COURSE: GROUNDWATER MODELLING USING MODFLOW

Session 8: Build a groundwater model

Objective:

The objective of this session is learning to define the active and inactive zone, , select the solver and import a DEM (raster).
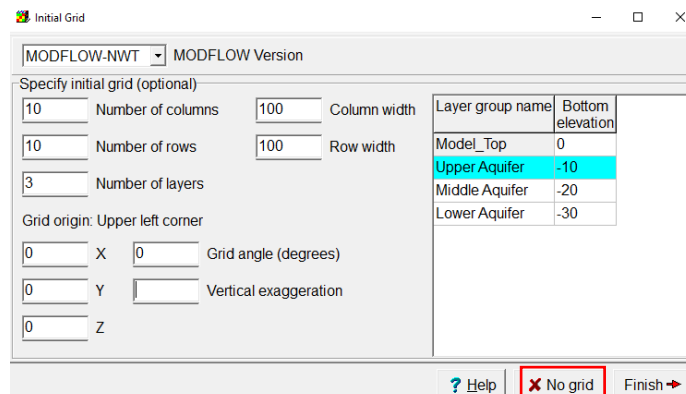
Setting up model parameters

Open ModelMuse.exe and choose the option **Create New MODFLOW Model**. In the "Geo Reference and model Description" window change the length units to "meters" and time units to "seconds", after that click on "Next".
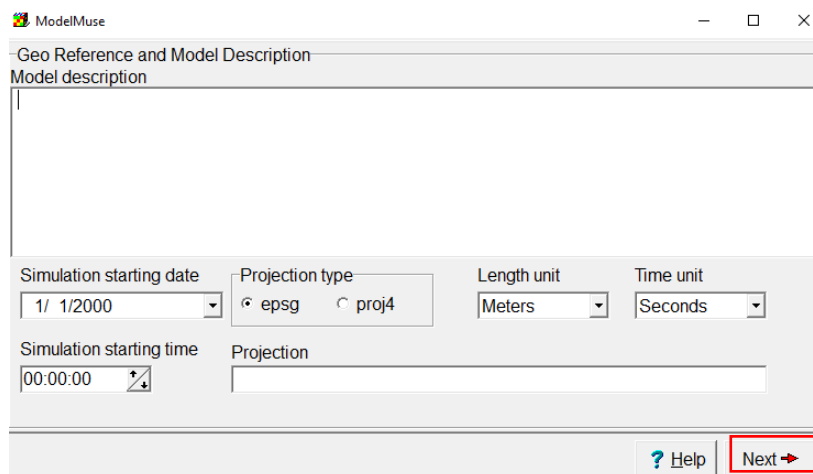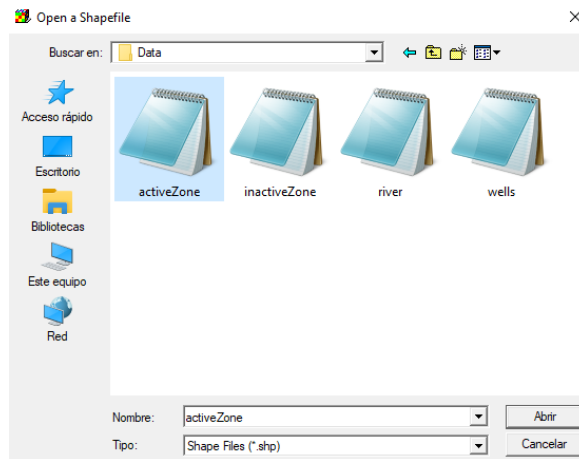

