COURSE: GROUNDWATER MODELLING USING MODFLOW

Session 4: Defining MODFLOW Layer Groups, Time, Output Control.

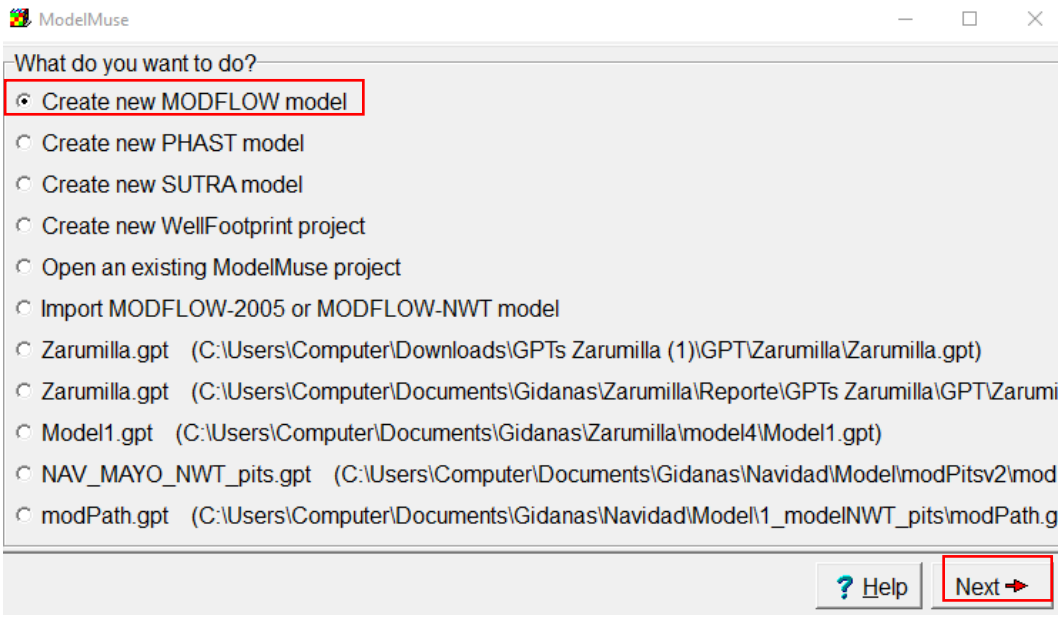
Objective:

The objective of this session is define model selection, layer groups, stress period and specify output control options.

Define Layer Groups

ModelMuse allow simulate steady and nonsteady flow in an irregularly shaped flow system in which aquifer layers can be confined or unconfined. ModelMuse has the option to see how the layer boundaries are defined with the tool MODFLOW Layer Groups.

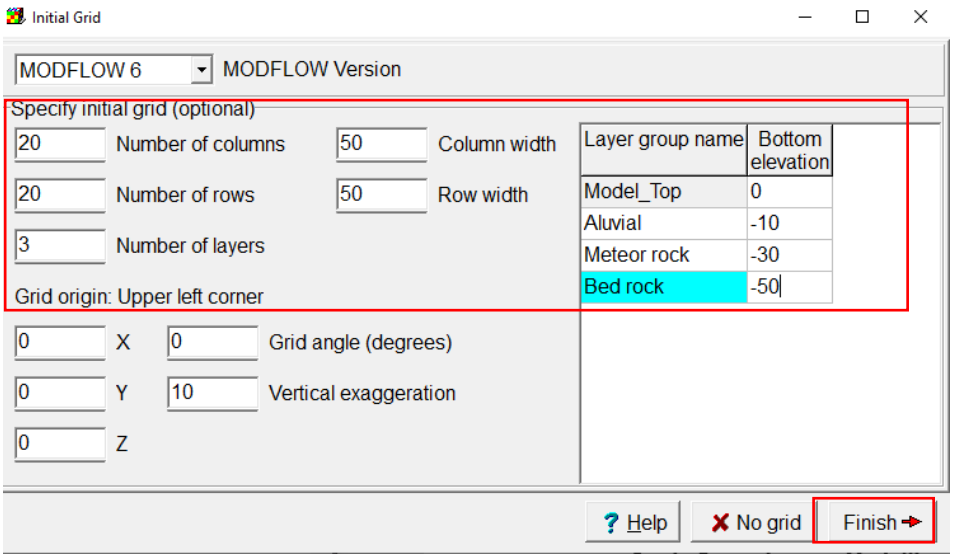
In this exercise, Open **ModelMuse.exe** and choose the option **Create New MODFLOW Model**.



