

# Education evenings 2018

*Practical introduction  
to groundwater modelling*

Computer exercises  
04 01 Grid design

# Purpose

In this exercise, we will

- ✓ modify the default grid manually,
- ✓ specify the grid design using objects,
- ✓ change the active part of the grid,
- ✓ and increase vertical discretization of the default Layer Groups,

in order to get acquainted with some of the ModelMuse grid design possibilities.

# Set initial grid

1. Start ModelMuse, create a new MODFLOW model and set the projection to "NA".

2. We are now at the initial grid window

3. where we can specify the number of cells in each direction

4. the grid origin, angle and vertical exaggeration

5. the horizontal cell dimensions

6. and the layer group names and bottom elevations.

7. Accept the defaults and click Finish.

Initial Grid

Specify initial grid (optional)

10 Number of columns 100 Column width

10 Number of rows 100 Row width

3 Number of layers

Grid origin:

0 X 0 Grid angle (degrees)

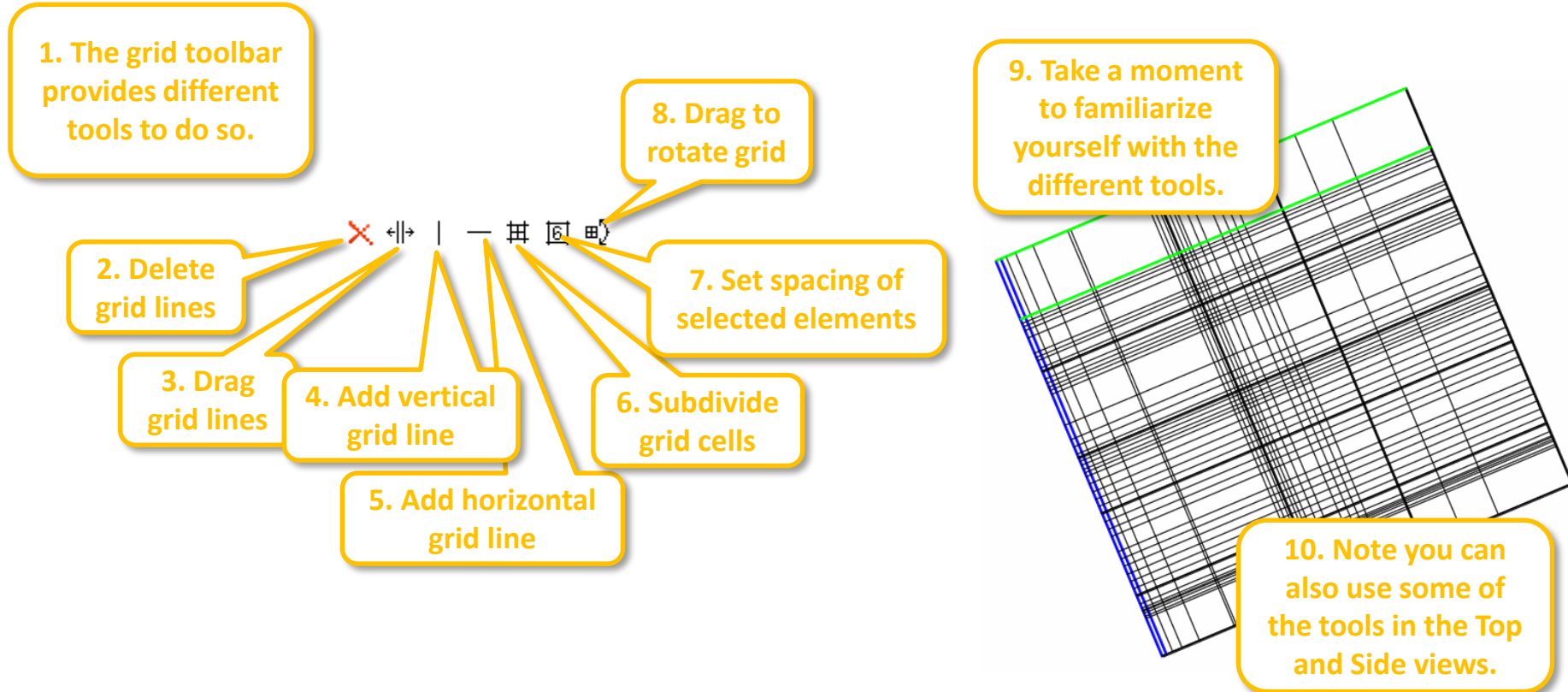
0 Y Vertical exaggeration

Z

Layer group name	Bottom elevation
Model_Top	0
Upper Aquifer	-10
Middle Aquifer	-20
Lower Aquifer	-30

