

Common borders. Common solutions.

Just



How to create Cross Sections ready for importing
into HEC-RAS for Hydraulic Analysis

Common borders. Common solutions.

Or



How to create Cross Sections ready for importing
into HEC-RAS for Hydraulic Analysis

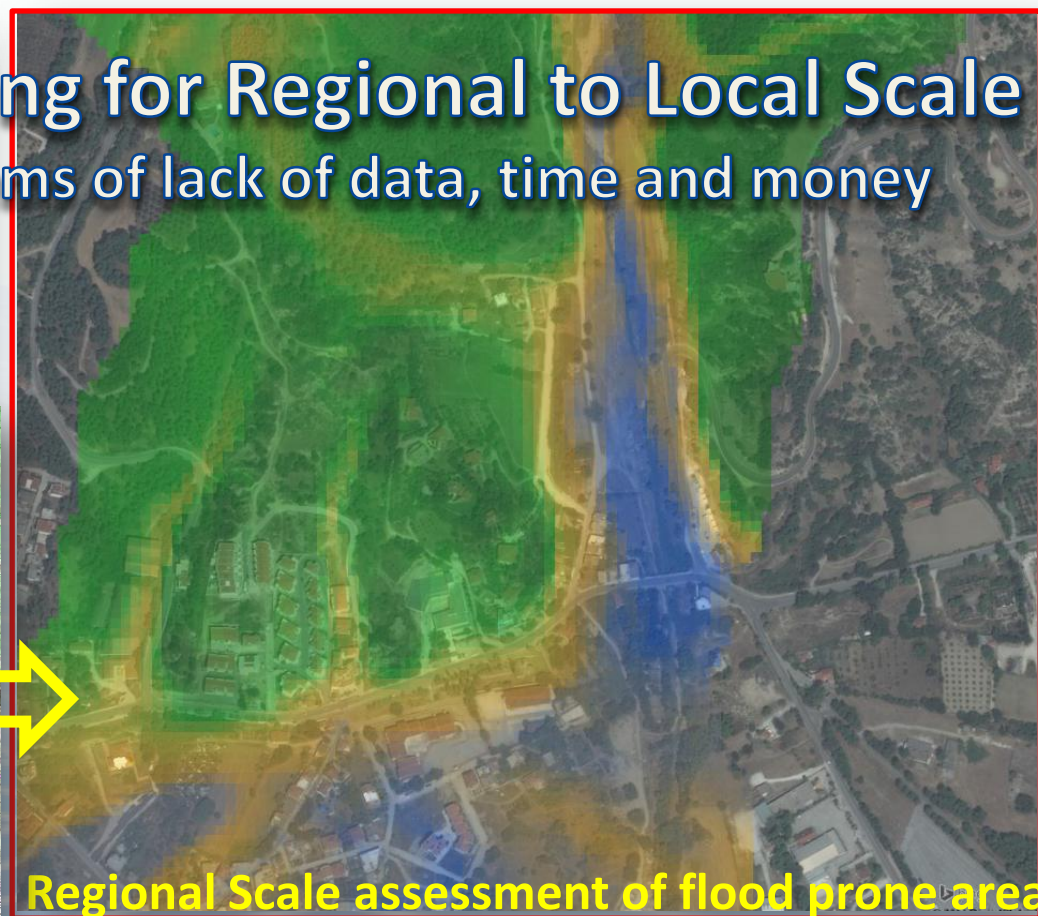
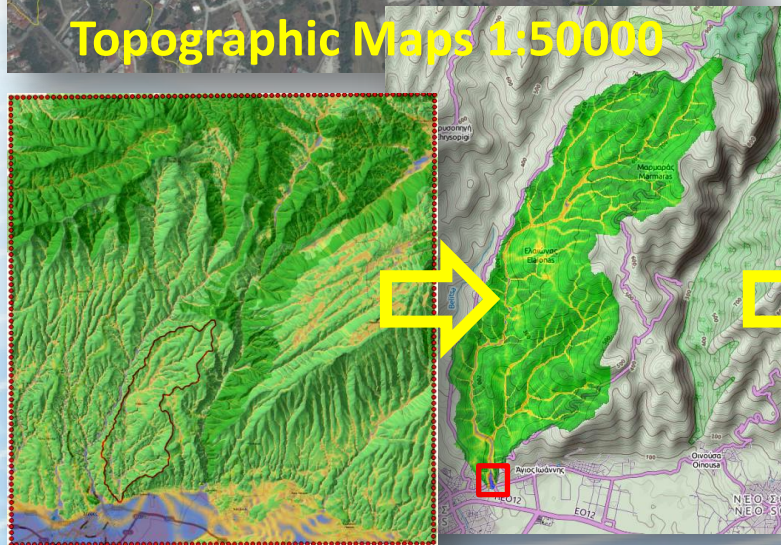
.....in less than 5 minutes !

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Flood Hazard Assessment: The ...SciNetNatHaz project approach

Flood Hazard: screening for Regional to Local Scale
...to overcome the problems of lack of data, time and money