Defining model grid properties

In the window, select the **No grid option** because the grid will be defined with shapefiles
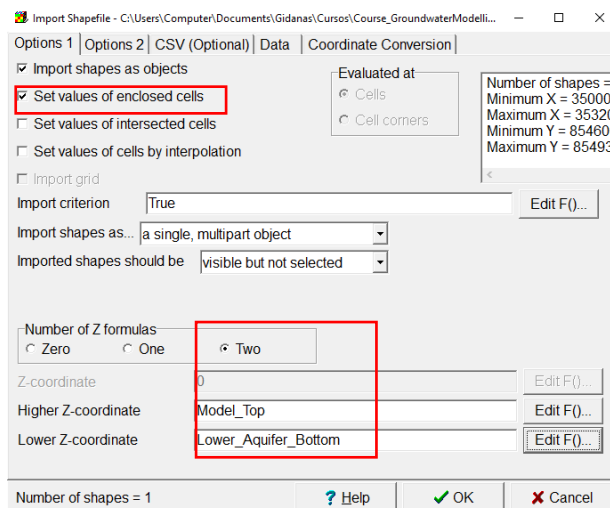
To import the files, go to **File/ Import / Shapefile.** Open the file **activeZone.shp** located in:
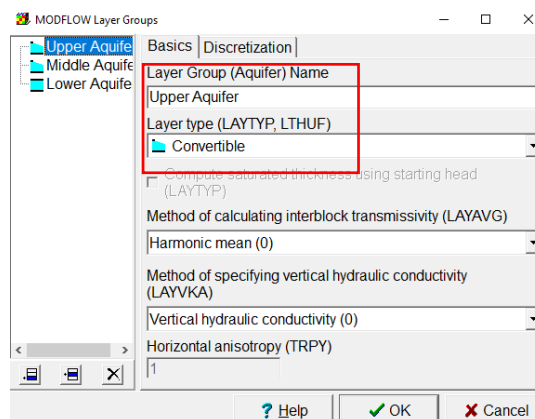
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In the following window select **Set values of enclosed cells**, the number of formulas is zero and click **OK.**


To define the layers, go to **Model/ MODFLOW layer Groups**. These will be called **Upper Aquifer, Middle Aquifer** and **Lower Aquifer**. All of them will be of the type **Convertible**.
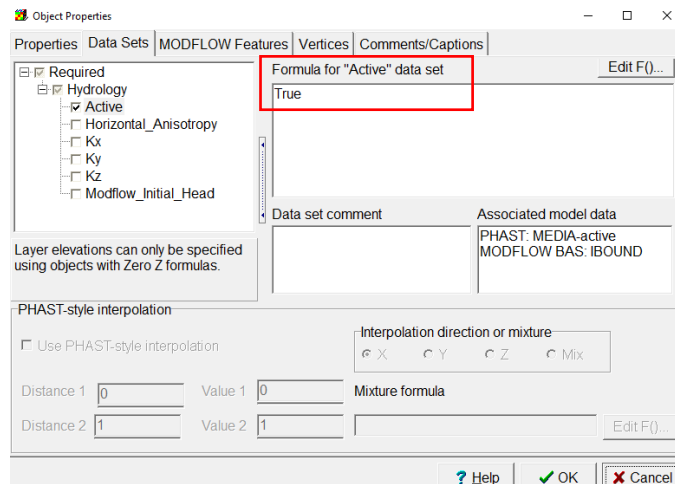
To discretize, click the **Upper Aquifer and Lower Aquifer**, which will have a discretization of 3 while the rest will have a value of 1. Click **OK.**
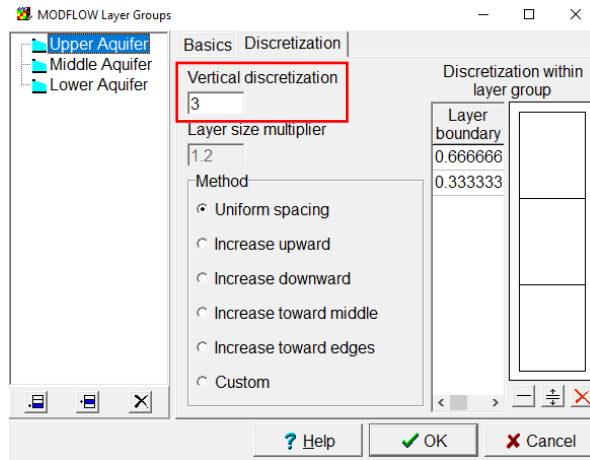
Select the **Show or hide object** option. For the shapefile **activeZone** select the options shown below.
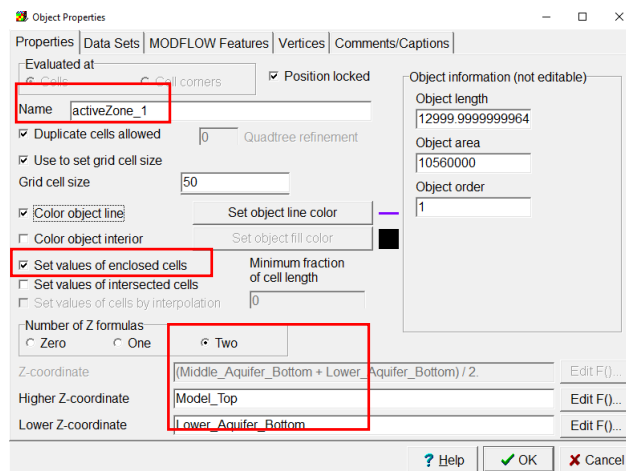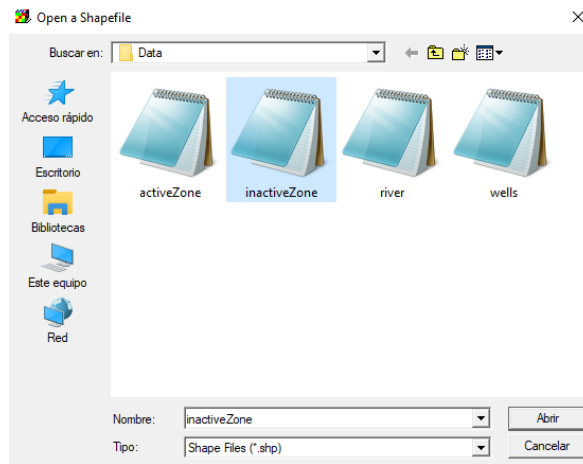