? Help X No grid Finish

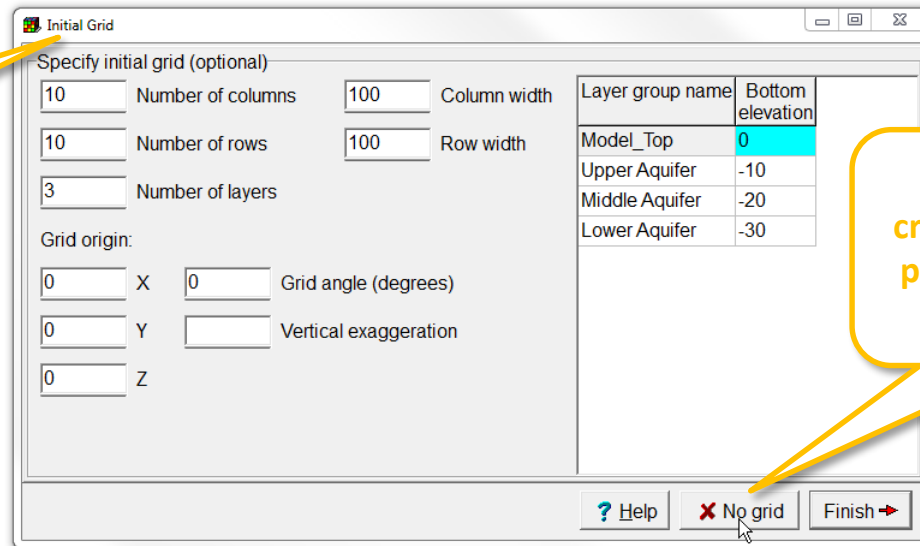
# Modify the grid manually



# Skip creating a grid

1. Start ModelMuse again, create a new MODFLOW model and set the projection to "NA".

2. We have used the initial grid window before



The 'Initial Grid' dialog box is shown with the following settings:

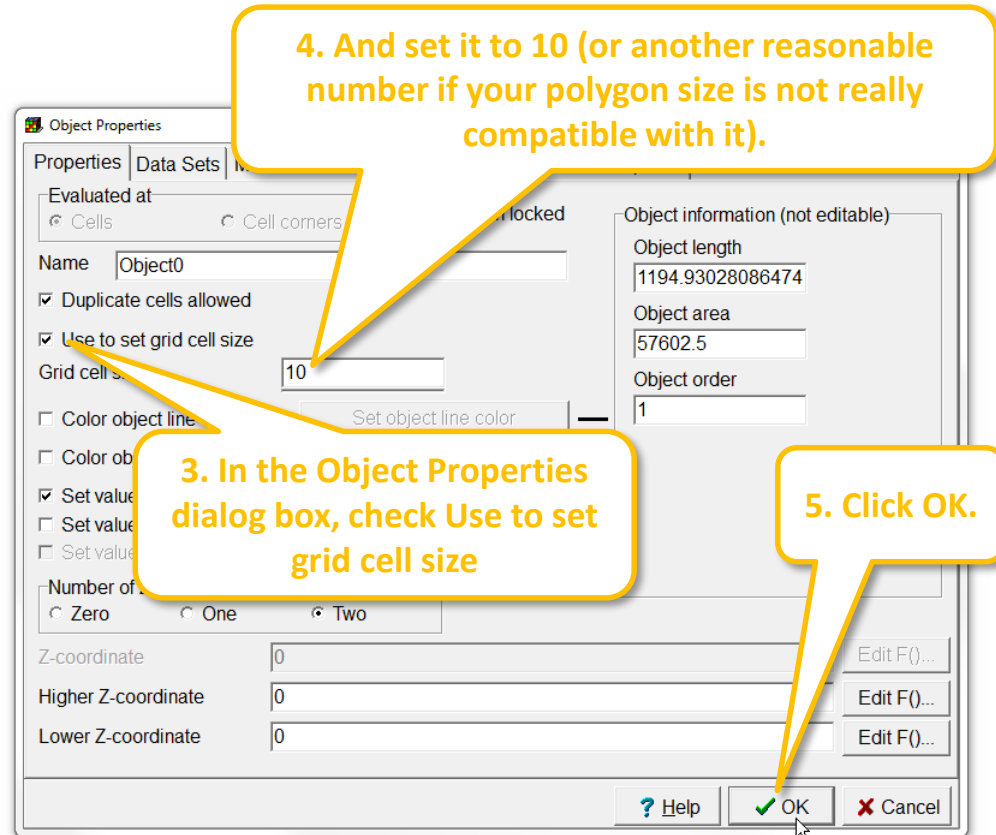
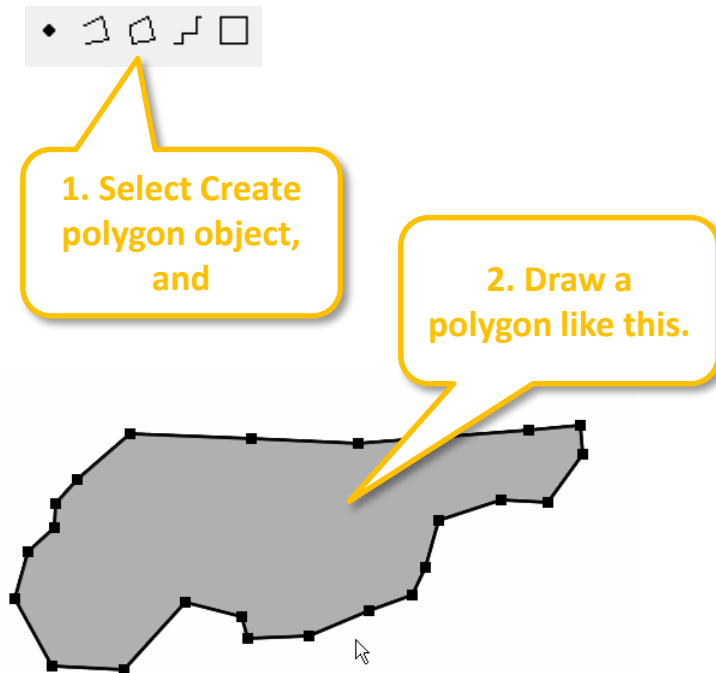
- Specify initial grid (optional):
  - Number of columns: 100
  - Column width: 100
  - Number of rows: 10
  - Row width: 100
  - Number of layers: 3
- Grid origin:
  - X: 0
  - Y: 0
  - Z: 0
- Grid angle (degrees): 0
- Vertical exaggeration: (empty)

Layer group name	Bottom elevation
Model_Top	0
Upper Aquifer	-10
Middle Aquifer	-20
Lower Aquifer	-30

Buttons at the bottom: ? Help, X No grid, Finish →

3. Therefore skip creating a grid at this point by clicking the No grid button

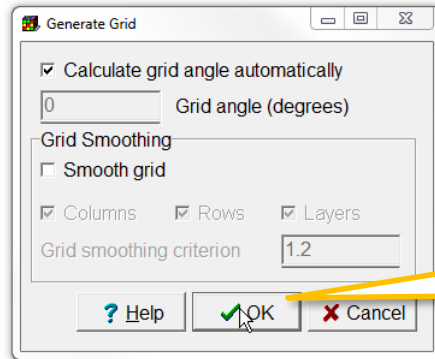
# Use object to set grid cell size



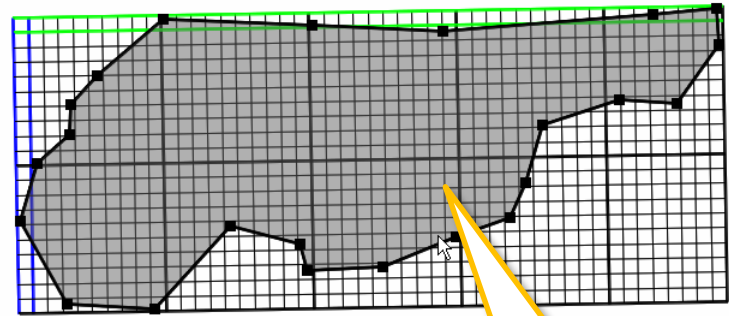
# Generate grid



1. Click the  
Generate  
grid button



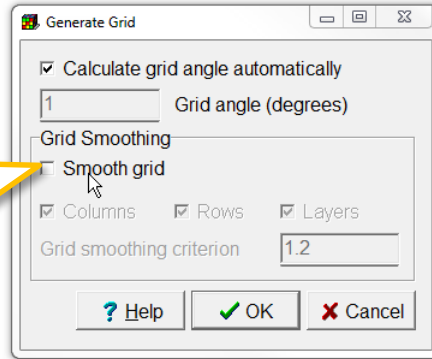
2. Leave the  
default options,  
and press OK.