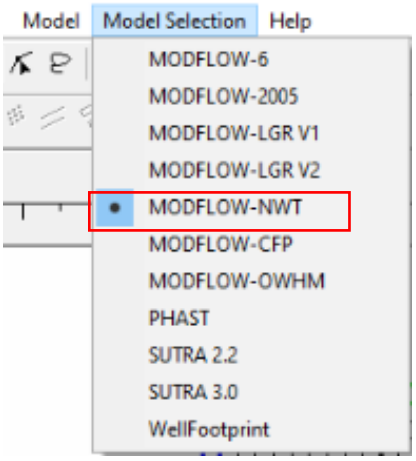
The new model has 20 columns and rows and the column/row width is 50 meters. This model will work with three layers. The aquifer characteristics are:

Layer	Description	Bottom elevation
1	Alluvial	-10
2	Meteor rock	-30
3	Bed rock	-50

Then click in **Finish** button. Choose a vertical exaggeration equal to 10.



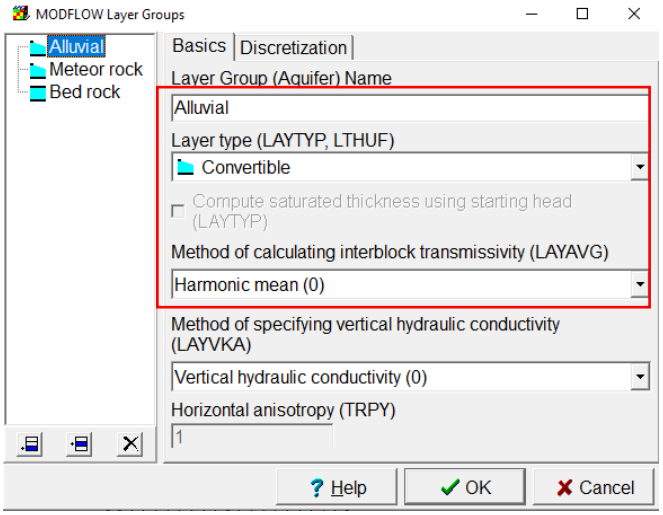
Then visualize the grid. Now go to **Model Selection** and check **MODFLOW - NWT.**



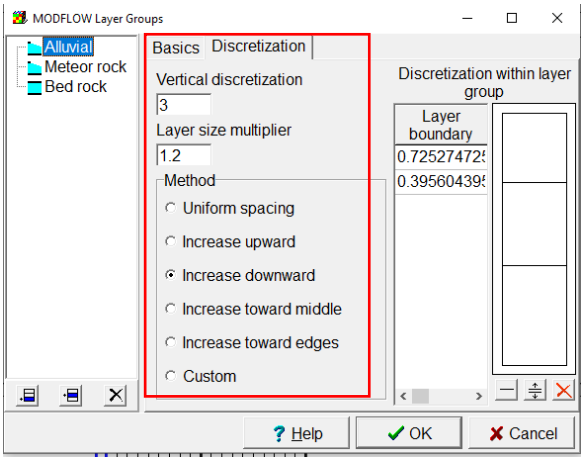
Then go to **Model /Modflow Layer Group.** Then will appear a dialog box and the layers in the model and change the **Layer type**:

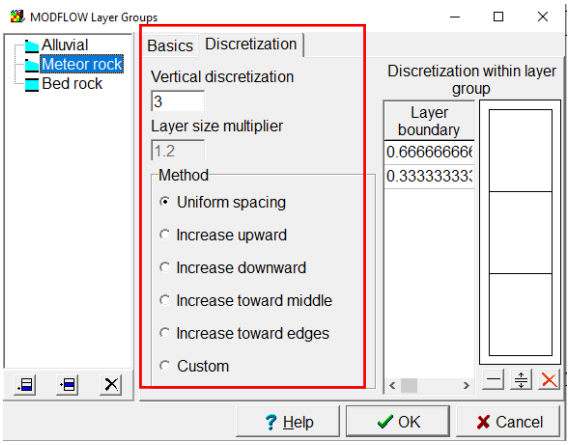
- Alluvial: Convertible
- Meteor rock: Convertible
- Bed rock: Confined