To activate the basin, go to **Data Sets/Active** and in the formula select **True**. Click **OK.**
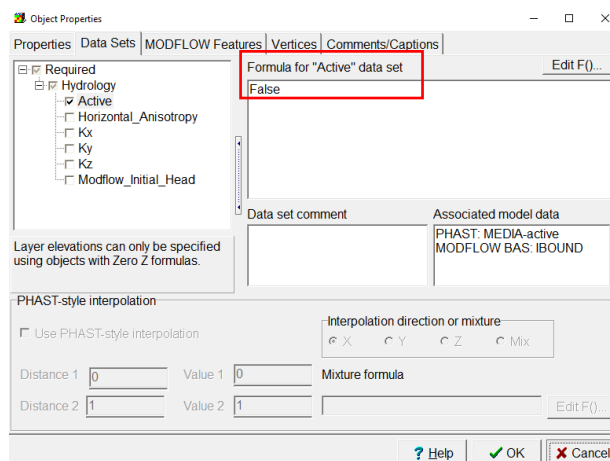
Now for the characteristics of the zone represent the inactive zone, to import the files, go to **File/ Import / Shapefile**. Open the file **inactiveZone.shp** located in:
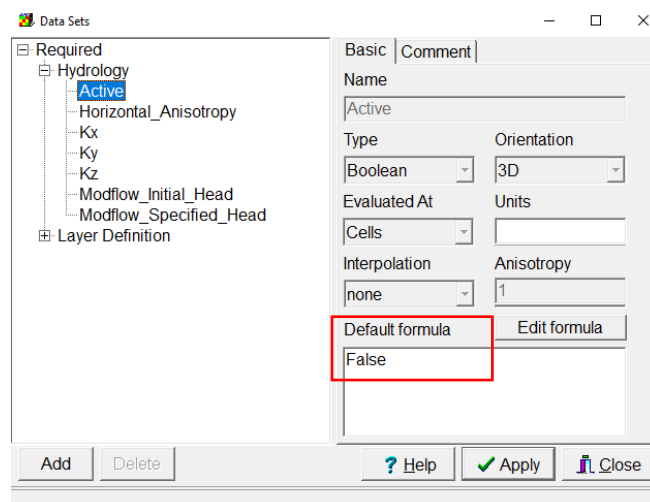
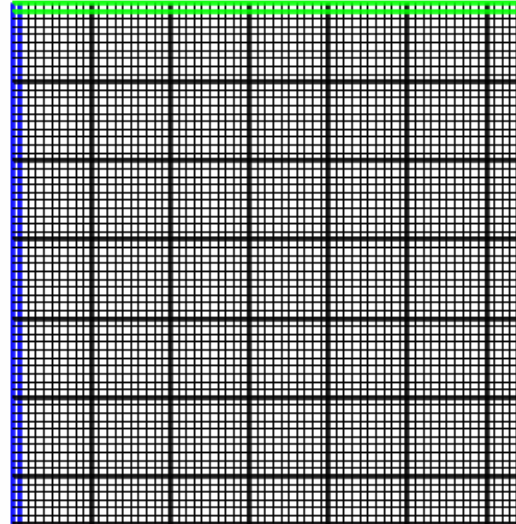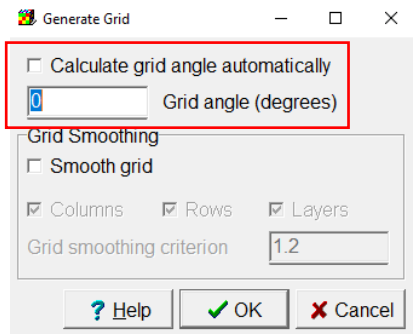Course_GroundwaterModellingMODFLOW\Week_8\Practice\Data