Topographic Maps 1:50000

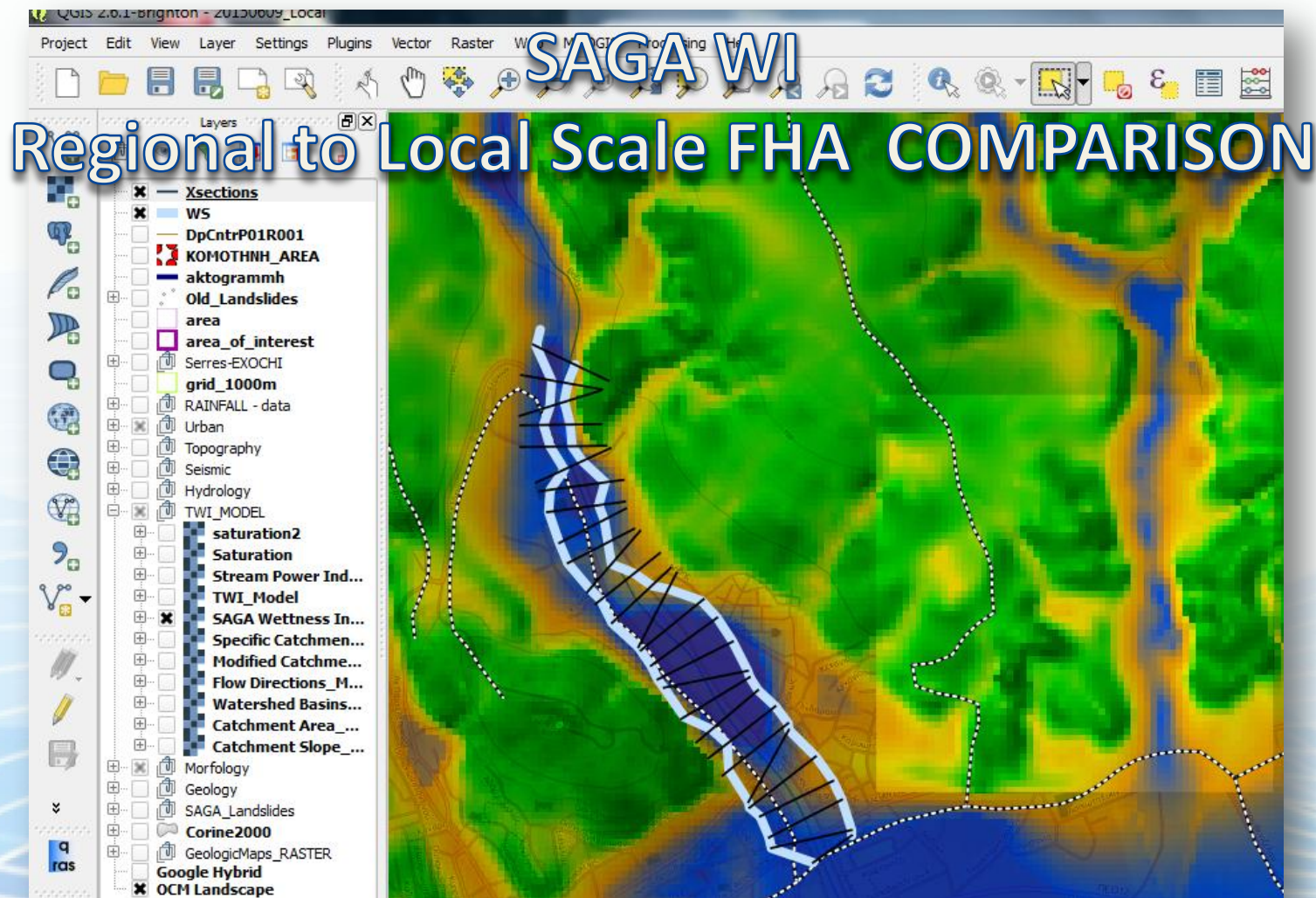


Common borders. Common solutions.
Flood Hazard... on Local scales

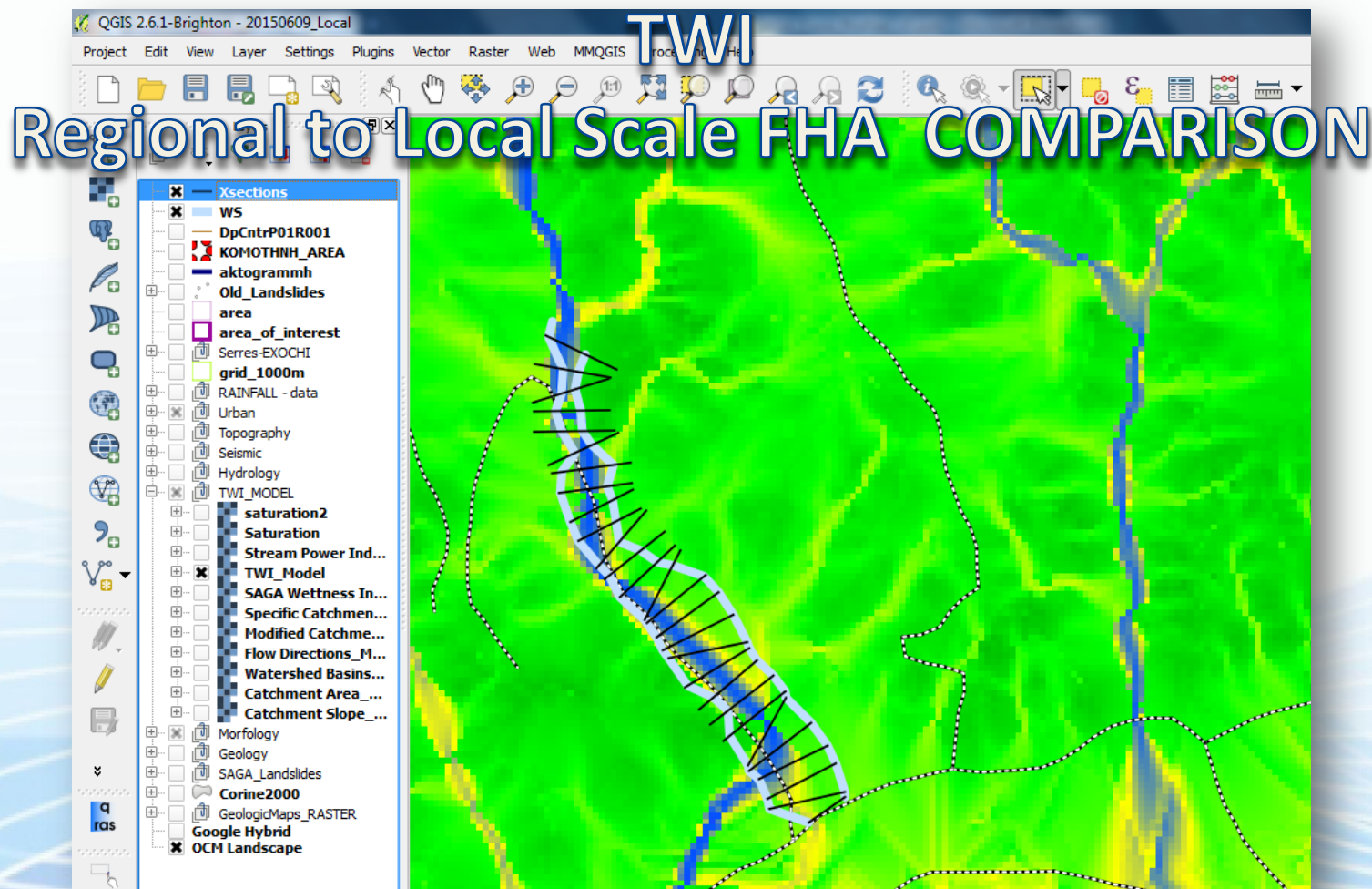
Implementation on a Local (site-specific) Scale



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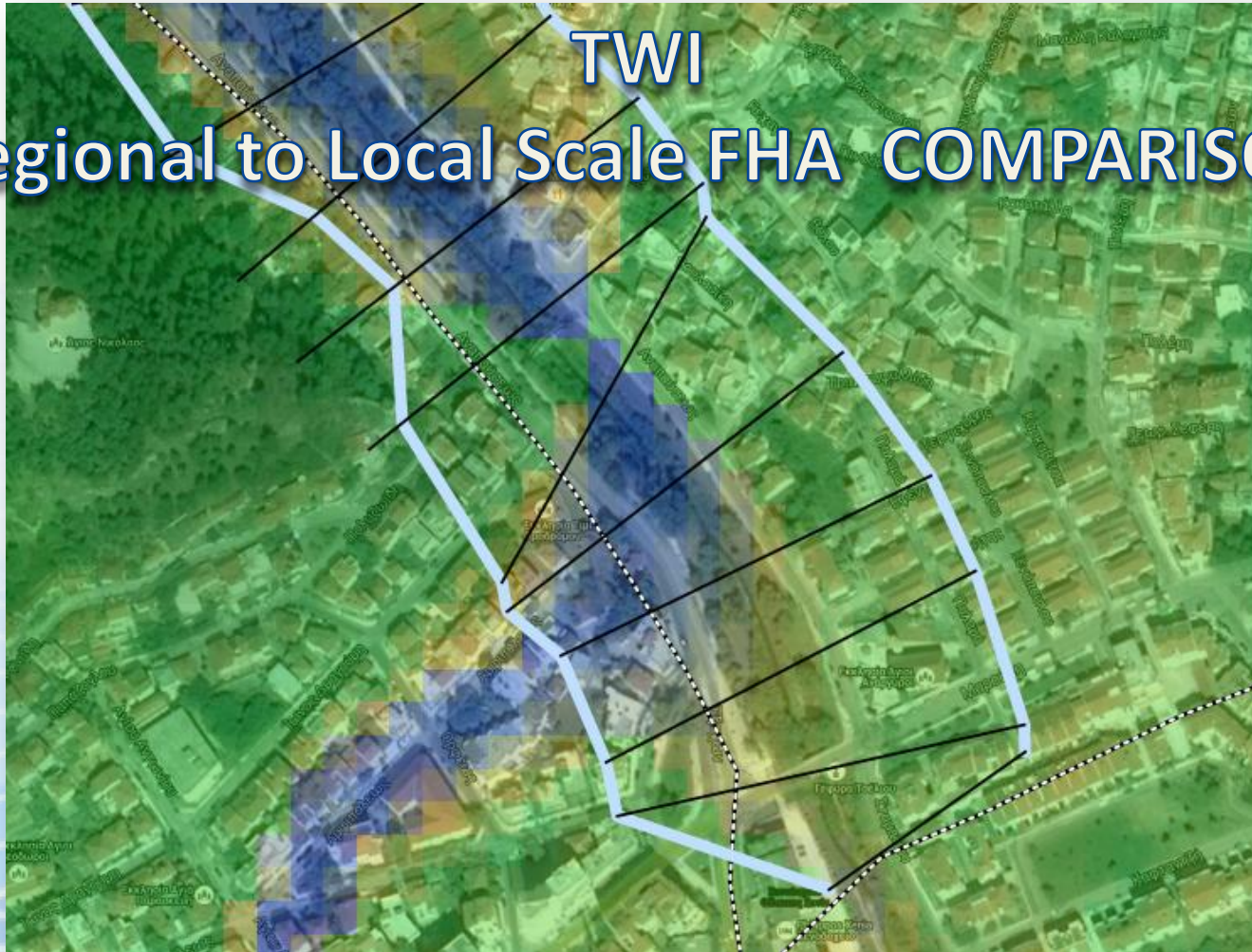


Local scale implementation of
topographic data (RTK)



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Regional to Local Scale FHA COMPARISON



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DATA REQUIREMENTS

Compulsory

- Contour lines (DIGITIZED) every 20m (topographic map at 1:50.000 scale of the **WATERSHED** (REGIONAL scale assessment)
- Contour lines (digitized) every 1m the most! (around 0.50m is OK) from a topographic map of a scale 1:1000 or higher (1:500 etc) (LOCAL scale assessment)

Optional

- Elevation points
- Ancillary data (road network, etc)

Data Created in the process

- DEMs, Stream line, Cross Sections (CR), CR elevation points


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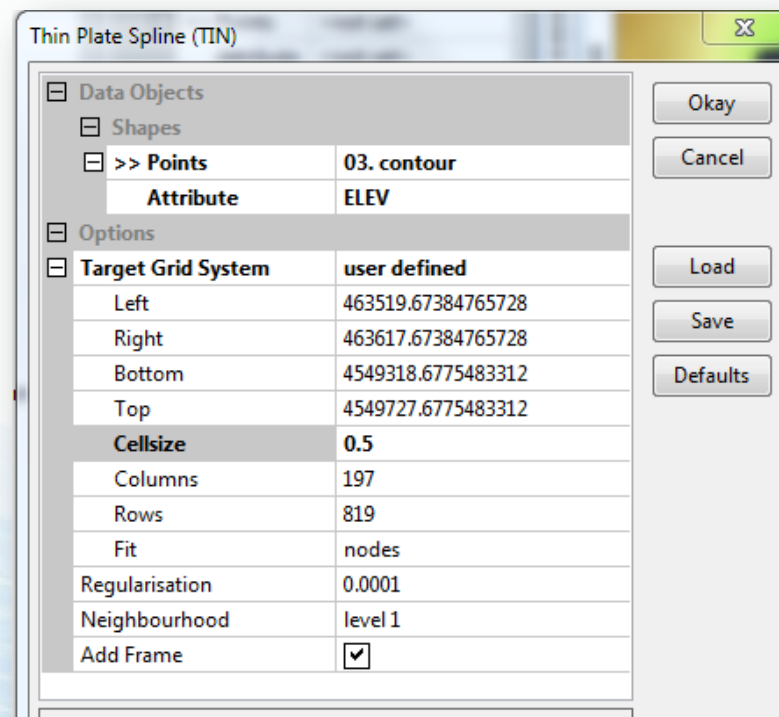
Other REQUIREMENTS

Compulsory

- Basic GIS concepts (types of data, Geographic and Projection systems ...)
- A minimum competency with GIS software

