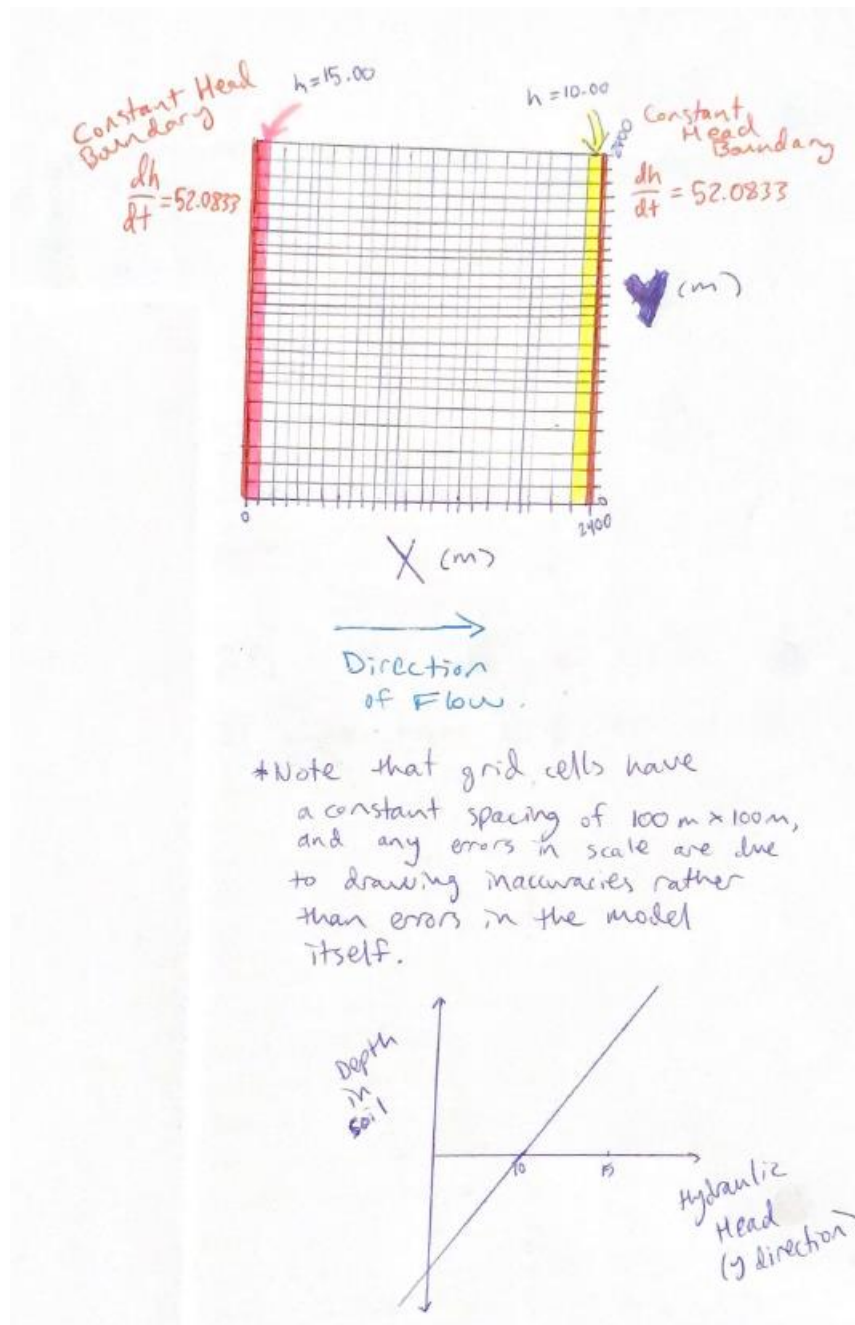


Figure 1: Conceptual model of the 2D model simulated in MODFLOW. Constant head boundaries as well as two head values within the flow field are marked on the grid above. Flow moves from left to right across the domain indicated by the decrease in head across the domain. Hydraulic head would have a cross-section looking something like the graph above in relation to depth within the soil.

