

COURSE: GROUNDWATER MODELLING USING MODFLOW

Session 10: Simulation a groundwater model

Objective:

The objective of this session is learning to establish the hydraulic parameters, assign the boundary conditions CHD, RCH, EVT, WEL and RIV, run the model, analyse the water balance, import the results and represent the water table in a profile view.

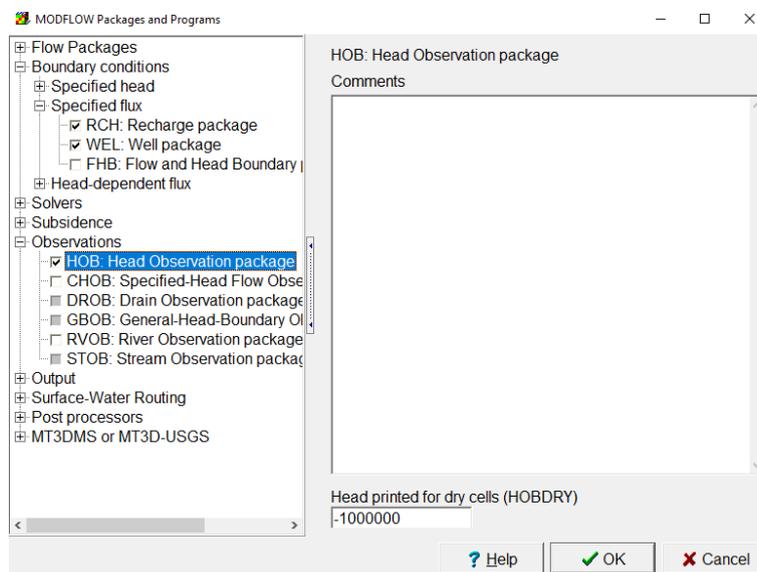
Go to

Course_GroundwaterModellingMODFLOW\Week_10\Practice\Models

Then open **Model1_b.gpt**.

Defining package and program

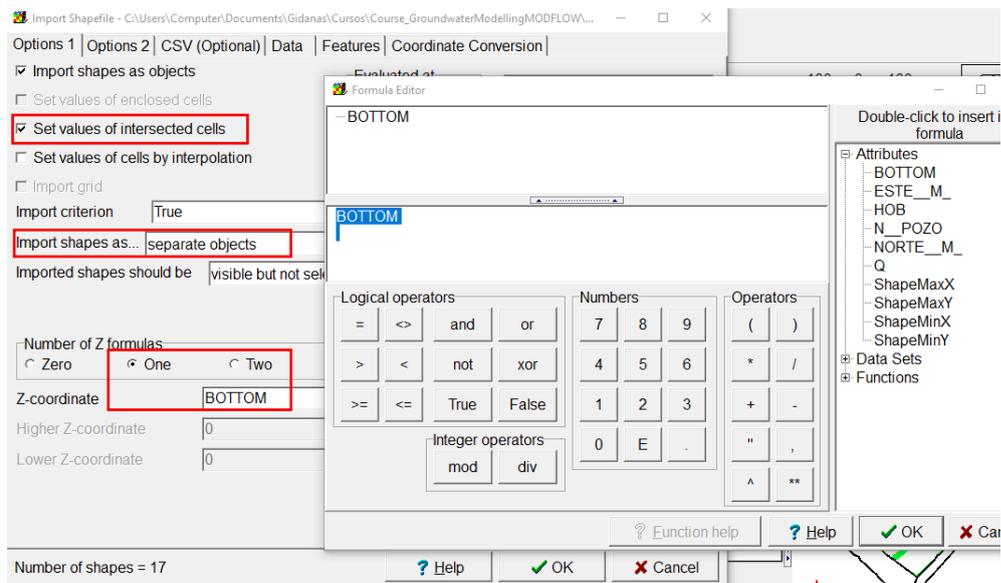
To define the boundary conditions, it is necessary that they are active. Go to **Model/MODFLOW Packages and Programs** and activate **MODFLOW-NWT**. Then, activate WEL and HOB.