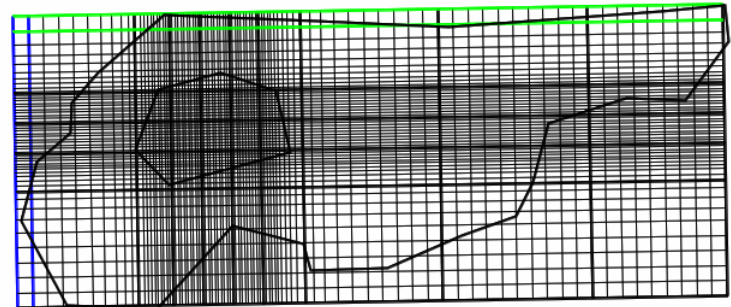
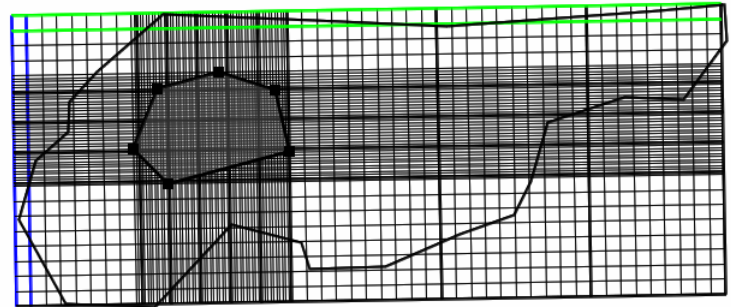
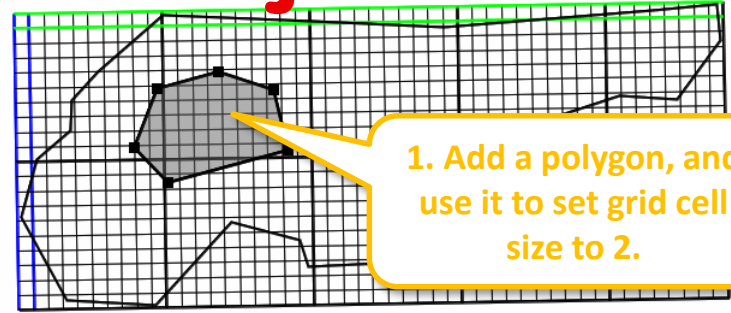
3. This is what  
you should  
get.

# Refine grid with object

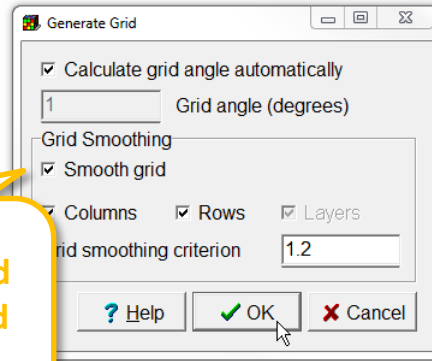
2. Generate the grid again without the Smooth grid option.