Select the **Show or hide object** option. For the shapefile **inactiveZone**, go to **Data Sets/Active** and in the formula select **False**. Click **OK.**


All the model area has to be inactive, but the basin zone which is the only active area. Go to **Data / Edit data sets /Active** and in **Edit formula** write False. Click **Apply**
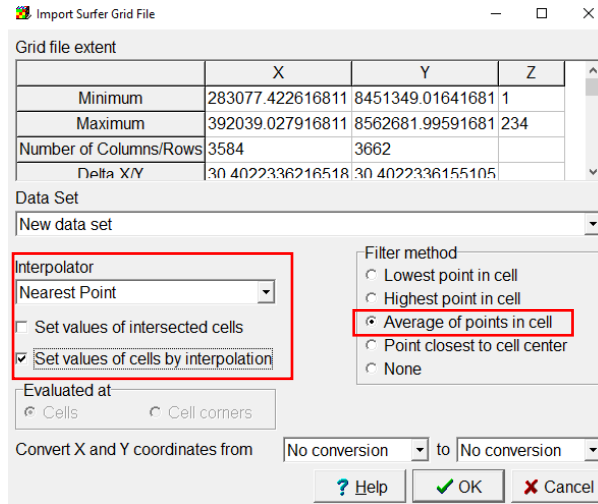
Select the option **Generate Grid** , click **OK**. The result should look like the image:


To import the basin topography, go to **File/ Import/ Surfer grid file** and locate in
Course_GroundwaterModellingMODFLOW\Week_8\Practice\Data, select the file **dem.**
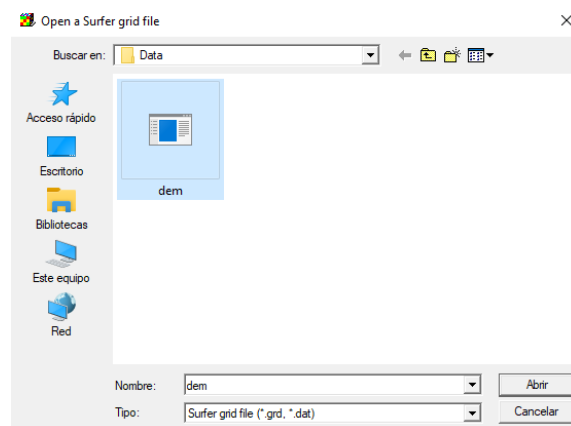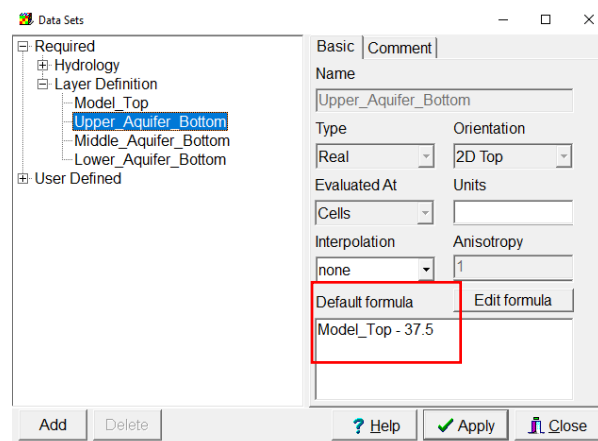