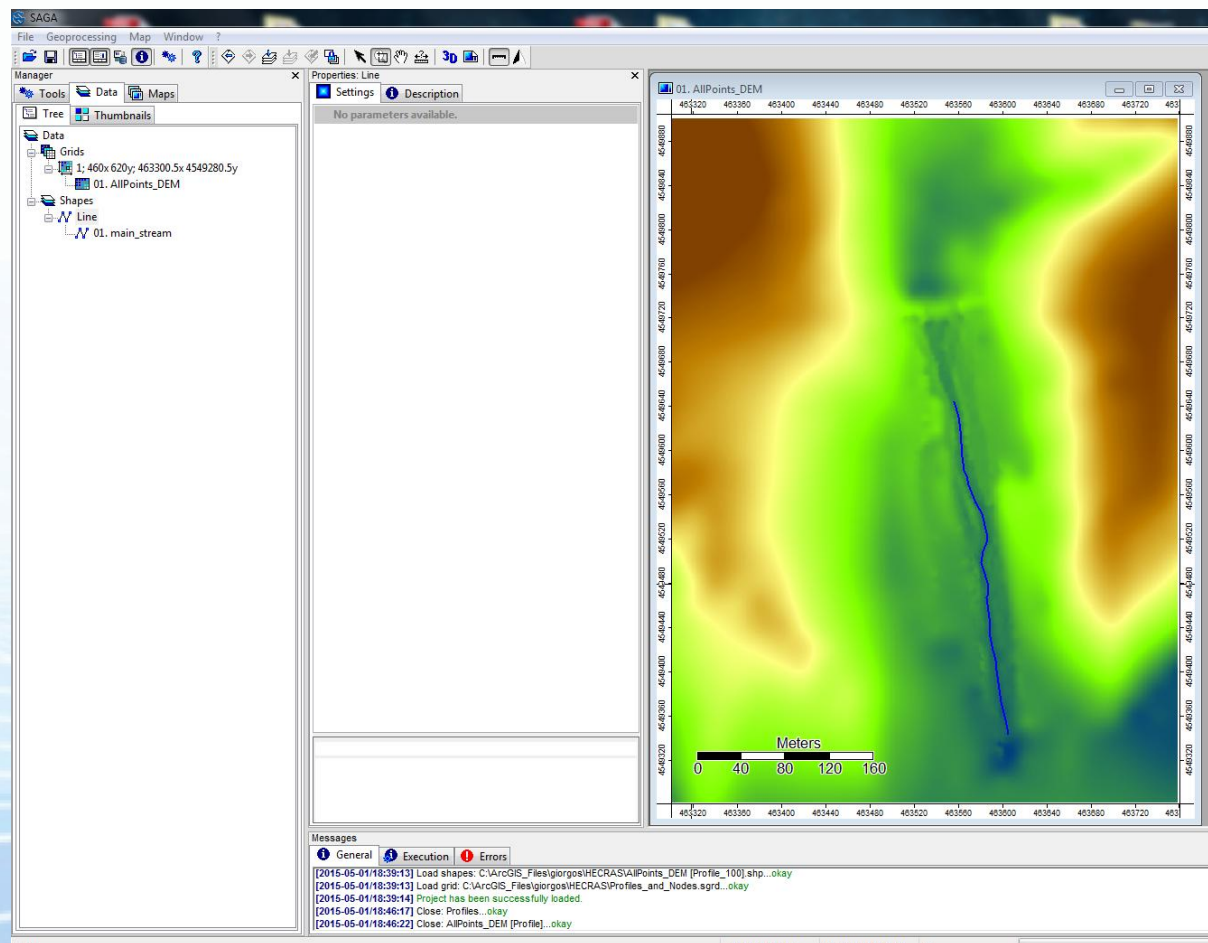
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- Run 
- **LOAD** the contour lines (just “**open**” the respective shapefile)
- RUN **Menu > Grid > Spline Interpolation> Thin Plate Spline**
- Insert the contour file name
- Insert the proper PIXEL size
 - for data from 1:50000 scale a pix.size of 15m is OK.
 - 1:1000, pix.size 0.5m



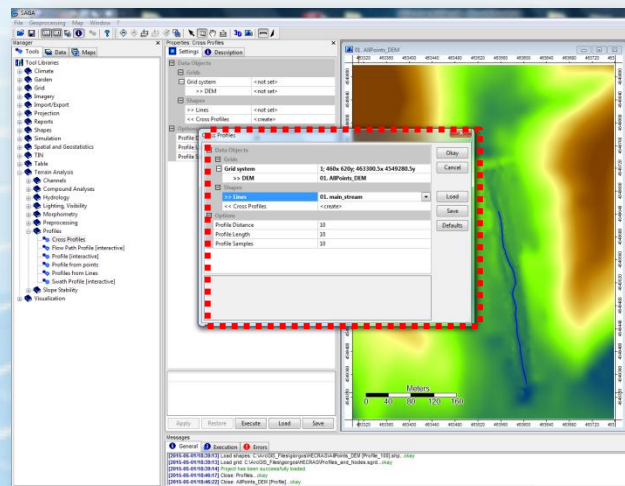
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- LOAD DEM (just “**open**” the geotiff)
- LOAD the stream (just “**open**” the shapefile)



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- GO to**Tools > Terrain Analysis > Profiles** and run (double click) **CROSS PROFILES**



Click and select
the only option

Click and select
the **DEM**

Click and select
the **STREAM** line

Cross Profiles

<input type="checkbox"/> Data Objects	
<input type="checkbox"/> Grids	
<input type="checkbox"/> Grid system	1; 460x 620; 463300.5x 4549280
>> DEM	01. AllPoints_DEM
<input type="checkbox"/> Shapes	
>> Lines	01. main_stream
<< Cross Profiles	<create>
<input type="checkbox"/> Options	
Profile Distance	20
Profile Length	120
Profile Samples	13

Buttons: Okay, Cancel, Load, Save, Defaults

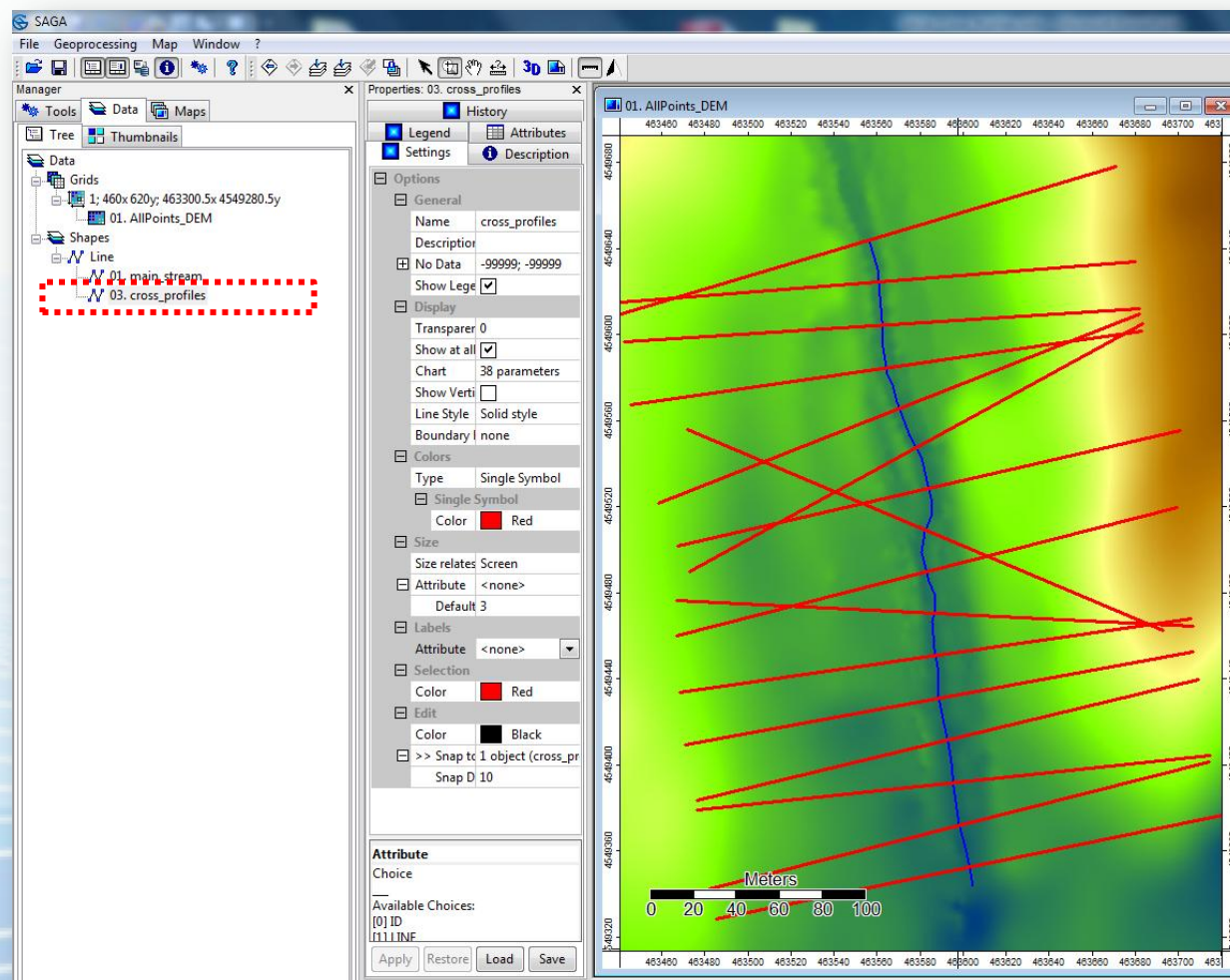
Click and select
"CREATE"

Insert the respective parameters in
map units. You should insert **HALF** the
length of the Profile length required

Prof. Distance: distance between profiles along the stream
Profile Samples: the number of points along the profile

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- **RUN** and
- Cross sections file appears under the Data click tab