1. Add a polygon, and use it to set grid cell size to 2.

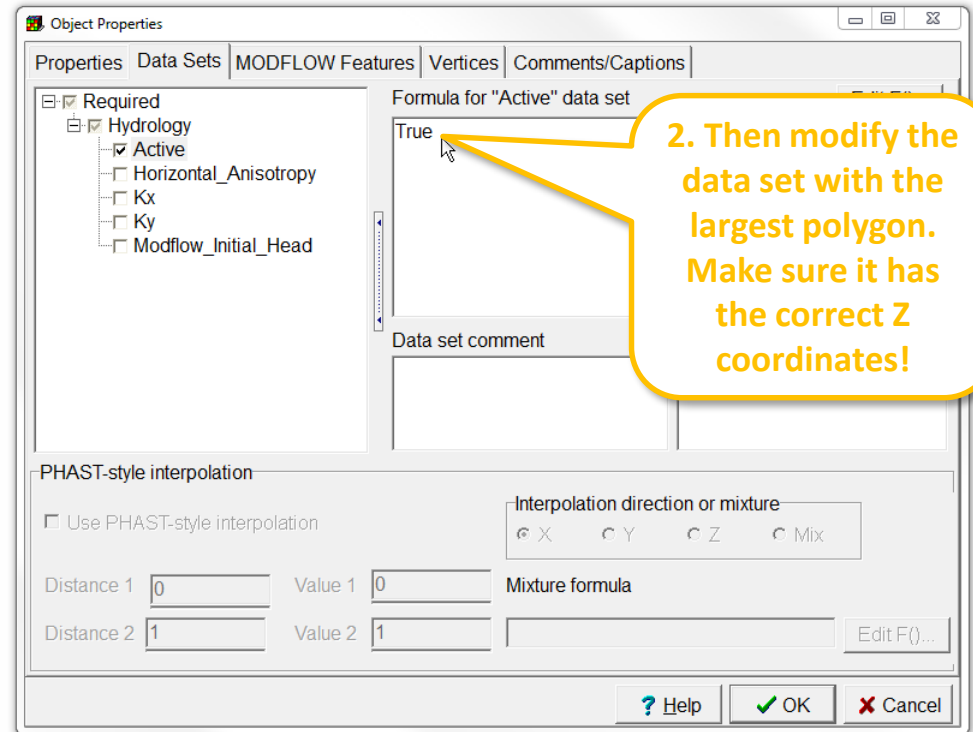
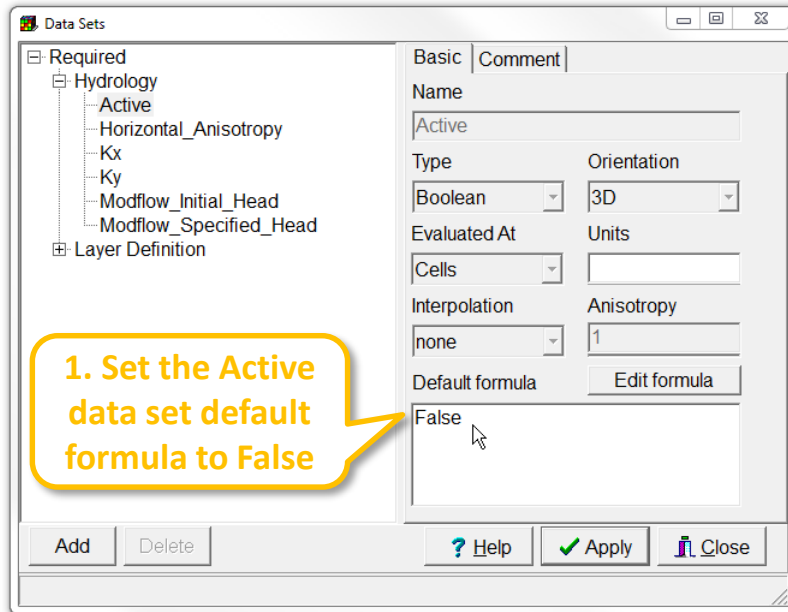


