Exercise 2: Rhine 2D unsteady simulation

Prerequisites

Consider that every software requires certain format. To work with Bluekenue, all points that are added as coordinates need to have 8 decimals after the point for it to work.

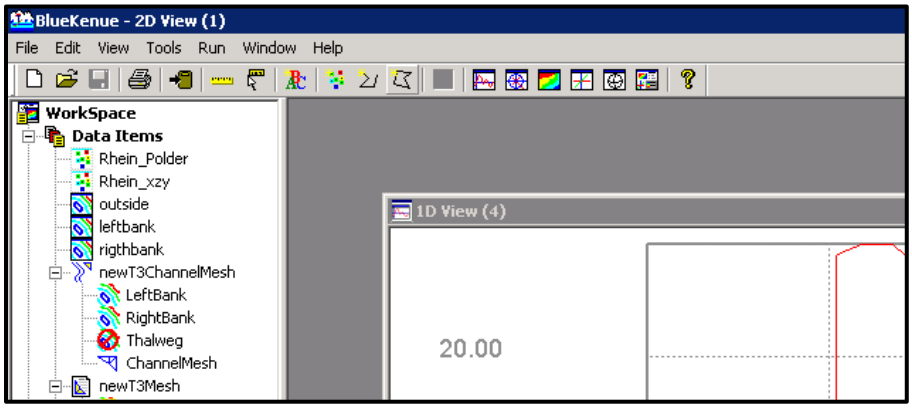
If required, open any files that are to be included in the analysis and change the number of decimals after the decimal point to 8 using Excel or other spreadsheet software. Once done, save the file removing the predetermined extension into xyz.

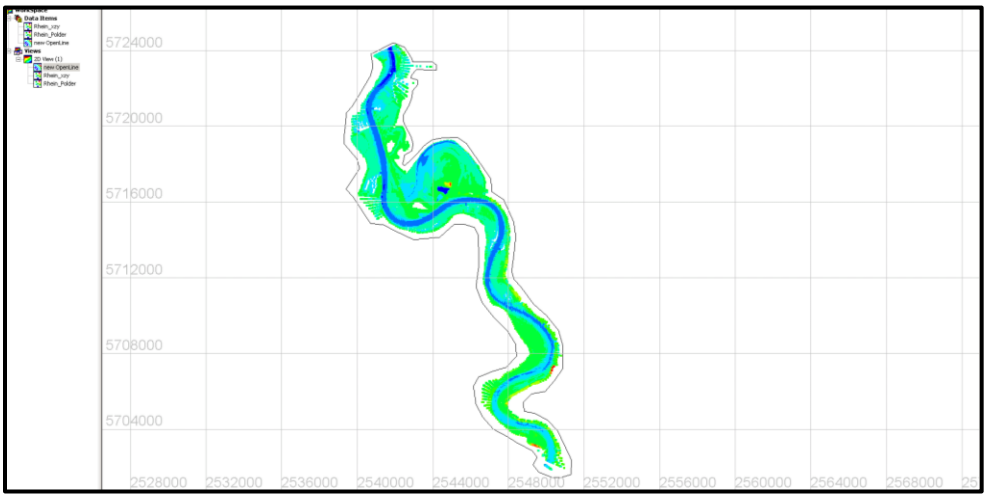
Import it to BlueKenue and try to move it to the 2D view.

Import the polder data just as before.

Outline definition

Draw the outline of the domain by using closed lines. Make sure that all of the points for which the domain is spanning are included. You also need to draw the left and right banks of the river. To do this, select open lines and draw the banks accordingly.