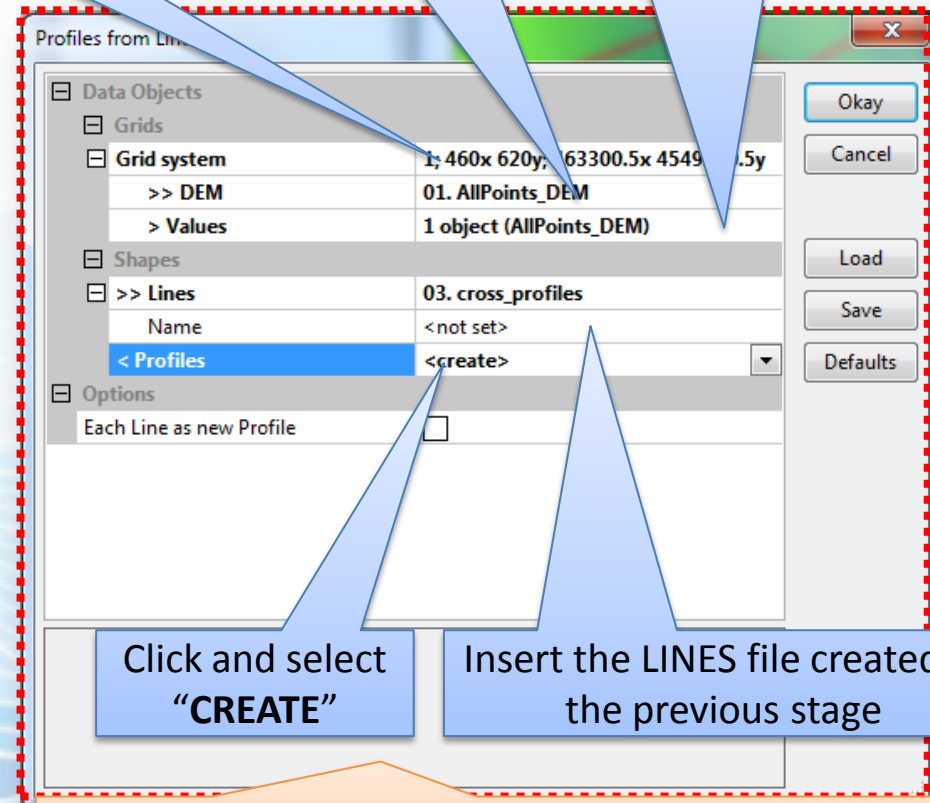
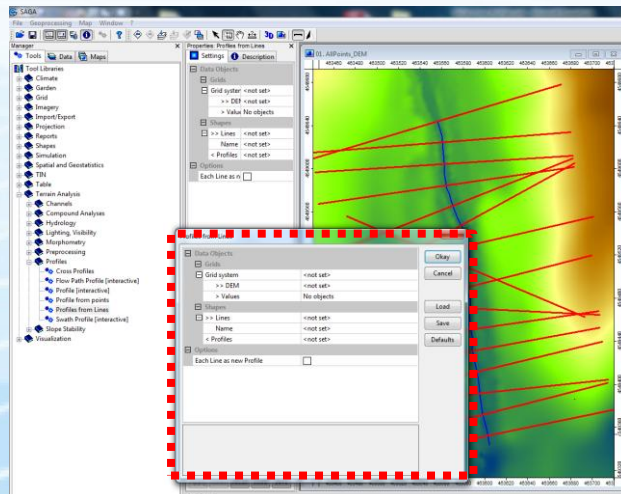
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- Now....RUN...
PROFILES from LINES

Click and select
the only option

Click and select
the **DEM**

Click and insert in the
requested the **DEM**



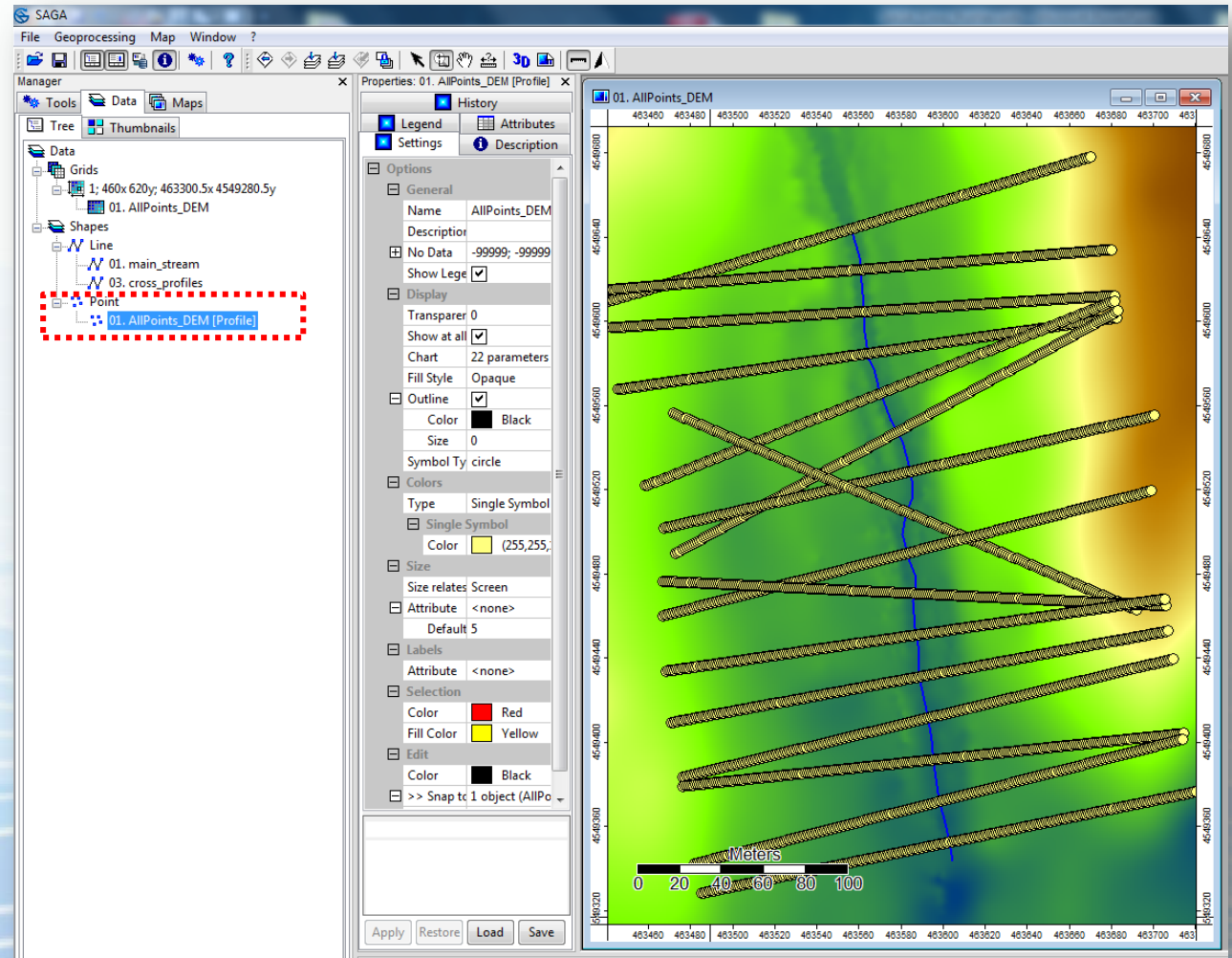
Click and select
"CREATE"

Insert the LINES file created in
the previous stage

Click Okay and

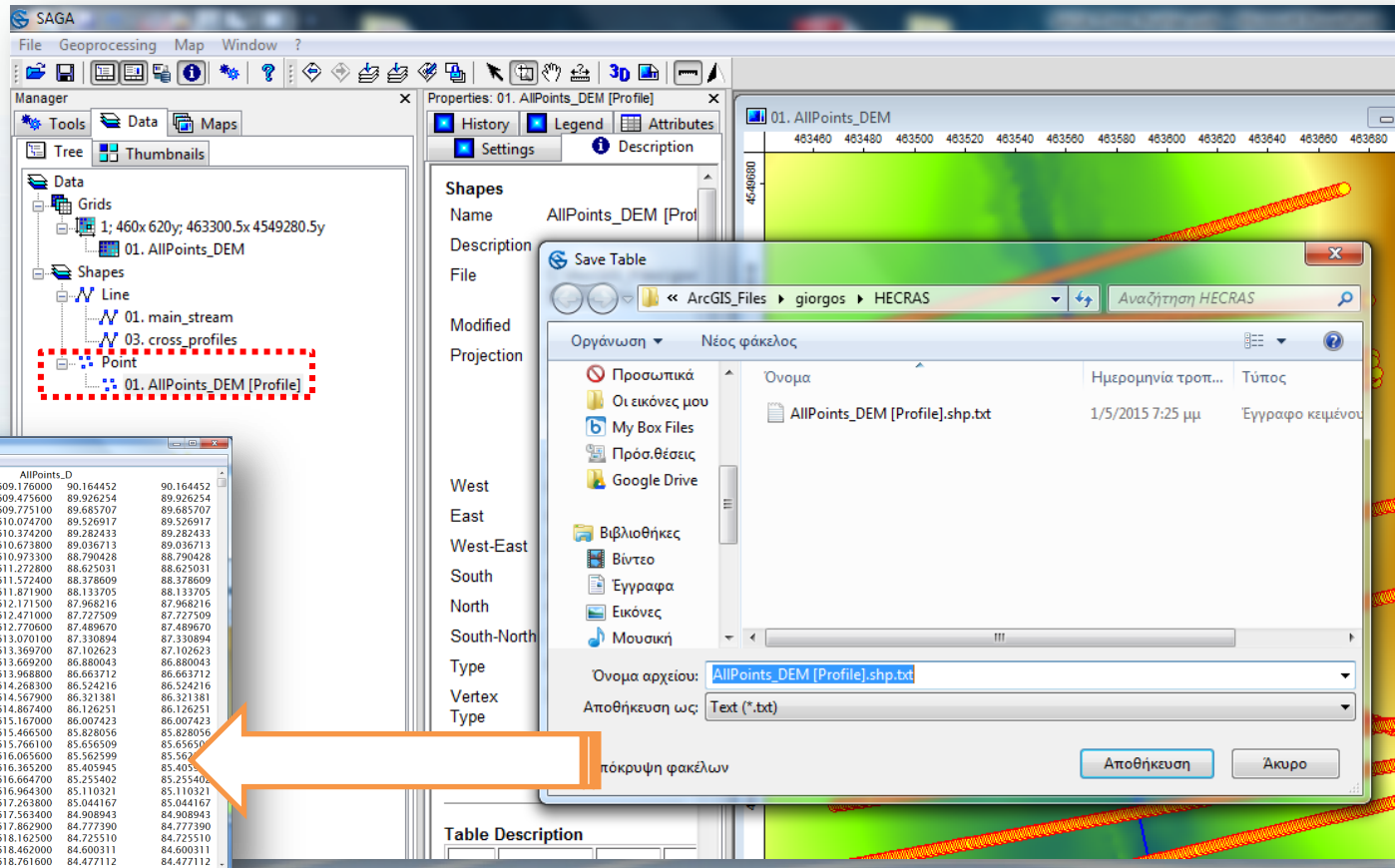
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- **RUN** and
- Cross sections POINTS file appears under the Data click tab
- Now, for every cross section, there are points spaced 1.4m from each other
- Right Click on the point data file and select...ATTRIBUTES "Save as"



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- Right Click on the point data file and select ATTRIBUTES ...”Save as” and **Save as TEXT**.