3. Then press undo and generate the grid with the Smooth grid option to see the difference.

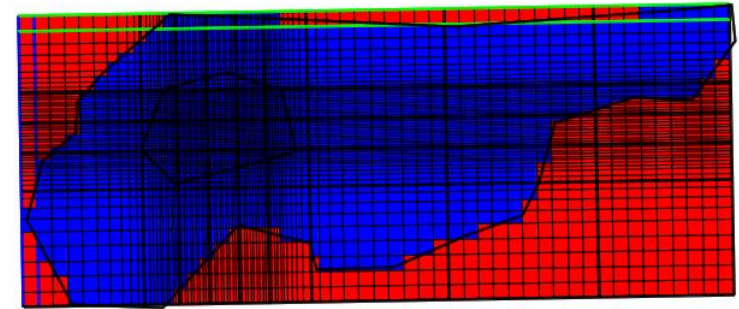
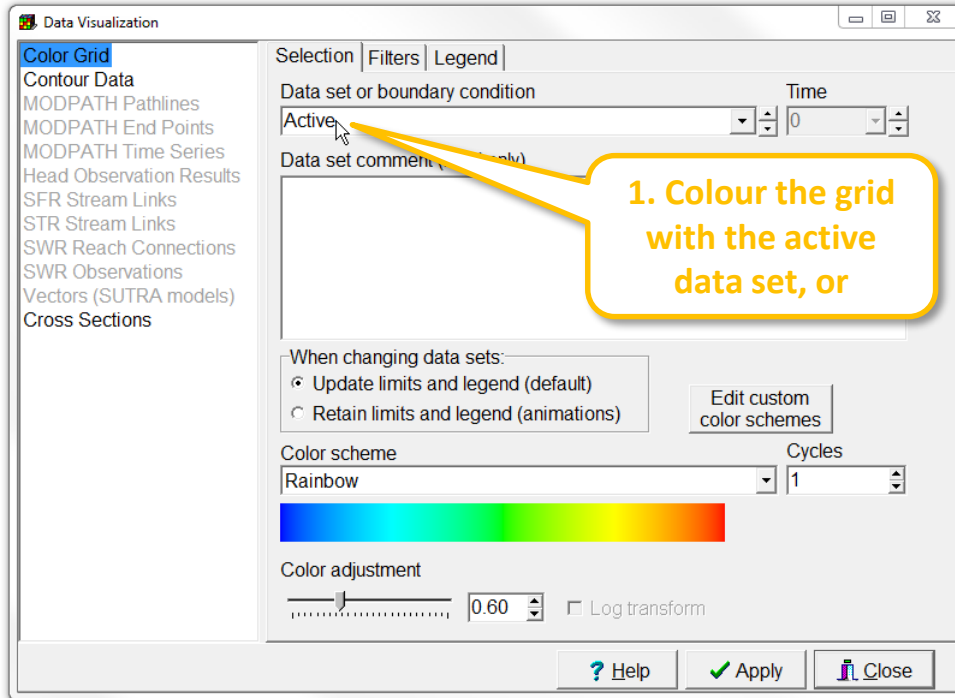




# Set active part of grid with object



# Visualize active part of grid



# Activate Middle and Lower Aquifers again

1. Check if the second and third layer are active.

2. If not, set the Lower Z-coordinate of the largest polygon to Lower\_Aquifer\_Bottom to fix this.

Object Properties

Properties | Data Sets | MODFLOW Features | Vertices | Comments/Captions

Evaluated at  
☒ Cells ☐ Cell corners ☐ Position locked

Name: Object0

☒ Duplicate cells allowed

☒ Use to set grid cell size  
Grid cell size: 10

☐ Color object line Set object line color

☐ Color object interior Set object fill color

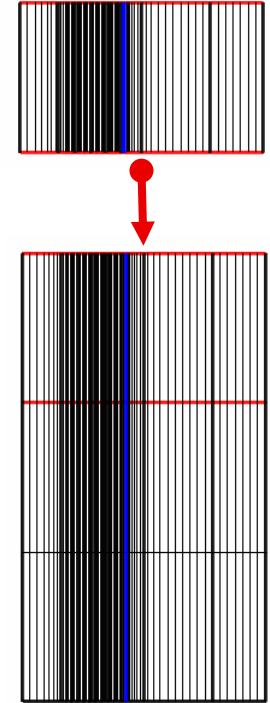
Object information (not editable)  
Object length: 1194.93028086474  
Object area: 57602.5  
Object order: 1

Set values of enclosed cells  
Set values of intersected cells  
Set values of cells by interpolation

Number of Z formulas: Two  
☐ Zero ☐ One ☒ Two

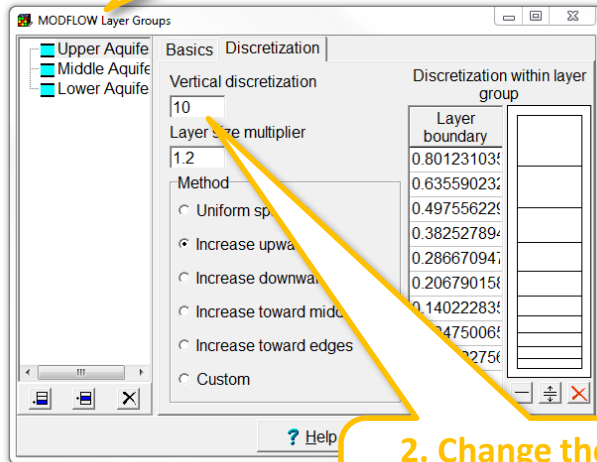
Lower Z-coordinate: Lower\_Aquifer\_Bottom