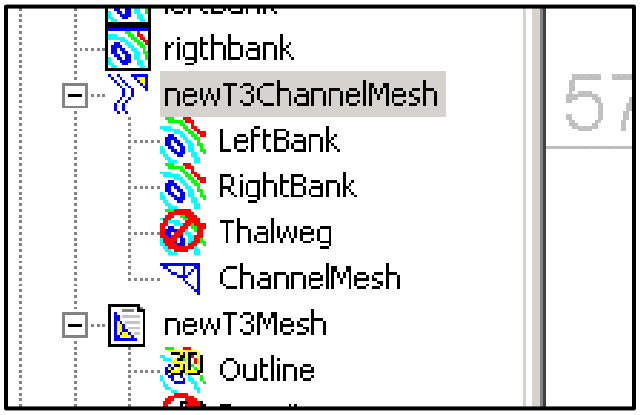




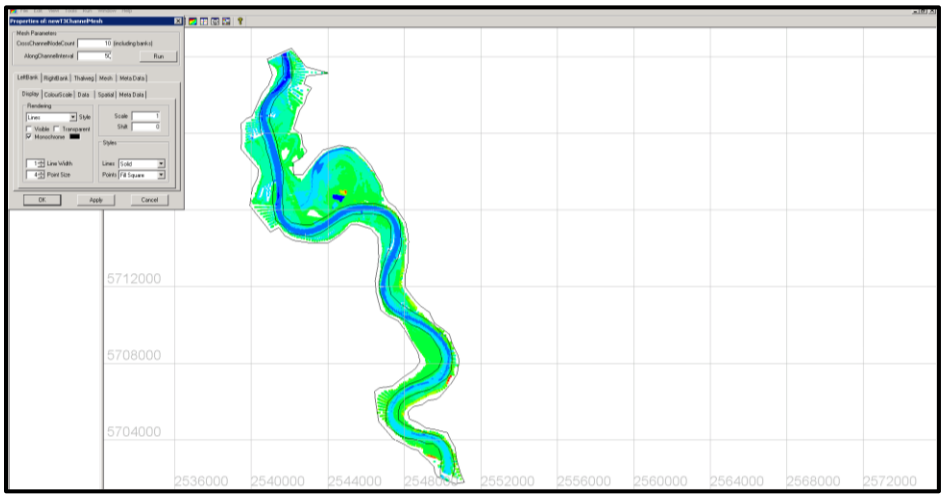
Meshes and interpolation

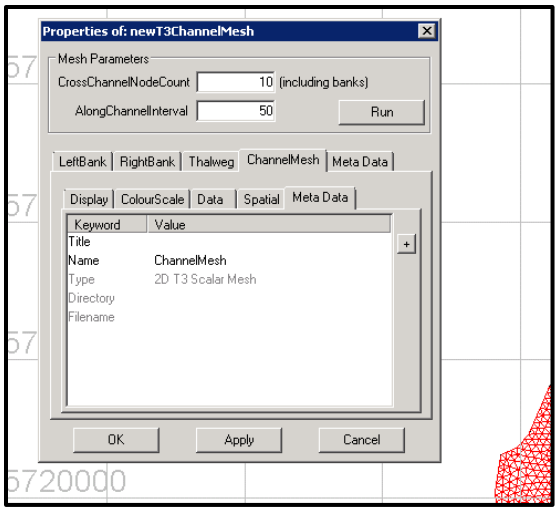
Generate a new mesh for the river. File->New File->new T2 channel mesher. Click OK.

Assign the left and right lines recently created to the channel mesher. After this: right click mesh-> properties->CrossChannelNodeCount: 10 -> AlongChannelInterval: 50. Click Run, apply and ok.