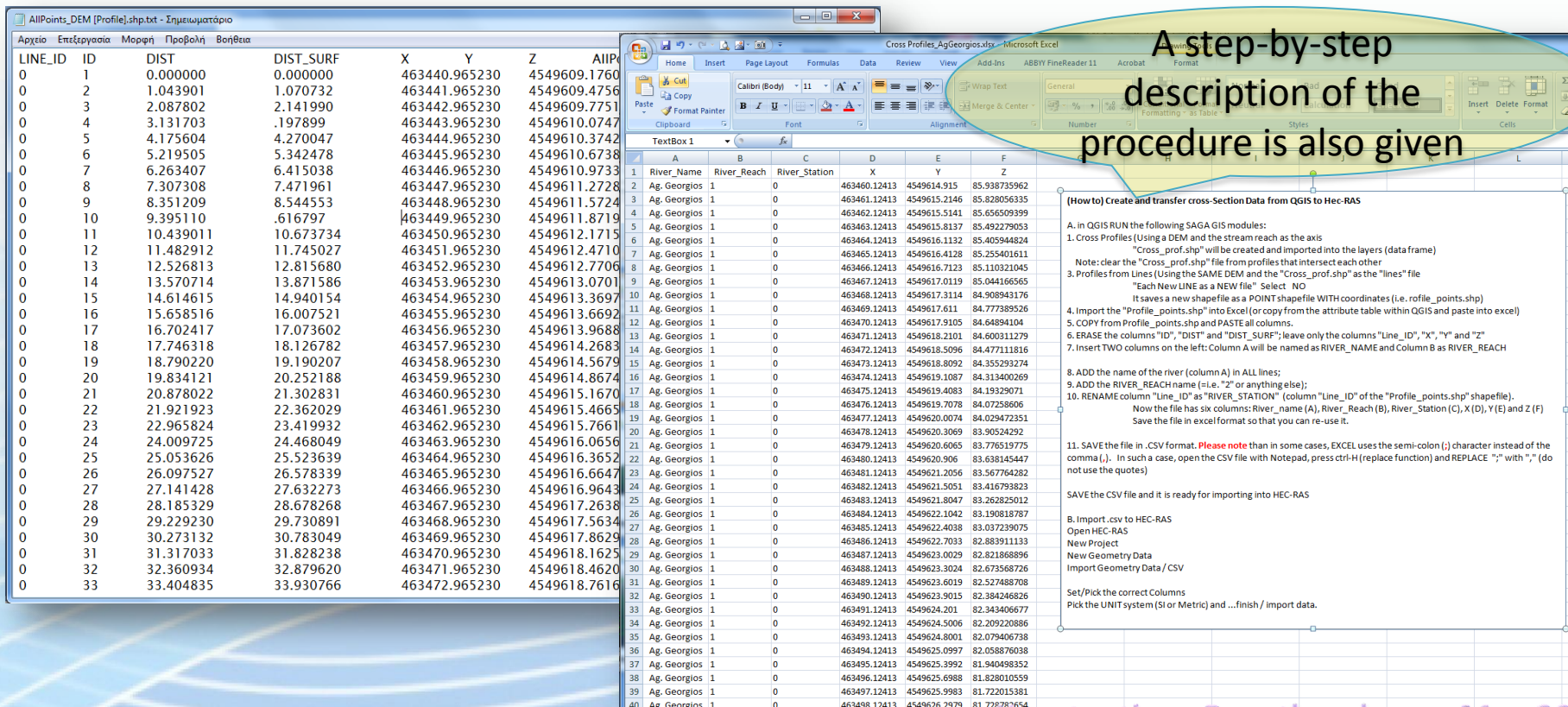
The screenshot shows the SAGA GIS interface with the '01. AllPoints_DEM [Profile]' file selected in the 'Point' category of the 'Data' tree. A red dashed box highlights this file. An orange arrow points from this file to the 'Save Table' dialog box. The 'Save Table' dialog shows the file name 'AllPoints_DEM [Profile].shp.txt' and the 'Save as' option set to 'Text (*.txt)'. The 'Table Description' window is also visible, showing the file's properties.

Table Description

LINE_ID	ID	DIST	DIST_SURF	X	Y	Z	AllPoints.D
0	1	0.000000	0.000000	463440.965230	4549609.176000	90.164452	90.164452
0	2	1.043901	1.070732	463441.965230	4549609.475600	89.926254	89.926254
0	3	2.087802	2.141990	463442.965230	4549609.775100	89.685707	89.685707
0	4	3.131703	.197899	463443.965230	4549610.074700	89.526917	89.526917
0	5	4.175604	4.270047	463444.965230	4549610.374200	89.282433	89.282433
0	6	5.219505	5.342478	463445.965230	4549610.673800	89.038713	89.038713
0	7	6.263407	6.415038	463446.965230	4549610.973300	88.790428	88.790428
0	8	7.307308	7.471961	463447.965230	4549611.272800	88.625031	88.625031
0	9	8.351209	8.544553	463448.965230	4549611.572400	88.378609	88.378609
0	10	9.395110	.616797	463449.965230	4549611.871900	88.133705	88.133705
0	11	10.439011	10.673734	463450.965230	4549612.171500	87.968216	87.968216
0	12	11.482912	11.745027	463451.965230	4549612.471000	87.727509	87.727509
0	13	12.526813	12.815680	463452.965230	4549612.770600	87.489670	87.489670
0	14	13.570714	13.871586	463453.965230	4549613.070100	87.330894	87.330894
0	15	14.614615	14.940154	463454.965230	4549613.369700	87.102623	87.102623
0	16	15.658516	16.007521	463455.965230	4549613.669200	86.880043	86.880043
0	17	16.702417	17.073602	463456.965230	4549613.968800	86.663712	86.663712
0	18	17.746318	18.126782	463457.965230	4549614.268300	86.524216	86.524216
0	19	18.790220	19.190207	463458.965230	4549614.567900	86.321381	86.321381
0	20	19.834121	20.252188	463459.965230	4549614.867400	86.126251	86.126251
0	21	20.878022	21.302831	463460.965230	4549615.167000	86.007423	86.007423
0	22	21.921923	22.362029	463461.965230	4549615.466500	85.828056	85.828056
0	23	22.965824	23.419932	463462.965230	4549615.766100	85.656509	85.656509
0	24	24.009725	24.468049	463463.965230	4549616.065600	85.562599	85.562599
0	25	25.053626	25.523839	463464.965230	4549616.365200	85.405945	85.405945
0	26	26.097527	26.578339	463465.965230	4549616.664700	85.255402	85.255402
0	27	27.141428	27.632273	463466.965230	4549616.964300	85.110321	85.110321
0	28	28.185329	28.687268	463467.965230	4549617.263800	85.044167	85.044167
0	29	29.229230	29.730891	463468.965230	4549617.563400	84.908943	84.908943
0	30	30.273132	30.783049	463469.965230	4549617.862900	84.777390	84.777390
0	31	31.317033	31.828238	463470.965230	4549618.162500	84.725510	84.725510
0	32	32.360934	32.879620	463471.965230	4549618.462000	84.600311	84.600311
0	33	33.404835	33.930766	463472.965230	4549618.761600	84.477112	84.477112

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- This file can be imported into EXCEL for the next few steps before being imported into HEC-RAS for applying the Hydraulic Model