In **Interpolator** select **Nearest Point** and activate **Set values of cells by interpolation.** Click **OK.**
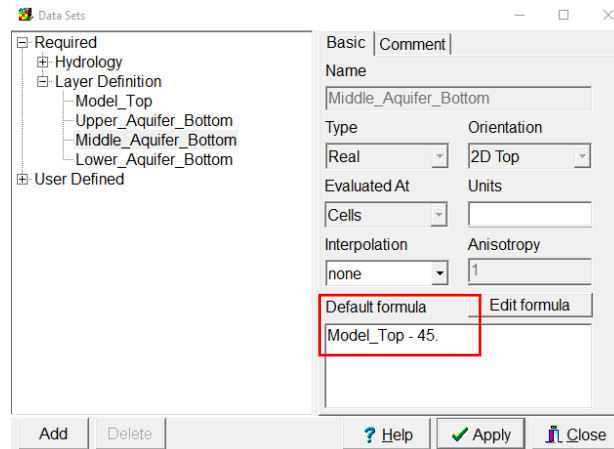
Then select **Data/ Edit data sets/Required / Layer definition.** Select the layer **Model_Top** and in Edit formula select the **dem**. Click **Apply.**
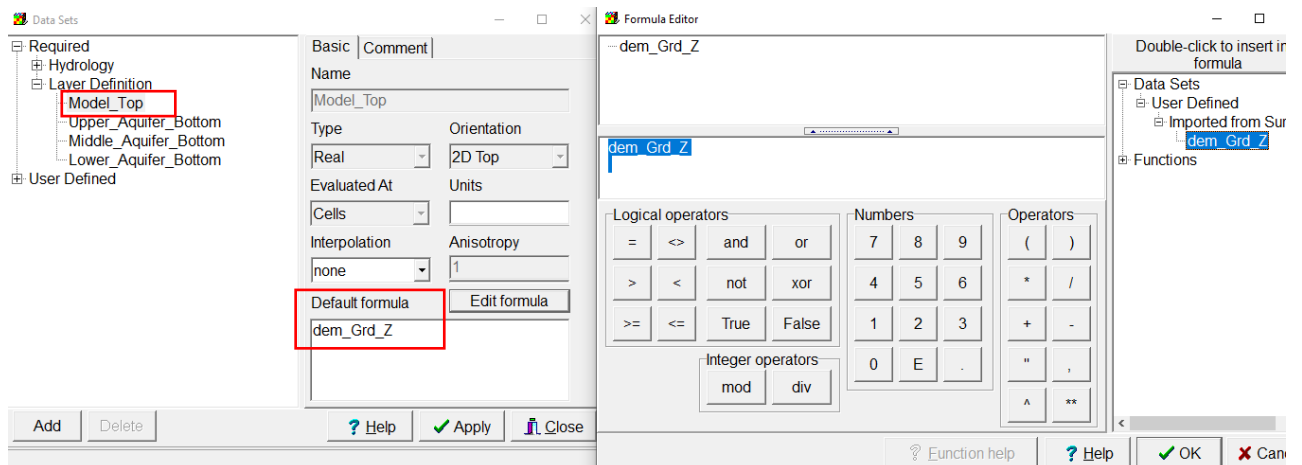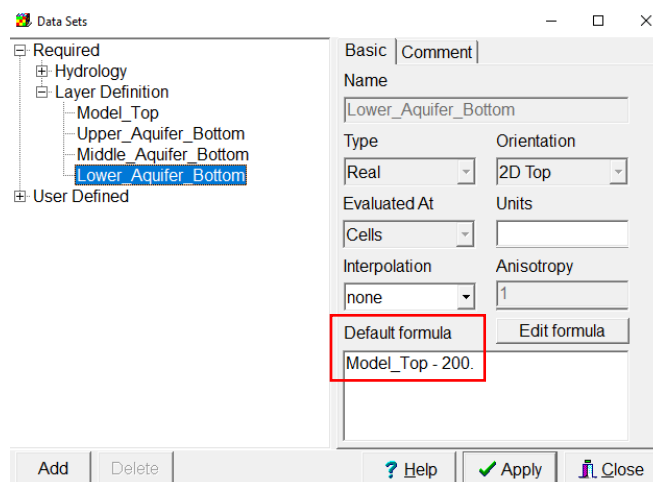