Help OK Cancel

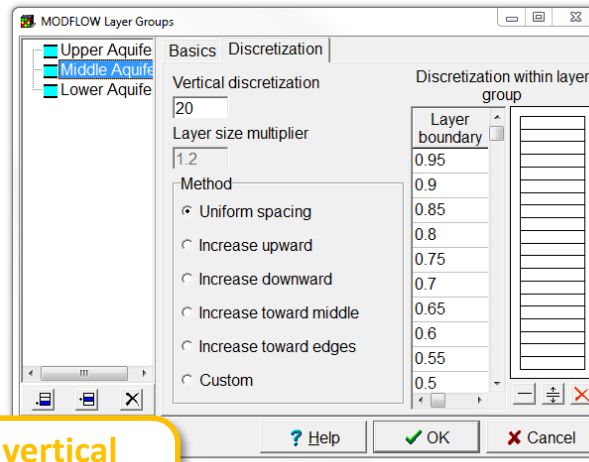


# Refine layer discretization

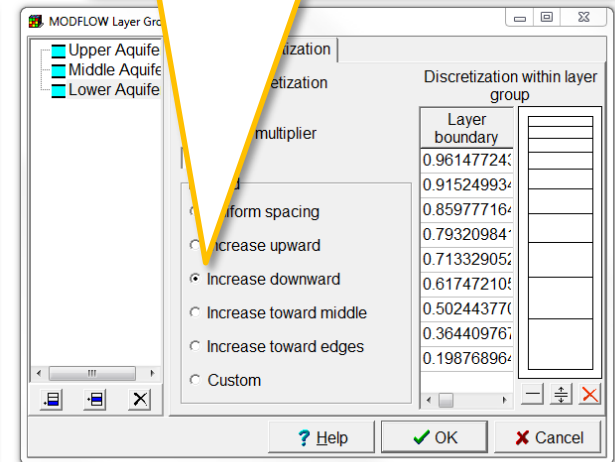
1. Select Model |  
MODFLOW Layer Groups,



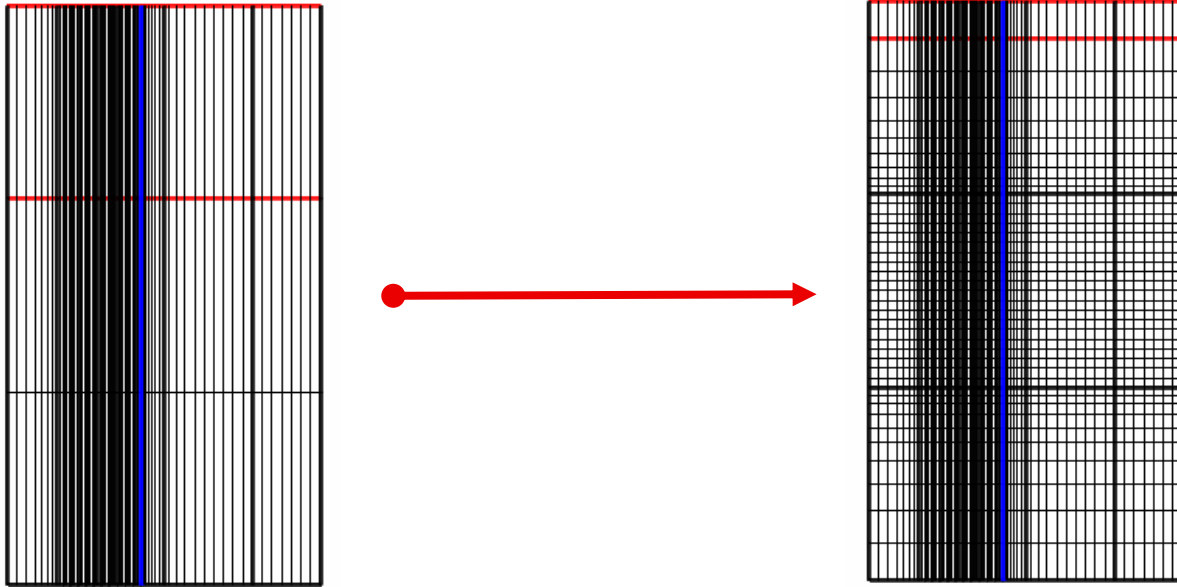
2. Change the vertical  
discretization to 10, 20,  
and 10 respectively,



3. And set the Method to  
Increase upward, Uniform  
spacing and Increase downward.



# This is what you should get



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*Questions? Found an error?  
Please contact B. Rogiers at [brogiers@sckcen.be](mailto:brogiers@sckcen.be).*