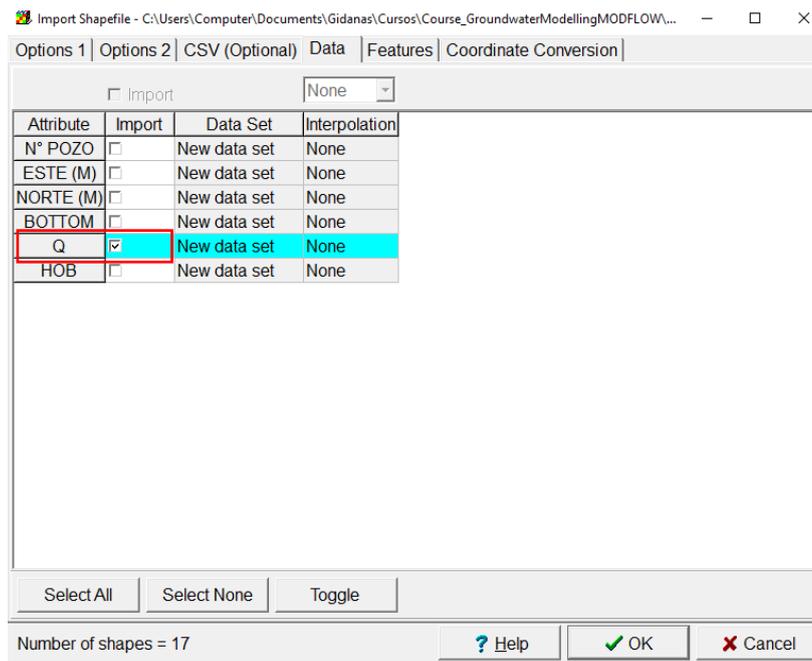
Defining boundary conditions

Then go to **File/ Import/ Shapefile**. The file is found in:

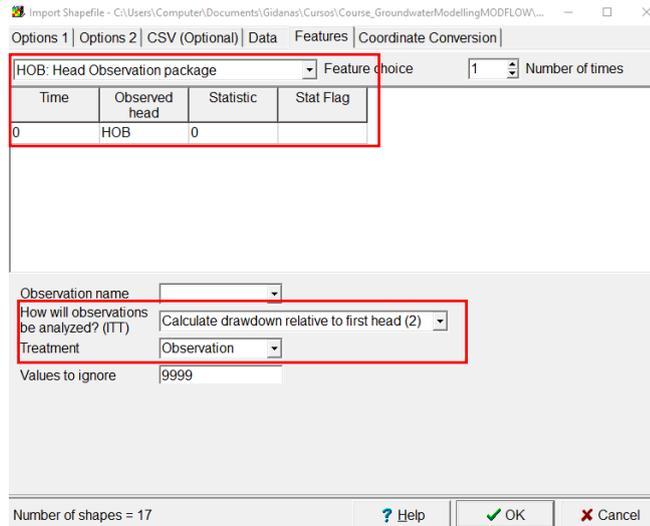
Course_GroundwaterModellingMODFLOW\Week_10\Practice\Data, and it is called **wells.shp**. Click **OK**



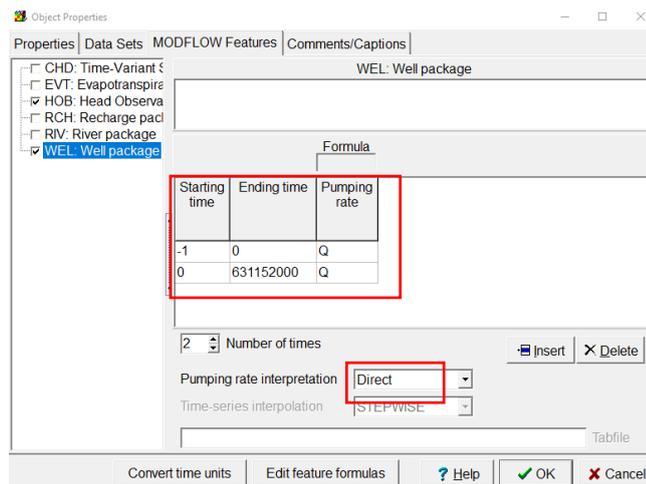
Then click on **Data**, select **Q**. Complete with the same values as in the image.