Select the layer **Upper_Aquifer_Bottom** and in Edit formula write **Model_Top-37.5**. Click **Apply.**
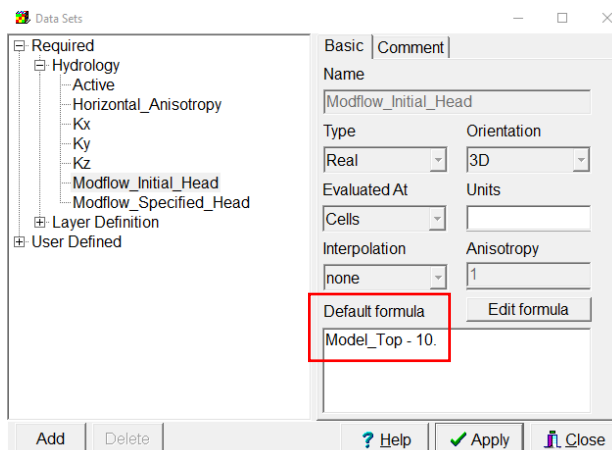
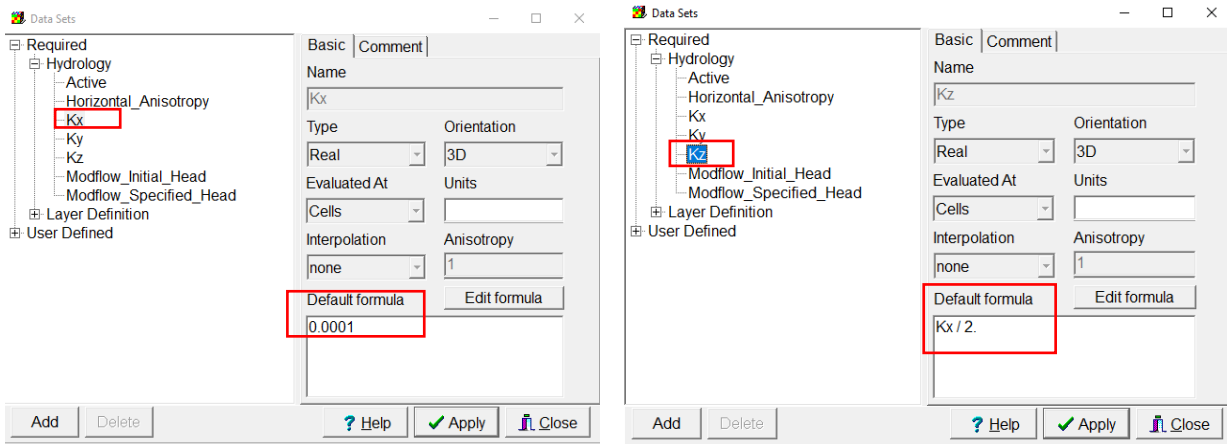Select the layer **Middle_Aquifer_Bottom** and in Edit formula write **Model_Top-45**. Click **Apply.**

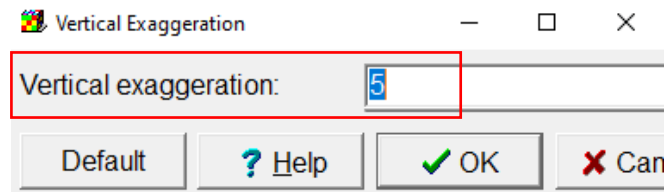For **Lower_Aquifer_Bottom**, in Edit formula write **Model_Top-200**. Click **Apply.**