Homogeneous Domain

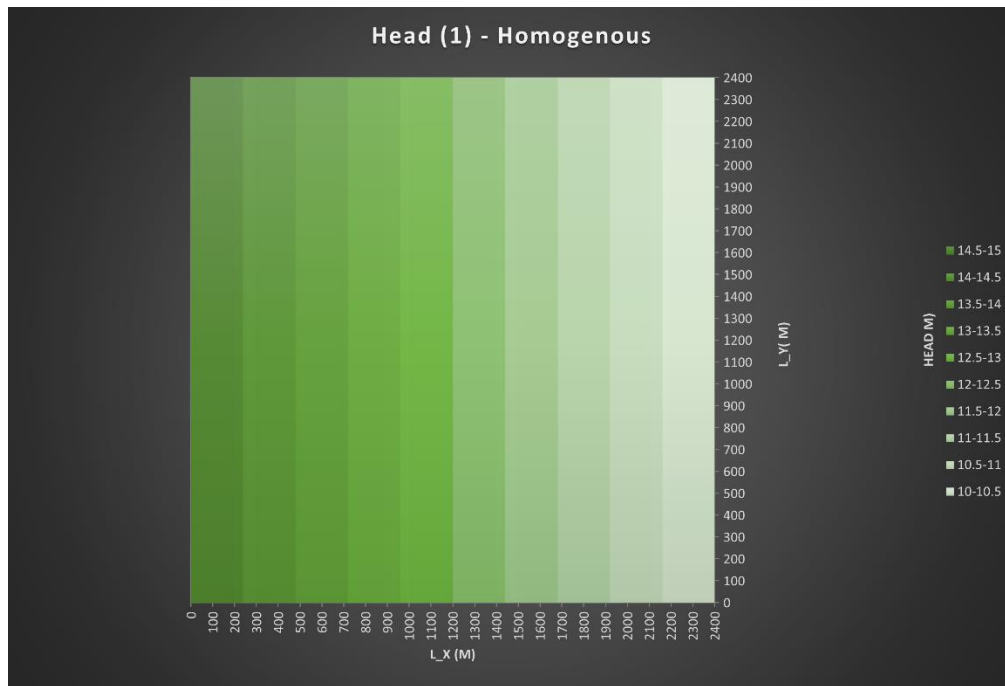


Figure 2: Hydraulic head behavior within the homogeneous domain. Head does not vary along the Y direction. However, the graph above indicates that the head decreases in the X direction. This shows that flow moves from left to right in the homogeneous domain.