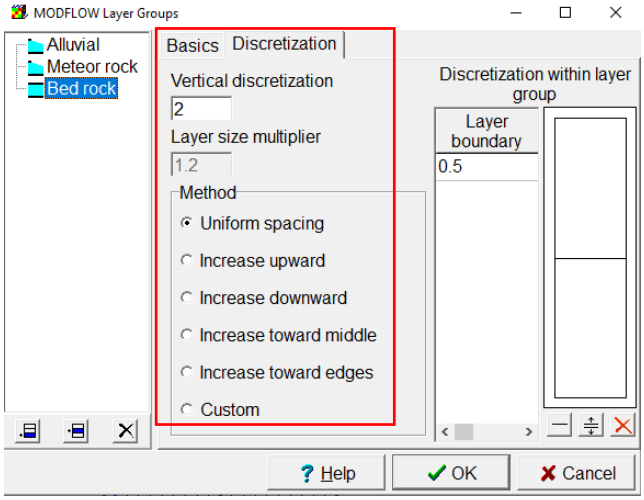
To defect to **Method of calculating interblock transmissivity** is **Hamonic mean** and the **Method specifying vertical hydraulic conductivity** is **Vertical hydraulic conductivity**



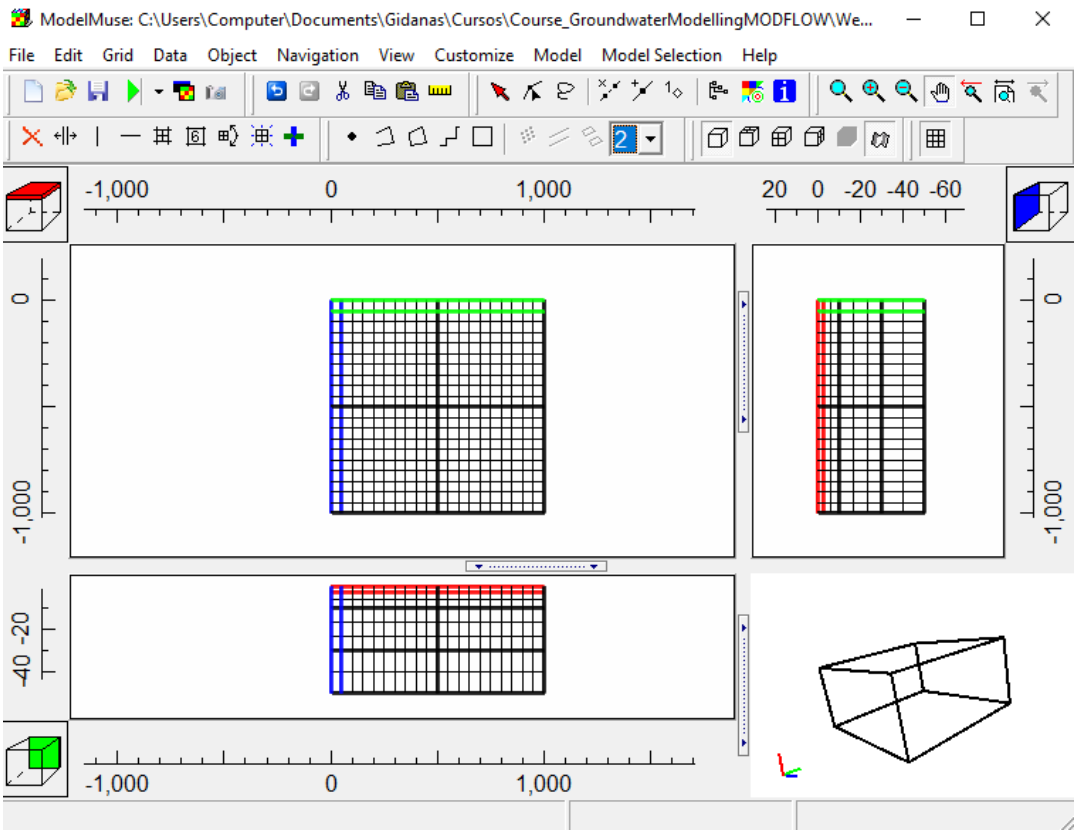
Then define the spatial discretization in all aquifers, go to **Discretization** and modified as show the image. Then click **OK**







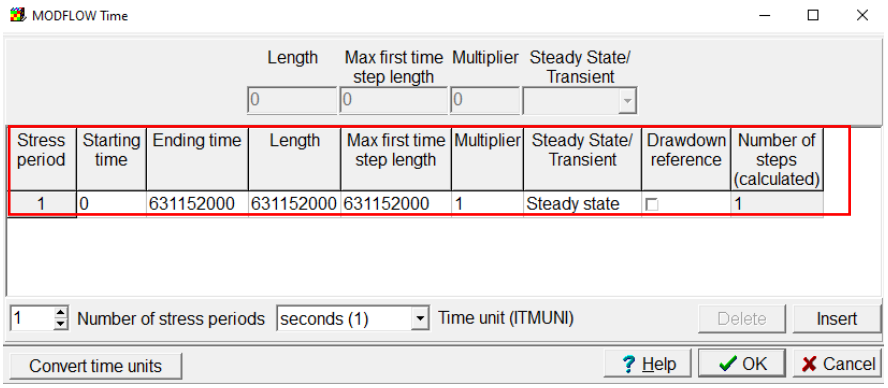
Then the layers are defined:



Defining MODFLOW Time

To see how MODFLOW define the time, select **Model / MODFLOW Time**. In this part the model can be defined as static or transient models. The model needs define the starting and ending time of the stress period, the length of the stress period, the desired length of the first time step, and the time-step multiplier. From these, the number of steps in the stress period is calculated.

This calculation will be performed in steady state. The model will run for 20 years, which is equal to 631152000 seconds. Indicate that the Max first time step length will have the same value in order to have just one calculation phase. Click **OK.**

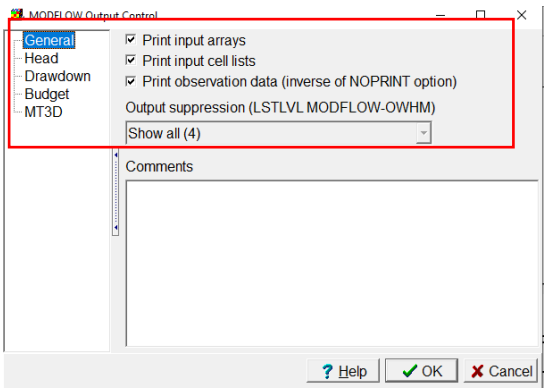


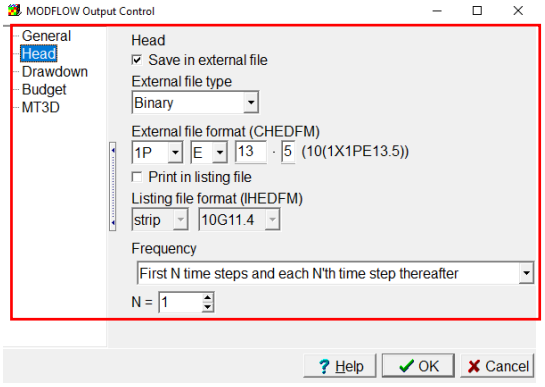
Defining Output Control

This tool allow specify the results as heads, drawdown, water budget, and IBOUND are printed in the listing file or saved to an external file.

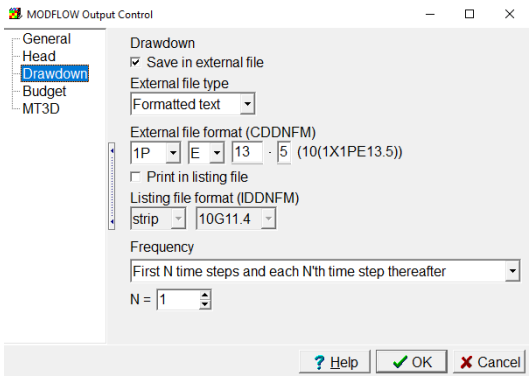
The MODFLOW Output Control dialog box has five panes: General, Head, Drawdown, Budget and MT3D.These panes are accessed by clicking on the name of the pane in the list.

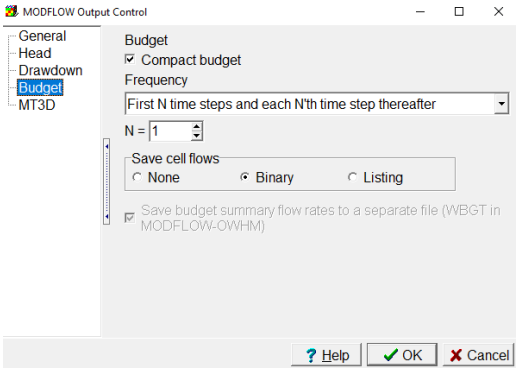
The general pane of the MODFLOW Output Control dialog box is used to control whether input data are printed in the listing file generated by MODFLOW.





The Head and Drawdown panes of the MODFLOW Output Control dialog box are similar in appearance. They are used to control how the head and drawdown data computed by MODFLOW will be printed in the main listing file or saved to an external file. The heads will be saved in a file with the extension ".fhd" if it is a formatted text file and ".bhd" if it is a binary file. The drawdowns will be save in a file with the extension ".fdn" if it is a formatted text file and ".bdn" if it is a binary file.





The Budget pane of the MODFLOW Output Control dialog box is used to control how the budget terms are printed or saved.