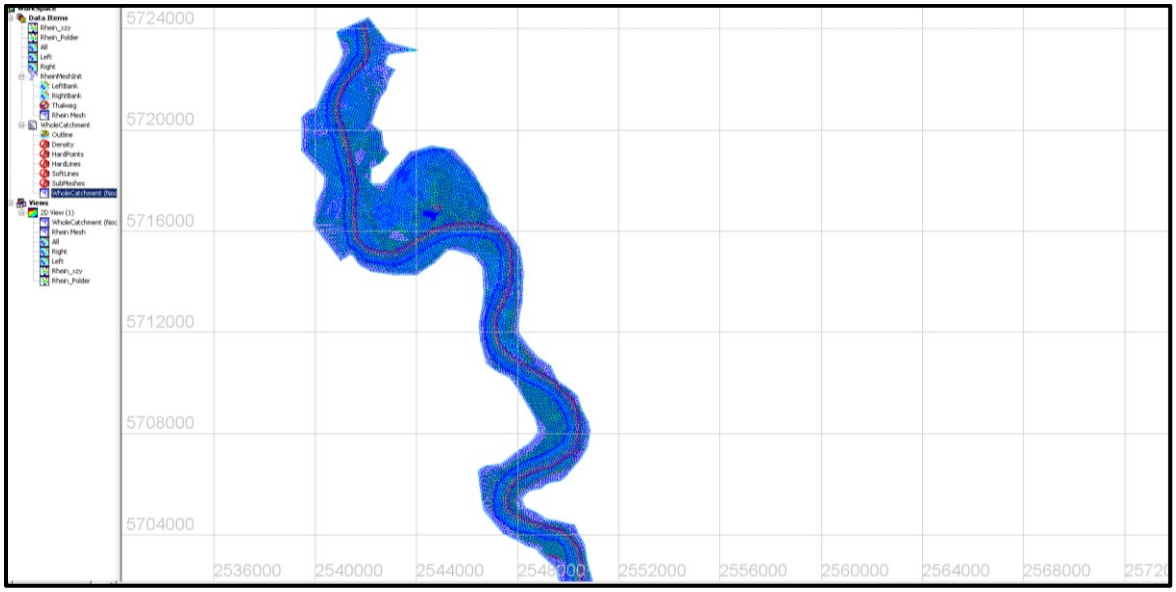
Generate new mesh for the whole domain. File->New File ->new T3 mesh generator. Click OK. Right click on the newly created mesh -> channel mesh -> metadata -> change the name to ChannelMesh





Create new mesh for the whole catchment area. File->New->T3Mesh. Se the default edge length to 100. Drag the closed boundary created before to the outline of the mesh. Right click on new3TMesh-> Run->OK

Drag the mesh result to the 2D viewer.