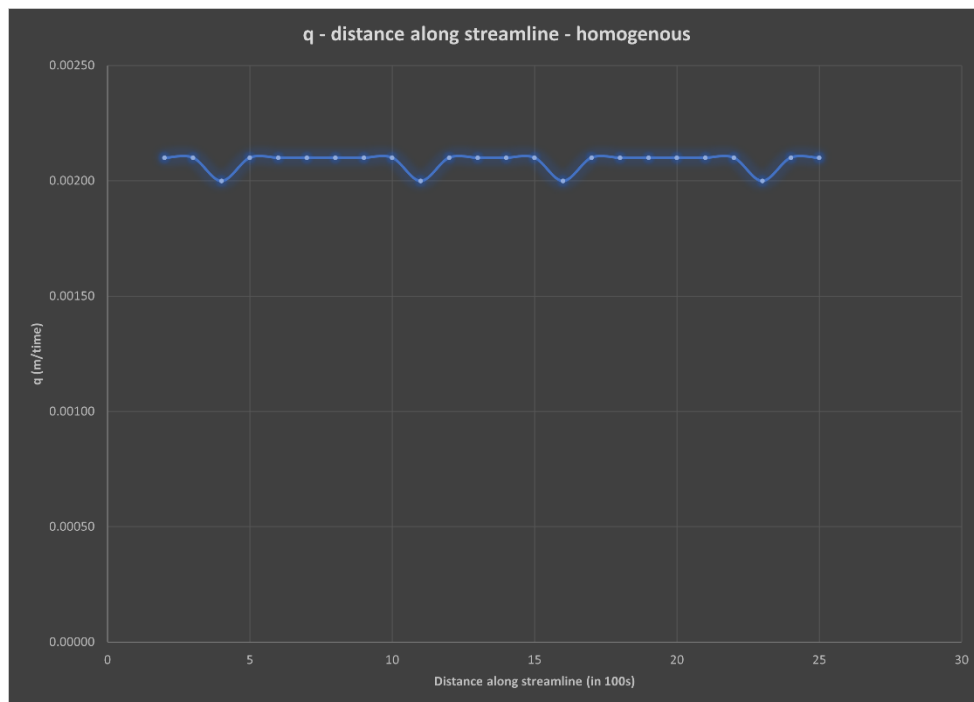


Figure 3: This figure shows the flux with distance along the streamline within the homogeneous domain. The local minima indicate points where the flux decreases for a short time, although I am not sure what causes this.

Heterogeneous Domain (In Direction of Flow)

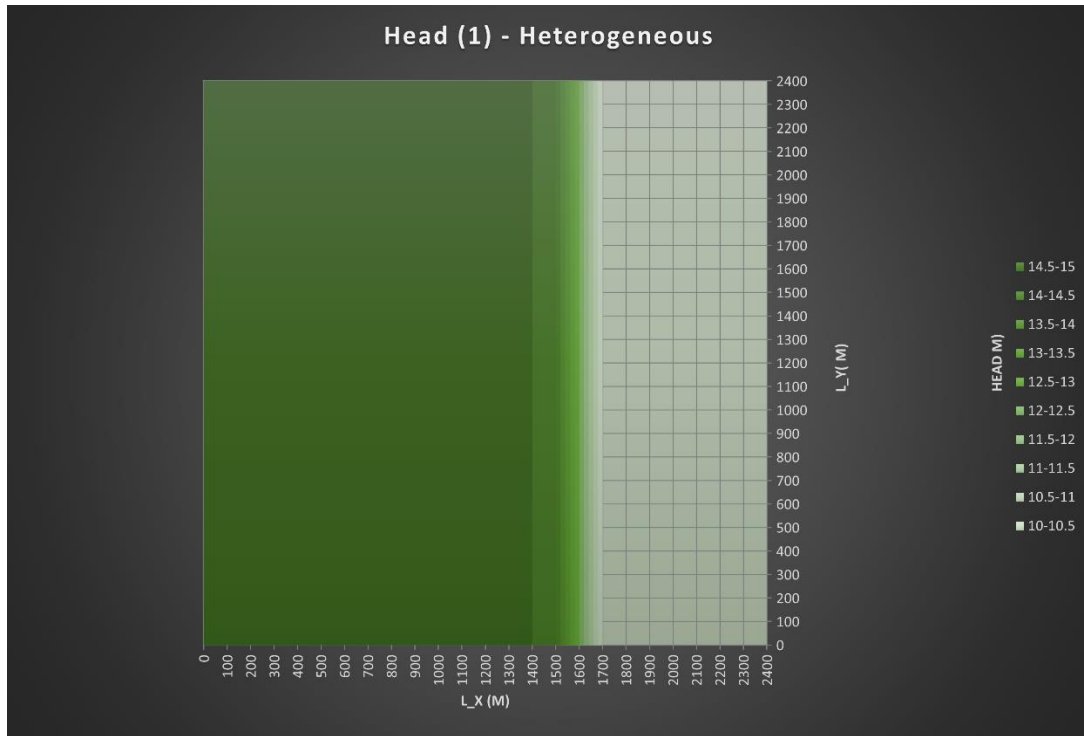


Figure 4: Hydraulic head for a heterogeneous domain. This domain had only two layers changed from the initial run of the model, one column of $K=2.5$ and one of $K = 0.00007$. This behavior seems anomalous, although it is unclear what may be causing this reaction in the model.