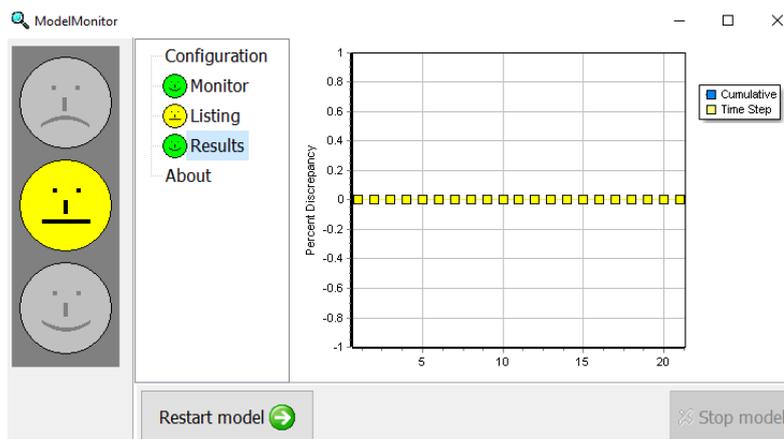
Then click on **Features**, select **HOB: Head Observation package**. Complete with the same values as in the image. Click **OK**.



Select all the wells and double click, go to **MODFLOW Features**, activate **WEL** and complete with the same values as in the image. Click **OK**.



Run the flow model. The happy face indicates that the convergence criteria has been reached. That means that all that all the fluxes that enter the model are equal to the ones exiting (water balance).



It is observed that there was convergence and the results generated the simulated values:

Model1_c: Bloc de notas

Archivo Edición Formato Ver Ayuda

TIME STEP LENGTH	3.15576E+07	5.25960E+05	8766.0	365.25	1.0000
STRESS PERIOD TIME	6.31152E+08	1.05192E+07	1.75320E+05	7305.0	20.000
TOTAL TIME	6.31152E+08	1.05192E+07	1.75320E+05	7305.0	20.000

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HEAD AND DRAWDOWN OBSERVATIONS			
OBSERVATION NAME	OBSERVED VALUE	SIMULATED VALUE	DIFFERENCE
Obs_1	40.700000763	41.357822418	-0.65782165527
Obs_2	67.949996948	-1000000.0000	
Obs_3	63.146999359	50.189876556	12.957122803
Obs_4	46.836799622	42.481723785	4.3550758362
Obs_5	48.009998322	42.396358490	5.6136398315
Obs_6	45.738601685	42.260814667	3.4777870178
Obs_7	46.830001831	41.317268372	5.5127334595
Obs_8	42.650001526	41.435508728	1.2144927979
Obs_9	36.2599998322	39.926467896	-3.6664695740
Obs_10	61.659999847	51.014179230	10.645820618
Obs_11	65.130798340	-1000000.0000	
Obs_12	65.150001526	-1000000.0000	
Obs_13	53.760299683	48.123683929	5.6366157532
Obs_14	58.379001617	47.286262512	11.092739105
Obs_15	55.342399597	46.789176941	8.5532226562
Obs_16	53.340000153	51.093292236	2.2467079163
Obs_17	62.430000305	-1000000.0000	