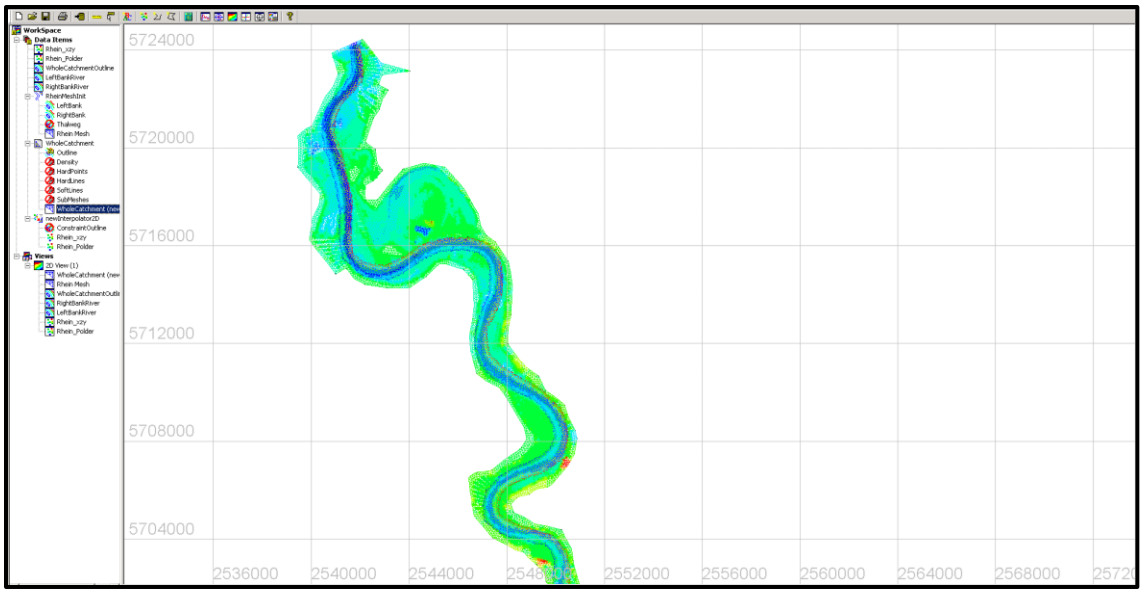


Interpolation of the bathymetry

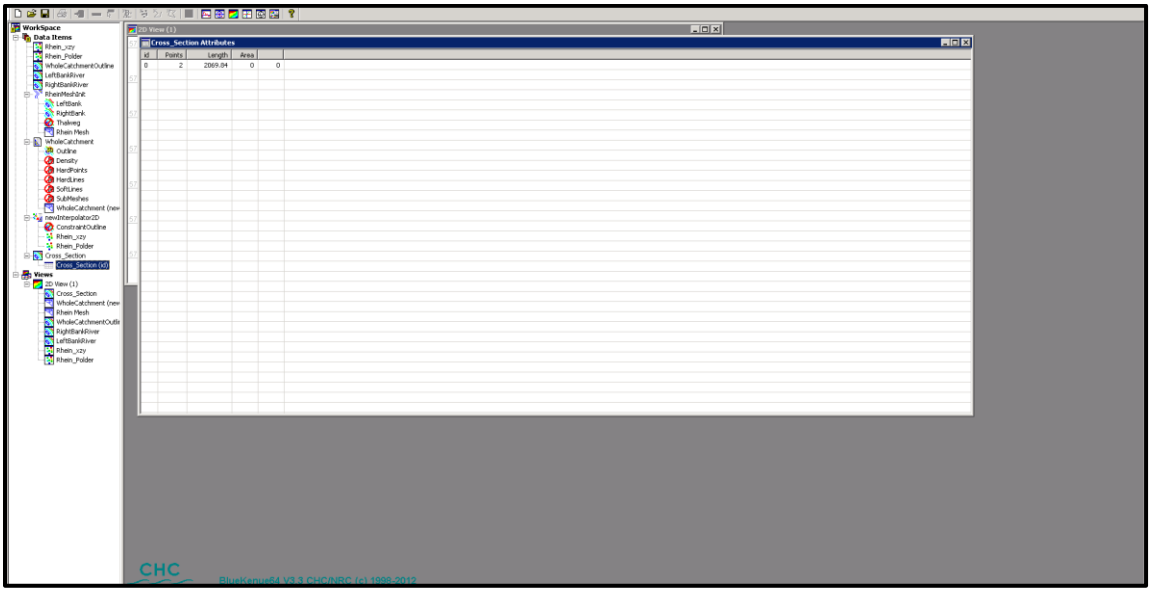
Create new 2D Interpolator. File->New->2D Interpolator.

Drag the points from Rhein and the polder to the 2D interpolator.

Select WholeCatchment Mesh and go to tools->MapObject->new2D interpolator. Click OK.



To verify that the work done is correctly, draw a new line between two points within the catchment. Select new open line, draw two points and save as cross_section. From the cross_section line, right click->show attribute table.



Right click on cross_section->resample->on resample options, change method into equal distance. Select resampled cross section->tools->map object->over the whole mesh.

Then on the top of the viewing screen select new 1Dview and move the resampled cross section to the 1D view.