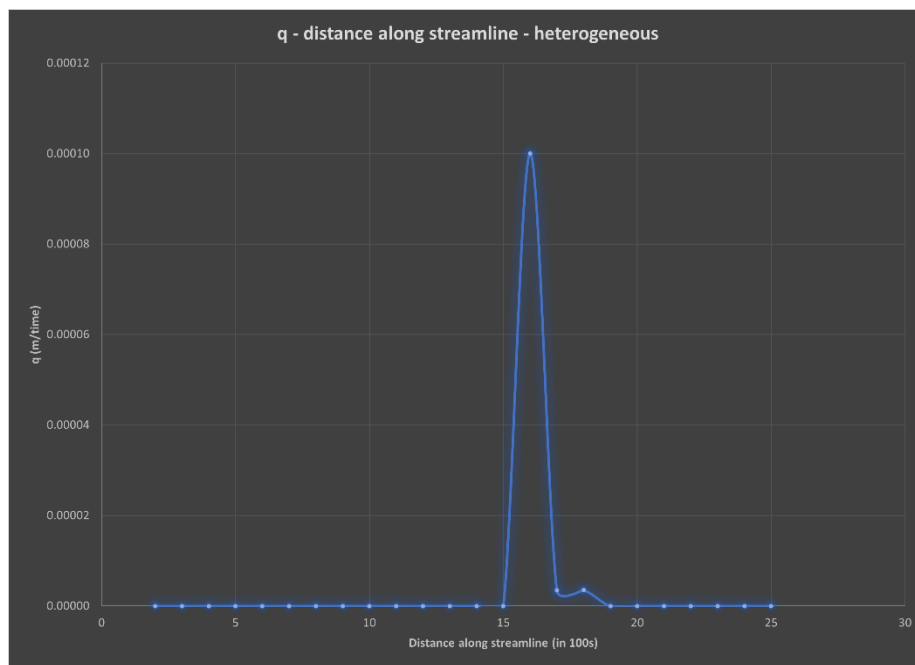


Figure 5: Graph of flux with distance along a streamline within a heterogeneous domain. The anomalous behavior seen in the head graph above is further confirmed by this discharge plot. Something is off in the model as there is no flow being recorded until the very middle, where there is a major pulse of flow and then a swift return to no flow.

Heterogeneous Domain (Middle Zone)