Then go **Required/ Hydrology/ Modflow_Inital_Head**, in Default Formula write **Model_Top-10.**
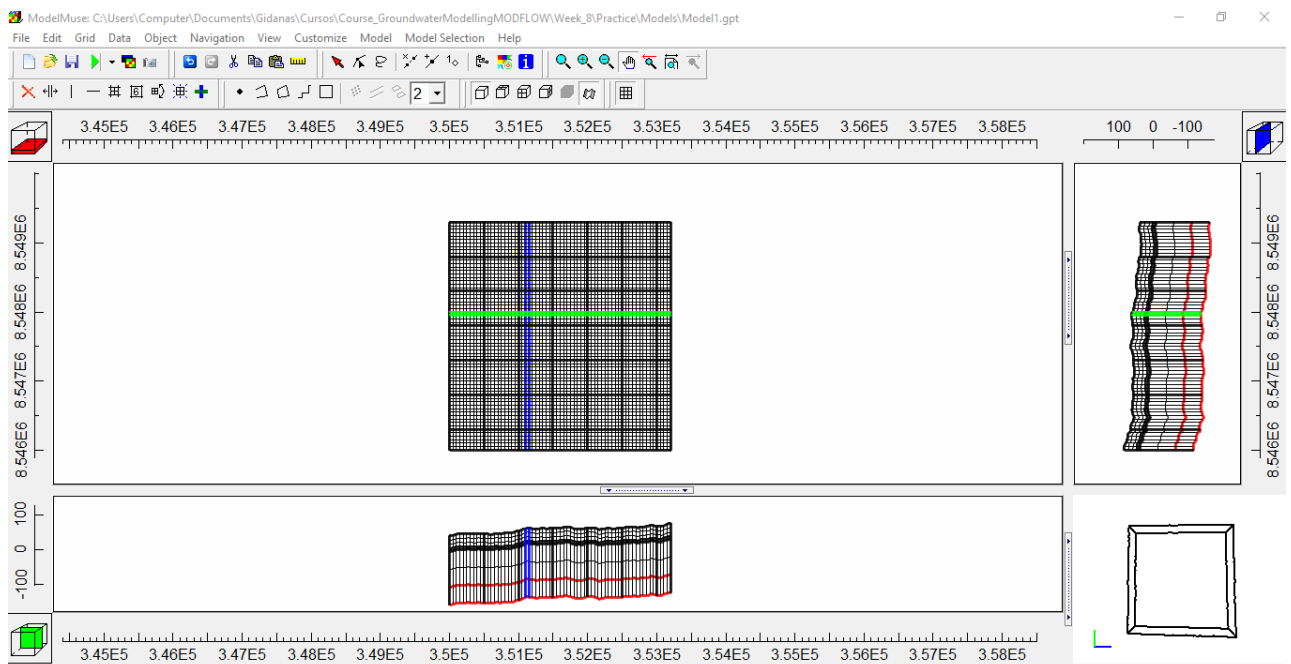
To de define the hydraulic conductivity, select Kx and write 0.0001, then select Kz and write Kx/2.
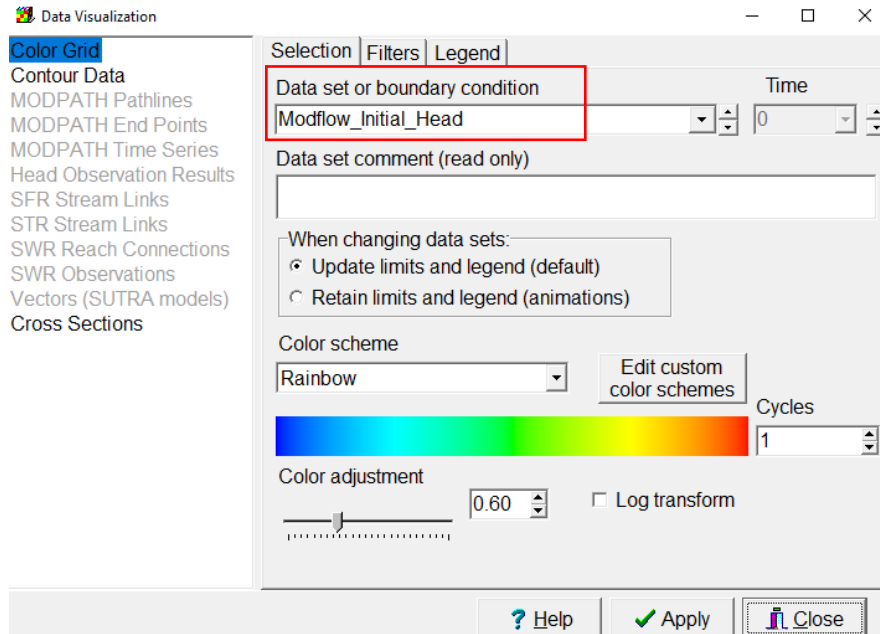

Then go **View/ Vertical exaggeration** and write 5. Click **OK.**

The result should look like the image:

To visualize the initial head, go to Data visualization > Color Grid > Data set or boundary condition. Select **Modflow_Initial_Head** and log transform. Click **Apply.**

The result should look like the image, go to **File/ Save** as **Model 1.gpt.**