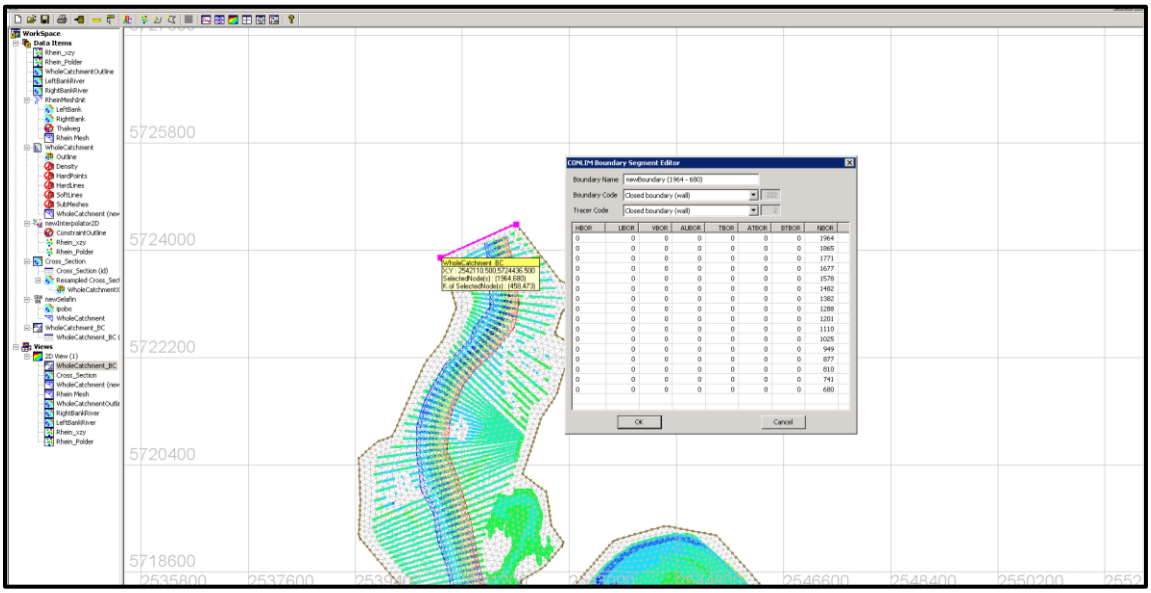
Boundary conditions

File->New->SELAFIN object

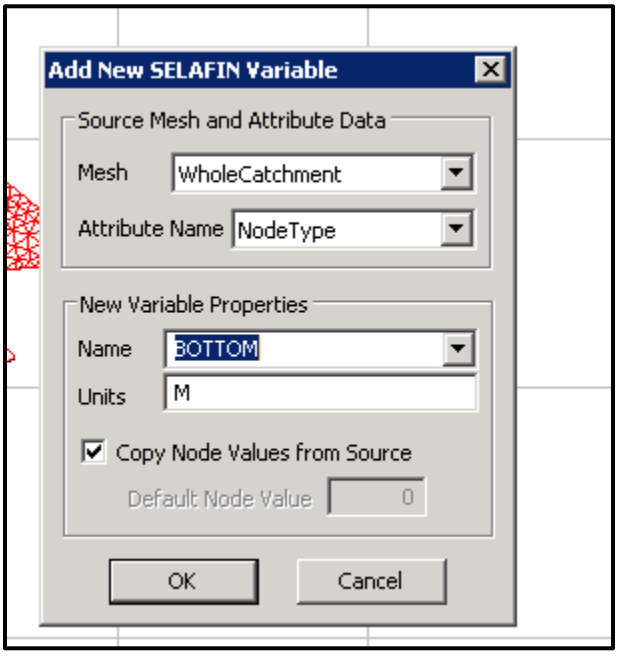
Drag the mesh to the SELAFIN object.

File->New->Boundary->Select whole catchment

Drag the boundary into 2D and then select two points in the upper boundary and set it as open boundary prescribed Q. Downwards leave as open boundary with prescribed H.