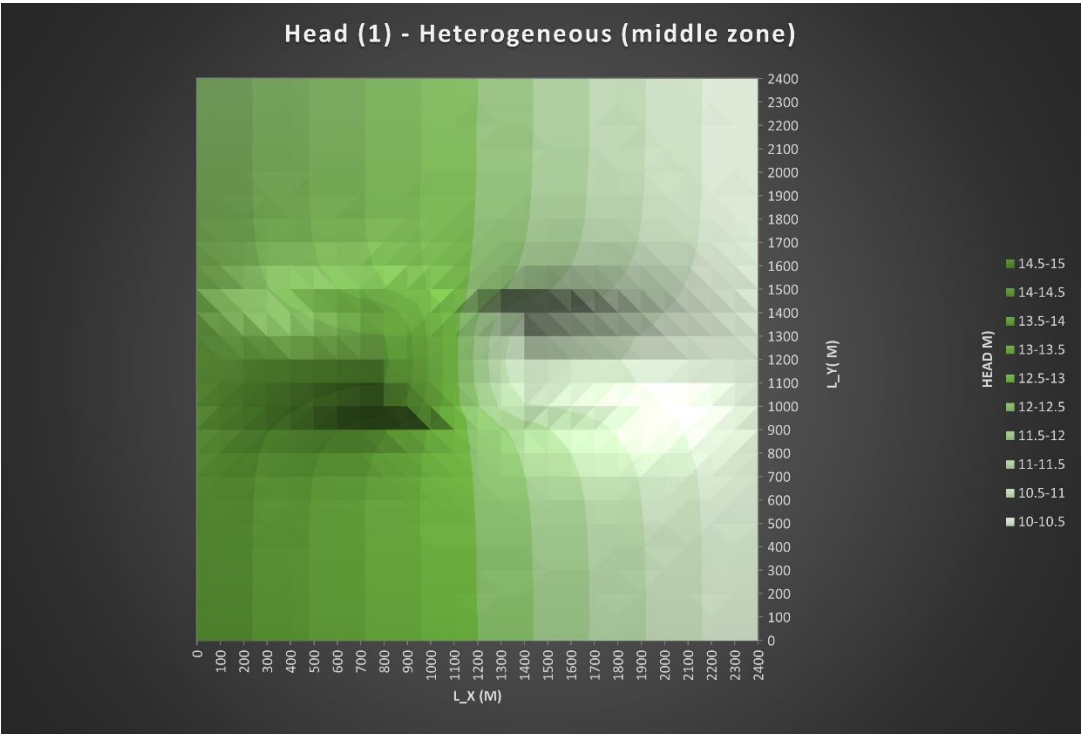


Figure 6: This plot shows the hydraulic head behavior of a heterogeneous domain with a low conductivity zone in the middle of the domain. This zone seems to create a kind of funneling effect where the flow curves through the low K zone initially and then is directed out through the middle zone thereafter (at about $x = 900$ m onward).

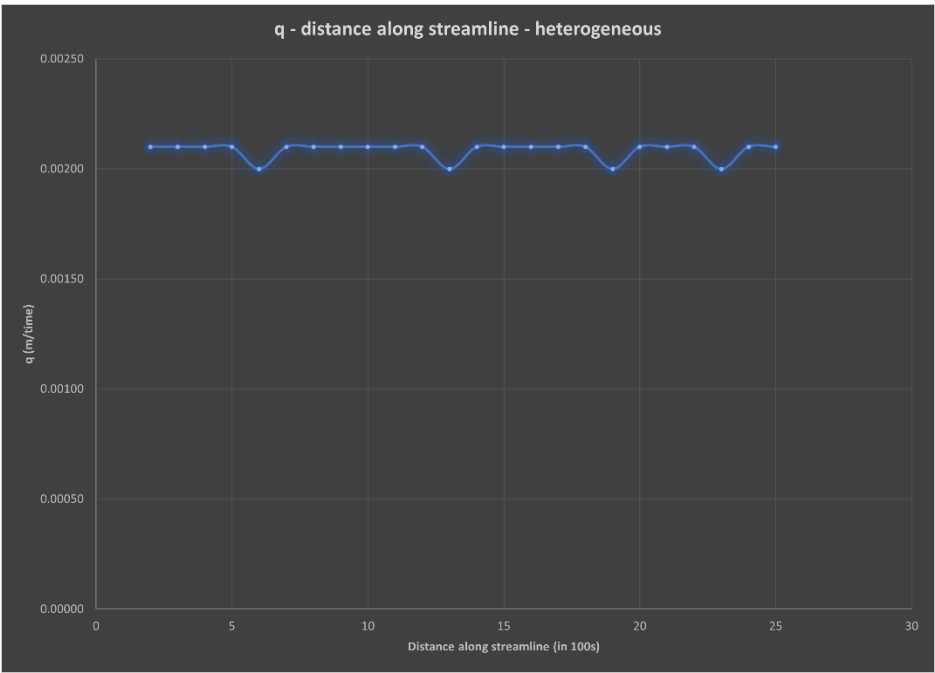


Figure 7: This plot shows the flux with distance along a streamline within a heterogeneous domain that has a low conductivity zone in its center. This plot looks very similar to the homogeneous flow plot as seen above, although the locations of the local minima are grouped in a slightly different order than the homogeneous flux plot.