A step-by-step description of the procedure is also given

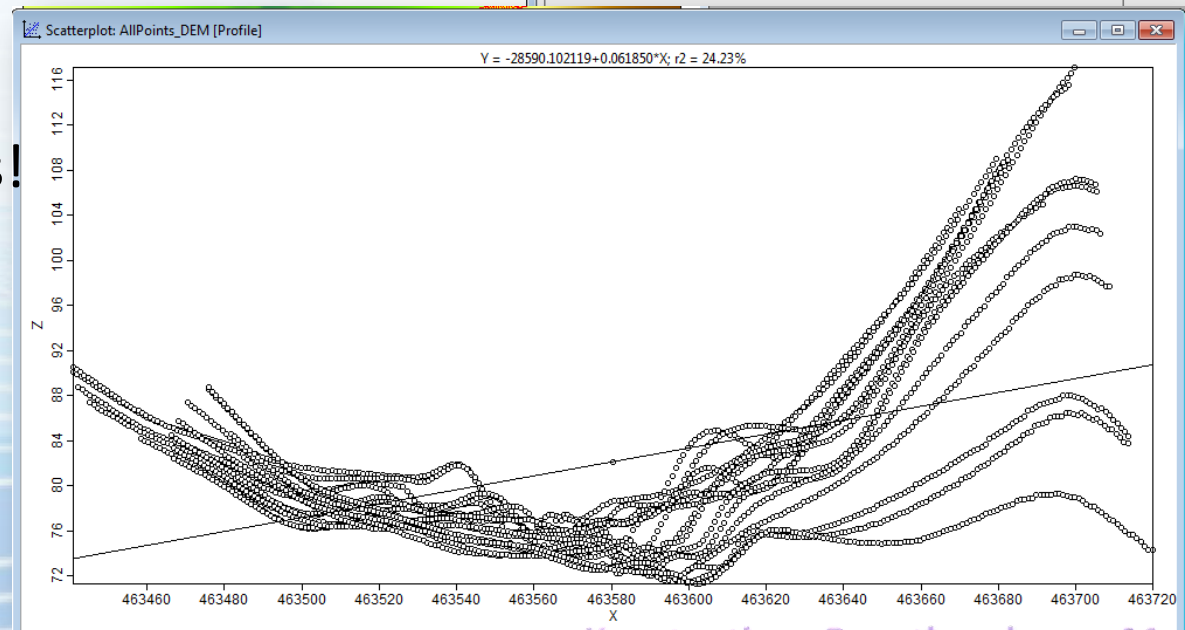
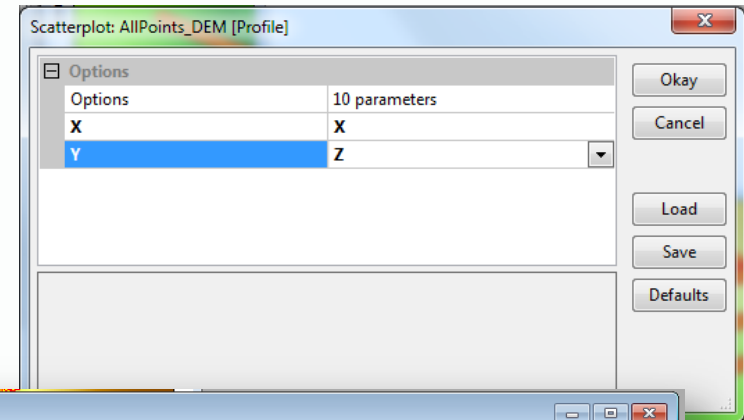
LINE_ID	ID	DIST	DIST_SURF	X	Y	Z	AIIP
0	1	0.000000		463440.965230	4549609.1760		
0	2	1.043901	1.070732	463441.965230	4549609.4756		
0	3	2.087802	2.141990	463442.965230	4549609.7751		
0	4	3.131703	.197899	463443.965230	4549610.0747		
0	5	4.175604	4.270047	463444.965230	4549610.3742		
0	6	5.219505	5.342478	463445.965230	4549610.6738		
0	7	6.263407	6.415038	463446.965230	4549610.9733		
0	8	7.307308	7.471961	463447.965230	4549611.2728		
0	9	8.351209	8.544553	463448.965230	4549611.5724		
0	10	9.395110	.616797	463449.965230	4549611.8719		
0	11	10.439011	10.673734	463450.965230	4549612.1715		
0	12	11.482912	11.745027	463451.965230	4549612.4710		
0	13	12.526813	12.815680	463452.965230	4549612.7706		
0	14	13.570714	13.871586	463453.965230	4549613.0701		
0	15	14.614615	14.940154	463454.965230	4549613.3697		
0	16	15.658516	16.007521	463455.965230	4549613.6692		
0	17	16.702417	17.073602	463456.965230	4549613.9688		
0	18	17.746318	18.126782	463457.965230	4549614.2683		
0	19	18.790220	19.190207	463458.965230	4549614.5679		
0	20	19.834121	20.252188	463459.965230	4549614.8674		
0	21	20.878022	21.302831	463460.965230	4549615.1670		
0	22	21.921923	22.362029	463461.965230	4549615.4665		
0	23	22.965824	23.419932	463462.965230	4549615.7661		
0	24	24.009725	24.468049	463463.965230	4549616.0656		
0	25	25.053626	25.523639	463464.965230	4549616.3652		
0	26	26.097527	26.578339	463465.965230	4549616.6647		
0	27	27.141428	27.632273	463466.965230	4549616.9643		
0	28	28.185329	28.678268	463467.965230	4549617.2638		
0	29	29.229230	29.730891	463468.965230	4549617.5634		
0	30	30.273132	30.783049	463469.965230	4549617.8629		
0	31	31.317033	31.828238	463470.965230	4549618.1625		
0	32	32.360934	32.879620	463471.965230	4549618.4620		
0	33	33.404835	33.930766	463472.965230	4549618.7616		

(How to) Create and transfer cross-Section Data from QGIS to HEC-RAS

1. Cross Profiles (Using a DEM and the stream reach as the axis "Cross_prof.shp" will be created and imported into the layers (data frame)
Note: clear the "Cross_prof.shp" file from profiles that intersect each other
2. Profiles from Lines (Using the SAME DEM and the "Cross_prof.shp" as the "lines" file
"Each New LINE as a NEW file" Select NO
It saves a new shapefile as a POINT shapefile WITH coordinates (i.e. profile_points.shp)
3. Import the "Profile_points.shp" into Excel (or copy from the attribute table within QGIS and paste into excel)
4. COPY from Profile_points.shp and PASTE all columns.
5. ERASE the columns "ID", "DIST" and "DIST_SURF"; leave only the columns "Line_ID", "X", "Y" and "Z"
6. Insert TWO columns on the left: Column A will be named as RIVER_NAME and Column B as RIVER_REACH
7. ADD the name of the river (column A) in ALL lines;
8. ADD the RIVER_REACH name (i.e. "Z" or anything else);
9. RENAME column "Line_ID" as "RIVER_STATION" (column "Line_ID" of the "Profile_points.shp" shapefile).
Now the file has six columns: River_name (A), River_Reach (B), River_Station (C), X (D), Y (E) and Z (F)
Save the file in excel format so that you can re-use it.
10. SAVE the file in .CSV format. Please note that in some cases, EXCEL uses the semi-colon (;) character instead of the comma (,). In such a case, open the CSV file with Notepad, press ctrl+H (replace function) and REPLACE ";" with "," (do not use the quotes)
11. Import .csv to HEC-RAS
Open HEC-RAS
New Project
New Geometry Data
Import Geometry Data / CSV
Set/Pick the correct Columns
Pick the UNIT system (SI or Metric) and ...finish / import data.

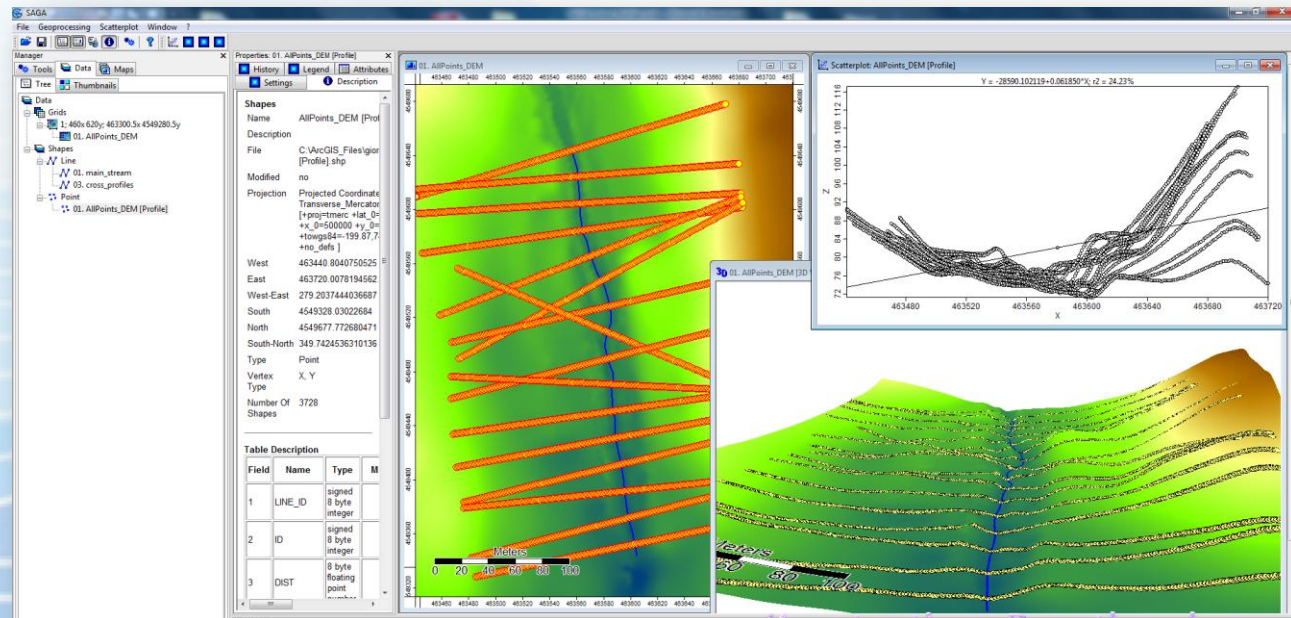
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- Right Click on the point data file and select...ATTRIBUTES "Scatterplot"....
- Provide the parameters for the cross sections... X & Z
- ..and you get...this!



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- Double Click on the DEM file on the DATA tab, and display the respective map
- Click on the map and select from the TOP MENU > Map > Show 3D View
- Input the parameters (DEM etc)
- Okay and PLAY!



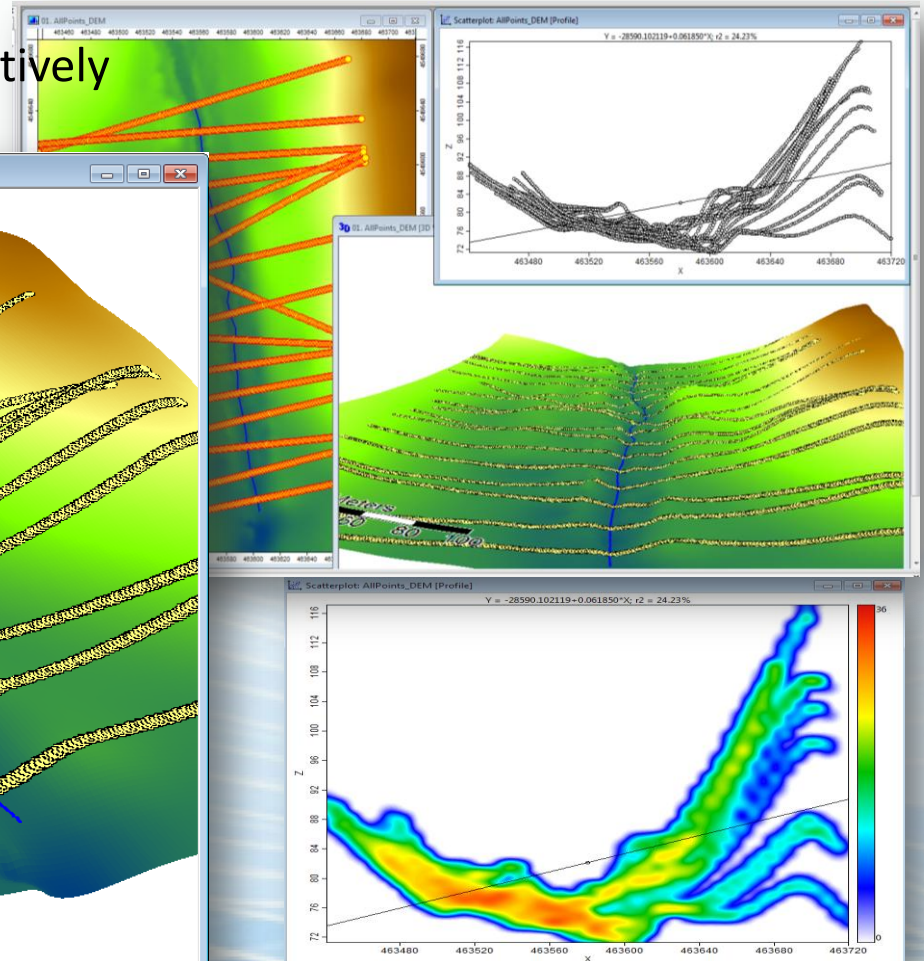
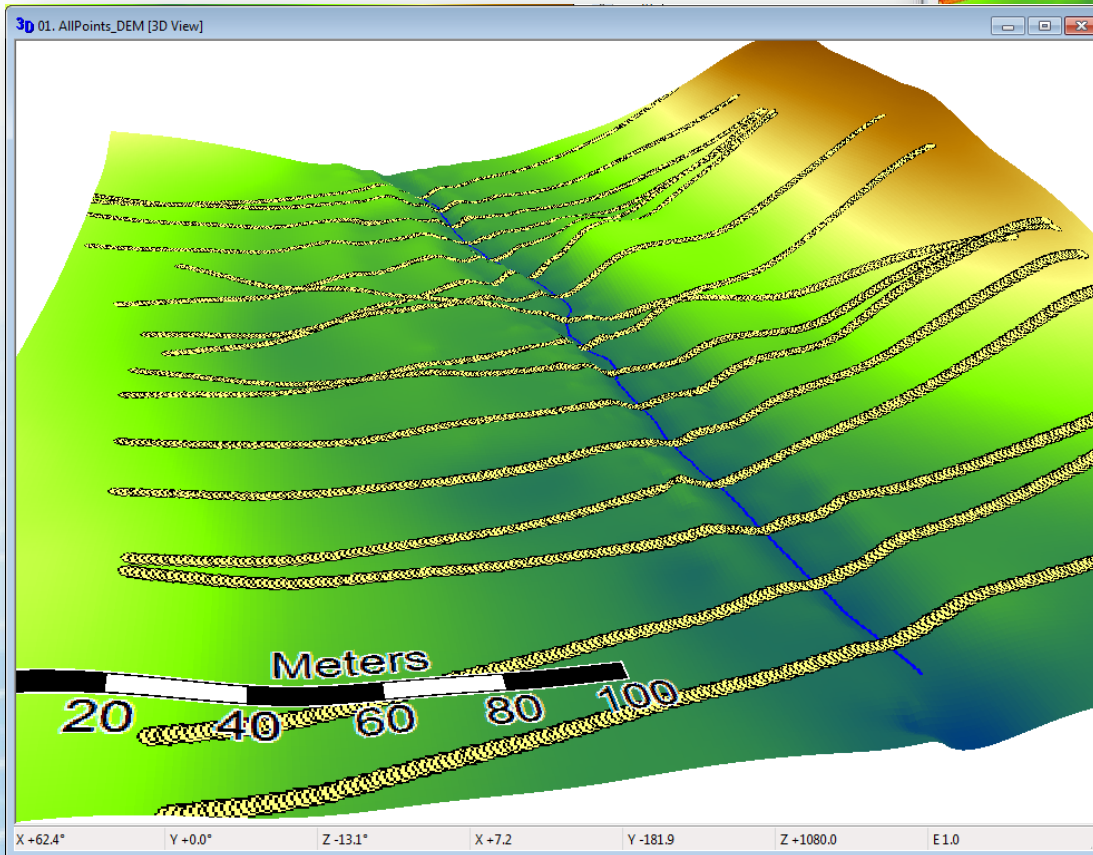


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- Mouse Scroll Wheel: zoom in and out
- Mouse LEFT: change perspective interactively
- Mouse RIGHT: Move the Map



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Steps to create Cross Sections for HEC-RAS

- RUN  **SAGA**
Systems for Automated Geoscientific Analyses
- Either open the contours and make a DEM within SAGA or open a DEM created with other software
- Open the Stream shapefile
- Run **Tools > Terrain Analysis > Profiles > CROSS PROFILES**
- RUN... **PROFILES from LINES** (same menu)
- Right Click on the point data file and select ATTRIBUTES ..."Save as" and **Save as TEXT**

.... import the file into EXCEL for making a few changes

Common borders. Common solutions.

The ...



...version

A Step-by-Step
Tutorial
(click to read)

How to create Cross Sections ready for importing
into HEC-RAS for Hydraulic Analysis

...IN LESS THAN 5' !

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(How to) Create and transfer cross-Section Data from QGIS to Hec-RAS

- In QGIS load/create the DEM of the area and the stream line
- RUN the following SAGA GIS modules:
 1. Cross Profiles (Using a DEM and the stream reach as the axis. A shapefile (named by you) will be created and imported into the layers (data frame).
 2. Profiles from Lines (Using the SAME DEM and the "Cross_prof.shp" as the "lines" file. "Each New LINE as a NEW file" Select NO (It saves a new shapefile as a POINT shapefile WITH coordinates (i.e. profile_points.shp))
 3. Copy from the attribute table within QGIS the list of numbers (all columns) and paste it PASTE into Excel
- *...some work is needed in Excel which is common for both the SAGA and the QGIS based procedure*

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Last fixes with



4. ERASE the columns "ID", "DIST" and "DIST_SURF"; leave only the columns "Line_ID", "X", "Y" and "Z"
 5. Insert TWO columns on the left: Column A will be named as RIVER_NAME and Column B as RIVER_REACH
 6. ADD the name of the river (column A) in ALL lines; (e.g. Agios_Georgios)
 7. ADD the RIVER_REACH name (=i.e. "2" or anything else);
 8. RENAME column "Line_ID" header as "RIVER_STATION" (column "Line_ID" of the "Profile_points.shp" shapefile).
- Now the file has six columns: **River_name (A), River_Reach (B), River_Station (C), X (D), Y (E) and Z (F)**
 - Save the file in excel format so that you can re-use it.

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Cross Profiles_AgGeorgios.xlsx - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Add-Ins ABBYY FineReader 11 Acrobat Format

Clipboard Font Alignment Number Styles Cells

	A	B	C	D	E	F	G	H	I	J	K	L
	River_Name	River_Reach	River_Station	X	Y	Z						
1	Ag. Georgios	1	0	463460.12413	4549614.915	85.938735962						
2	Ag. Georgios	1	0	463461.12413	4549615.2146	85.828056335						
3	Ag. Georgios	1	0	463462.12413	4549615.5141	85.656509399						
4	Ag. Georgios	1	0	463463.12413	4549615.8137	85.492279053						
5	Ag. Georgios	1	0	463464.12413	4549616.1132	85.405944824						
6	Ag. Georgios	1	0	463465.12413	4549616.4128	85.255401611						
7	Ag. Georgios	1	0	463466.12413	4549616.7123	85.110321045						
8	Ag. Georgios	1	0	463467.12413	4549617.0119	85.044166565						
9	Ag. Georgios	1	0	463468.12413	4549617.3114	84.908943176						
10	Ag. Georgios	1	0	463469.12413	4549617.611	84.777389526						
11	Ag. Georgios	1	0	463470.12413	4549617.9105	84.64894104						
12	Ag. Georgios	1	0	463471.12413	4549618.2101	84.600311279						
13	Ag. Georgios	1	0	463472.12413	4549618.5096	84.477111816						
14	Ag. Georgios	1	0	463473.12413	4549618.8092	84.355293274						
15	Ag. Georgios	1	0	463474.12413	4549619.1087	84.313400269						
16	Ag. Georgios	1	0	463475.12413	4549619.4083	84.19329071						
17	Ag. Georgios	1	0	463476.12413	4549619.7078	84.07258606						
18	Ag. Georgios	1	0	463477.12413	4549620.0074	84.029472351						
19	Ag. Georgios	1	0	463478.12413	4549620.3069	83.90524292						
20	Ag. Georgios	1	0	463479.12413	4549620.6065	83.776519775						
21	Ag. Georgios	1	0	463480.12413	4549620.906	83.638145447						
22	Ag. Georgios	1	0	463481.12413	4549621.2056	83.567764282						
23	Ag. Georgios	1	0	463482.12413	4549621.5051	83.416793823						
24	Ag. Georgios	1	0	463483.12413	4549621.8047	83.262825012						
25	Ag. Georgios	1	0	463484.12413	4549622.1042	83.190818787						
26	Ag. Georgios	1	0	463485.12413	4549622.4038	83.037239075						
27	Ag. Georgios	1	0	463486.12413	4549622.7033	82.883911133						
28	Ag. Georgios	1	0	463487.12413	4549623.0029	82.821868896						
29	Ag. Georgios	1	0	463488.12413	4549623.3024	82.673568726						
30	Ag. Georgios	1	0	463489.12413	4549623.6019	82.527488708						
31	Ag. Georgios	1	0	463490.12413	4549623.9015	82.384246826						
32	Ag. Georgios	1	0	463491.12413	4549624.201	82.343406677						
33	Ag. Georgios	1	0	463492.12413	4549624.5006	82.209220886						

(How to) Create and transfer cross-Section Data from QGIS to Hec-RAS

A. in QGIS RUN the following SAGA GIS modules:

1. Cross Profiles (Using a DEM and the stream reach as the axis
"Cross_prof.shp" will be created and imported into the layers (data frame)
Note: clear the "Cross_prof.shp" file from profiles that intersect each other
3. Profiles from Lines (Using the SAME DEM and the "Cross_prof.shp" as the "lines" file
"Each New LINE as a NEW file" Select NO
It saves a new shapefile as a POINT shapefile WITH coordinates (i.e. rofile_points.shp)
4. Import the "Profile_points.shp" into Excel (or copy from the attribute table within QGIS and paste into excel)
5. COPY from Profile_points.shp and PASTE all columns.
6. ERASE the columns "ID", "DIST" and "DIST_SURF"; leave only the columns "Line_ID", "X", "Y" and "Z"
7. Insert TWO columns on the left: Column A will be named as RIVER_NAME and Column B as RIVER_REACH
8. ADD the name of the river (column A) in ALL lines;
9. ADD the RIVER_REACH name (=i.e. "2" or anything else);
10. RENAME column "Line_ID" as "RIVER_STATION" (column "Line_ID" of the "Profile_points.shp" shapefile).
Now the file has six columns: River_name (A), River_Reach (B), River_Station (C), X (D), Y (E) and Z (F)
Save the file in excel format so that you can re-use it.
11. SAVE the file in .CSV format. **Please note** than in some cases, EXCEL uses the semi-colon (;) character instead of the comma (,). In such a case, open the CSV file with Notepad, press ctrl-H (replace function) and REPLACE ";" with "," (do not use the quotes)

SAVE the CSV file and it is ready for importing into HEC-RAS

B. Import .csv to HEC-RAS

Open HEC-RAS
New Project
New Geometry Data
Import Geometry Data / CSV

Set/Pick the correct Columns
Pick the UNIT system (SI or Metric) and ...finish / import data.

Common borders. Common solutions.

(How to) Create and transfer cross-Section Data from QGIS to Hec-RAS

- 11. SAVE the file in .CSV format.
- **Please note** than in some cases, EXCEL uses the semi-colon (;) character instead of the comma (,). In such a case, open the CSV file with Notepad, press ctrl-H (replace function) and REPLACE ";" with "," (do not use the quotes)
- The CSV file and it is ready for importing into HEC-RAS

Common borders. Common solutions.

(How to) Create and transfer cross-Section Data from QGIS to Hec-RAS

- A. in QGIS RUN the following SAGA GIS modules

B. Import .csv to HEC-RAS

- Open HEC-RAS
- 1. **Menu FILE > New Project** (create a project)
- 2. **Menu EDIT > Geometric data**
- 3. **Menu Geometric data > New Geometry Data**
- 4. **Menu Import Geometry Data / Import CSV**
- 5. **Set/Pick the correct Columns**
- 6. **Pick the UNIT system (SI or Metric) and ...finish** to import data.

A Step-by-Step
Tutorial
(click to read)

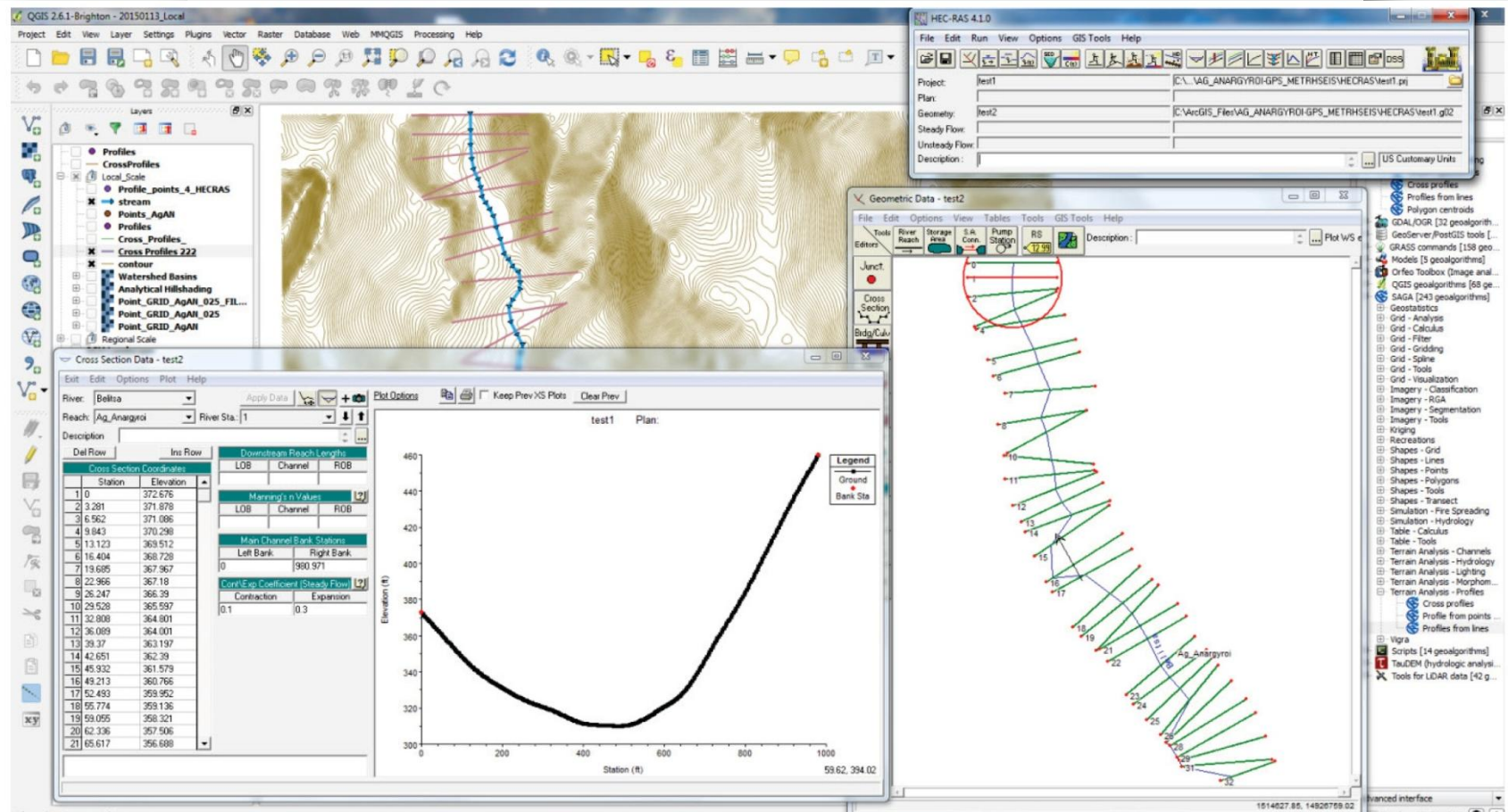


Project funded by the
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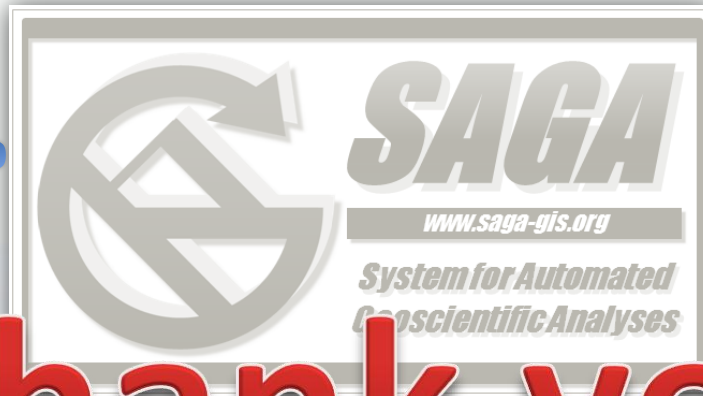
Common borders. Common solutions.

Got it! Create in QGIS Cross Sections and import them into HEC-RAS in less than 5'

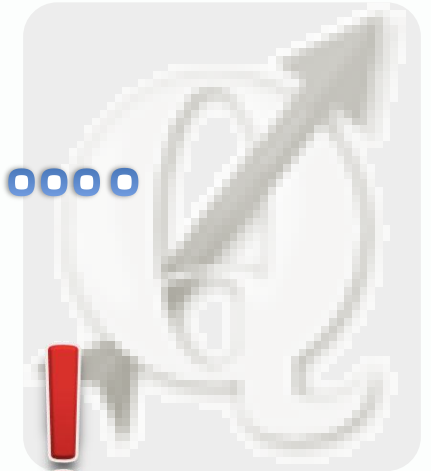


Common borders. Common solutions.

Just



Or



Thank you !

How to create Cross Sections ready for importing
into HEC-RAS for Hydraulic Analysis