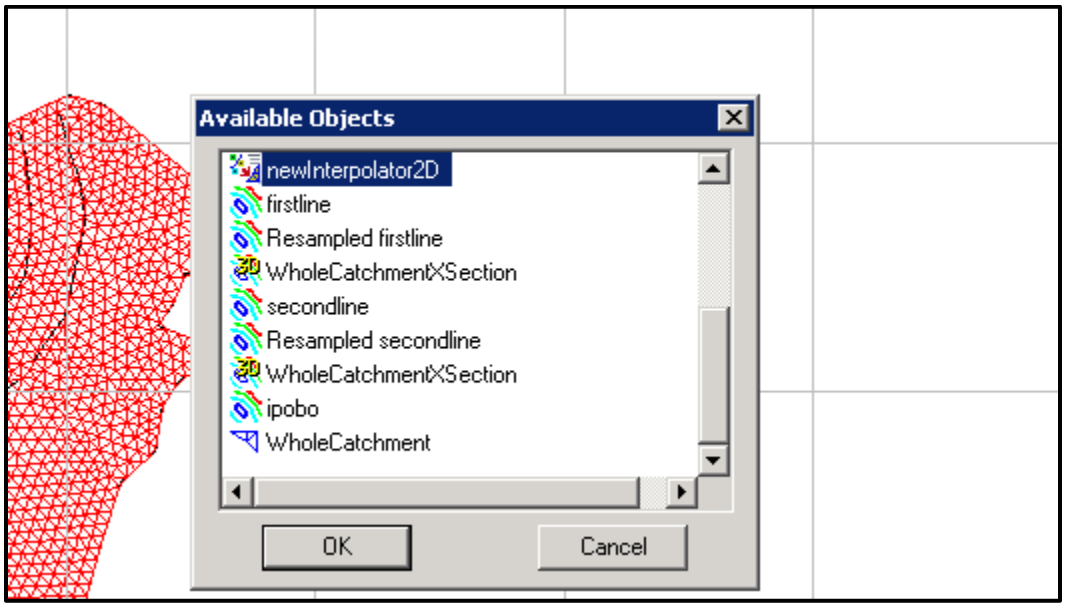


In SELAFIN object, right click->Add variable->Mesh: WholeCatchment, attribute name: newAtribb, Name: BOTTOM, Units: M, select copy node values from source and then OK



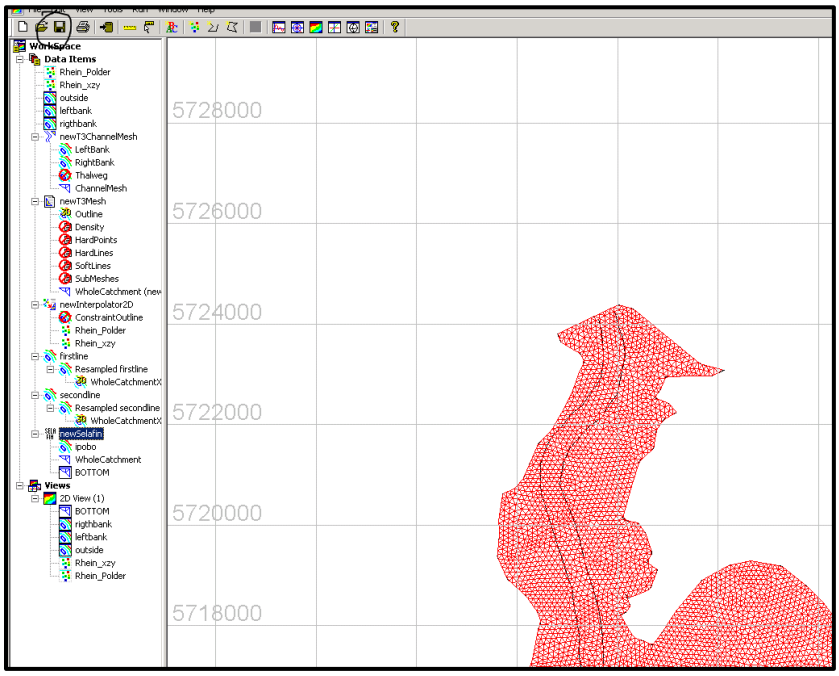
Make invisible all other files, just leave BOTTOM mesh.

After adding the SELAFIN, select the BOTTOM, go to Tools->Map Object->2D interpolator->OK.



Save files

To save, select on SELAFIN, save and do it as slf. Similarly, for the boundary file, select the attribute table of the BC.



See the protocol for TELEMAC to continue with the analysis.