HEAD/DRAWDOWN SUM OF SQUARED DIFFERENCE: 6.22562E+02

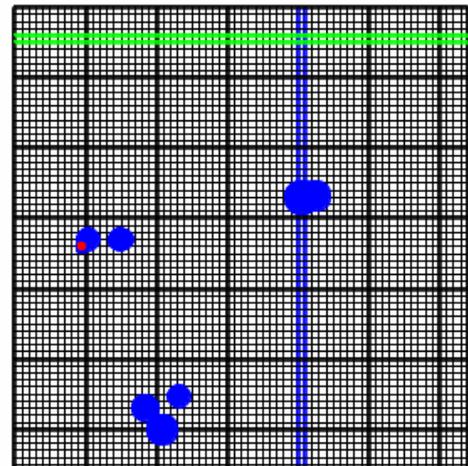
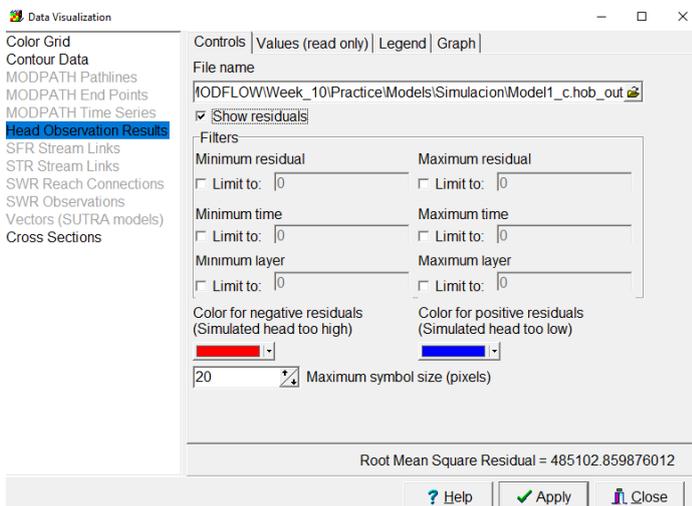
Run end date and time (yyyy/mm/dd hh:mm:ss): 2020/05/14 15:03:39
 Elapsed run time: 1.487 Seconds

Then select **Data Visualization** and select **Head Observation Results**.

File name: Model1_c.hob_out in the route:

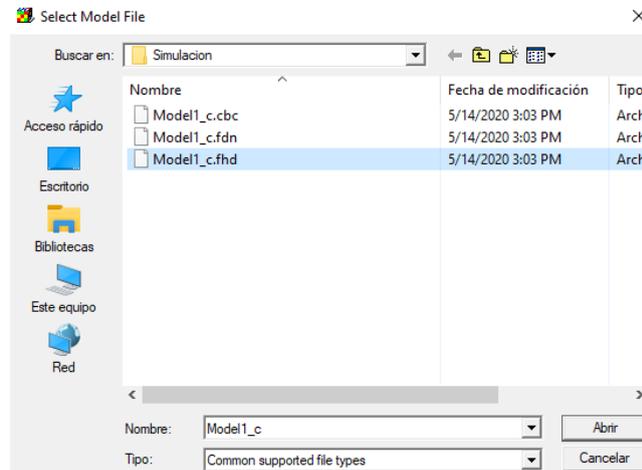
Course_GroundwaterModellingMODFLOW\Week_10\Practice\Models\Simulacion \Model1_c.hob_out

Activate **Show residuals** and click in **Apply**

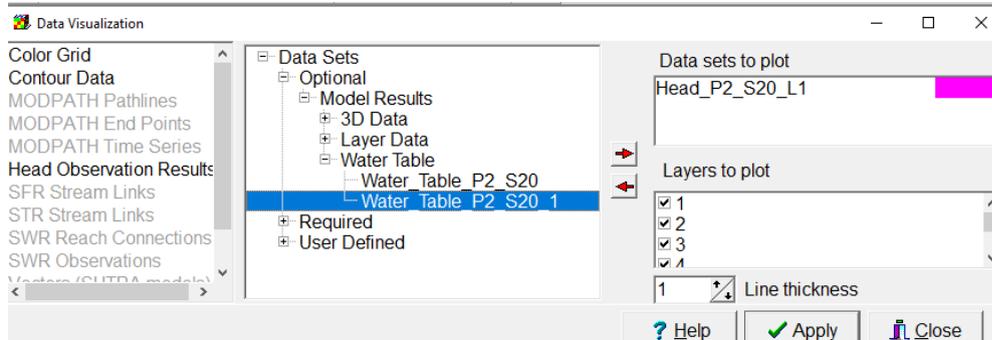


It is observed that in the model, the red color defines a high hydraulic load while the blue defines a low hydraulic load

Now the water table will be imported. Import the hydraulic heads to the model (.fhd file). Click to Open.



Then select **Data Visualization** and select **Cross Section** and select **Water_table** as in the image. Click **Apply**.



The results are:

