

TUTORIAL 2

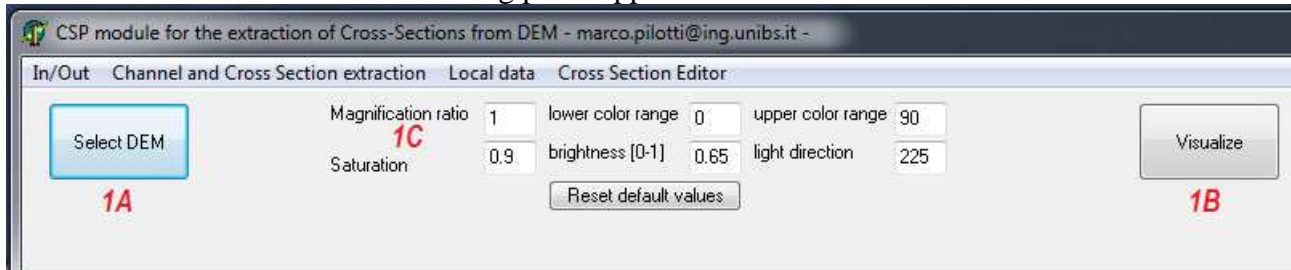
test case 1: *basin1.grd*

SELECTION OF THE CN END-POINTS BY USING THE MOUSE

Most of the instructions presented in this tutorial have already been explained in Tutorial 1. These instructions are needed to give completeness to the tutorial. New instructions, regarding the selection of the CN end-points with the mouse, will be written in blue within the text.

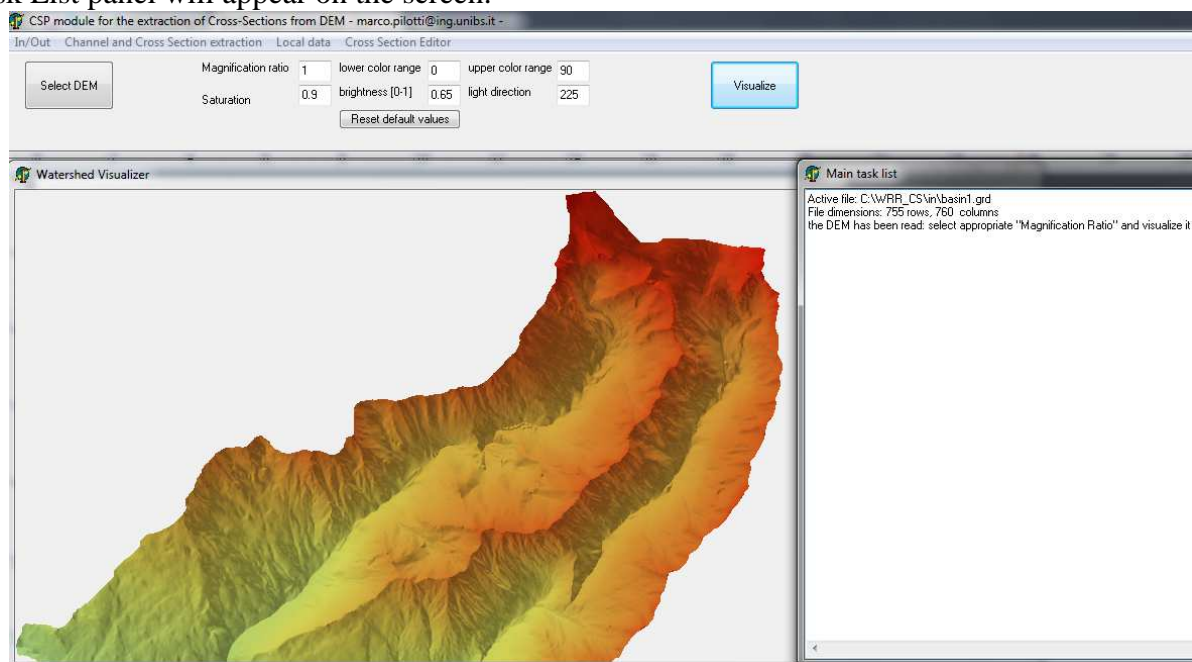
Run the CSP program by clicking on the *CSP.exe* icon.

Select command 1 above: the following panel appears

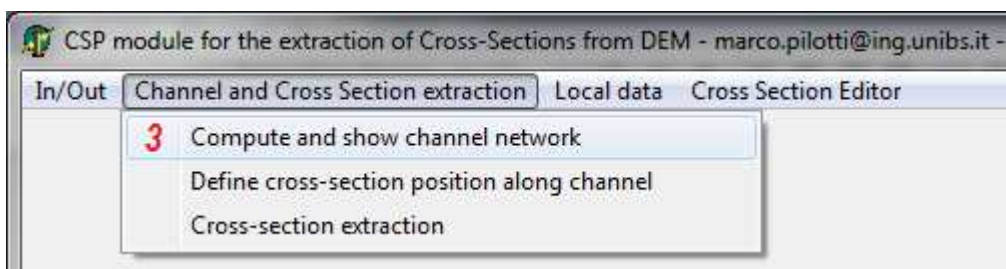


Using 1A, select the file *basin1.grd*. By pressing 1B, the basin is shown on the screen, according to the magnification ratio 1C.

After pressing 1B, the screen will look like in the following: the Watershed Visualizer panel and the Task List panel will appear on the screen.

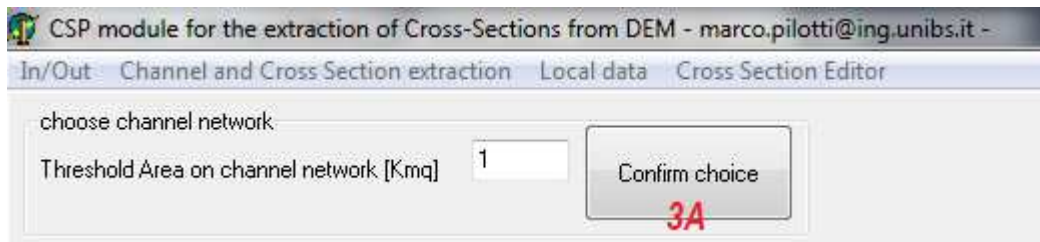


Select command 3 below.



The program will automatically accomplish the tasks shown in the Main Task List panel, needed for the computation of the SFDN. This may take some dozens of seconds depending on the computer and on the DEM dimension.

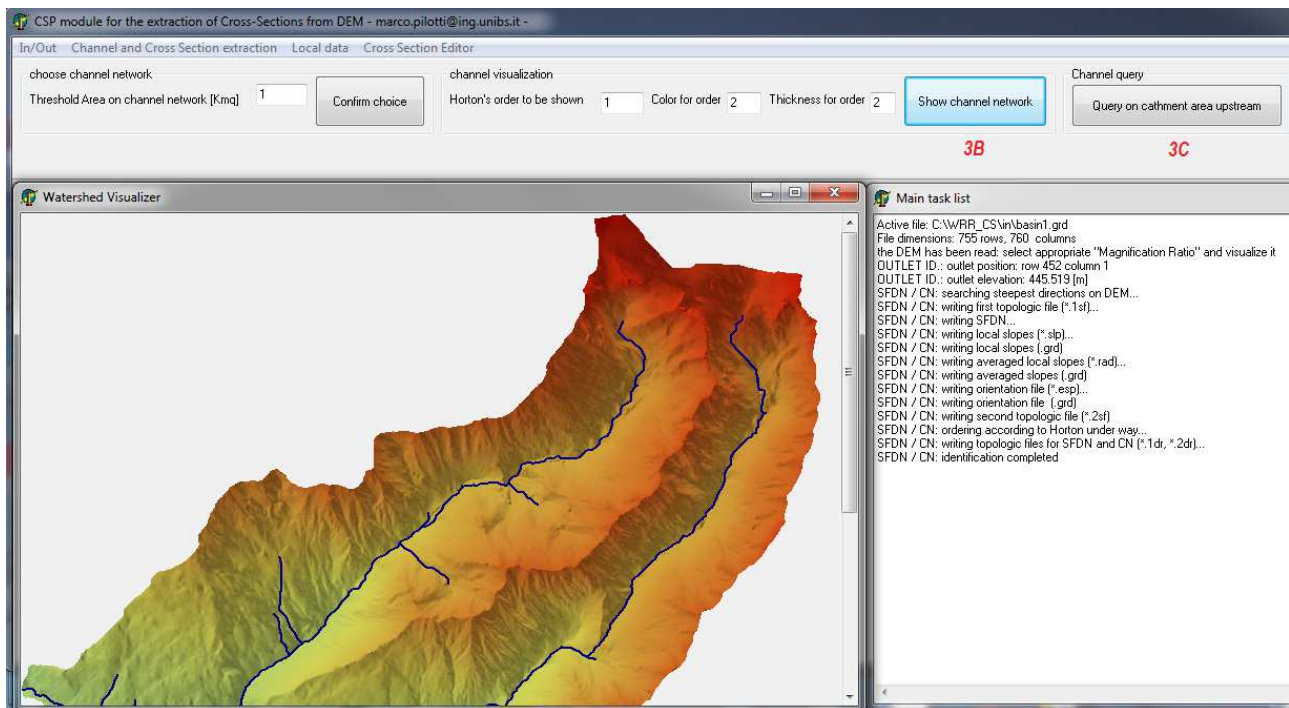
the following panel is shown



Here the user can specify the constant area threshold (a real number ≥ 0 , in km^2) on the basis of which the CN will be filtered from the SFDN.

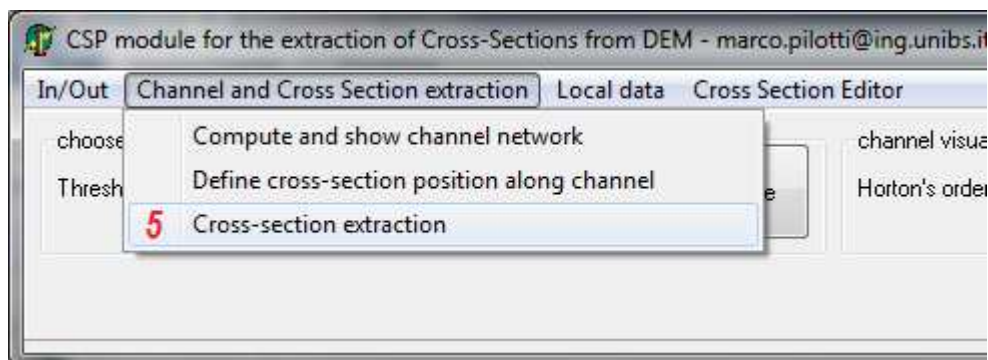
If one selects 0, the SFDN is shown on the screen, but this is very inconvenient for the following operations.

The default value of 1 km^2 will be used for this example. After confirming the choice (3A key), in a few seconds the following panel appears

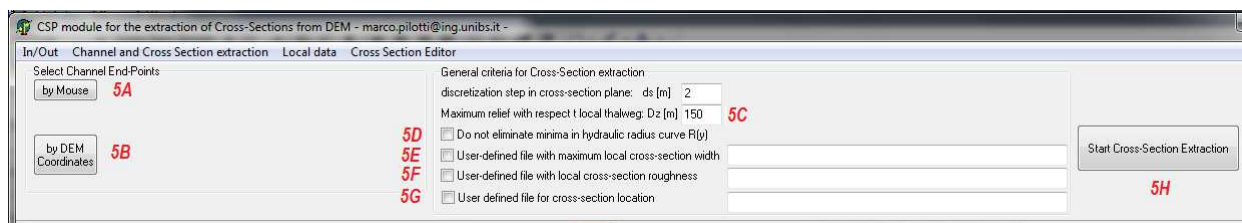


where the CN is shown.

Select command 5 below.



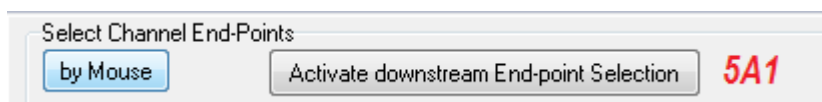
The following panel will be shown on the screen



This panel allows the user to select the CN stretch along which the CS will be computed. To this purpose, the first end-point upstream and last downstream have to be specified. This can be done in three different ways:

1. by clicking on the corresponding stations with the mouse (option 5A);
2. by providing an ASCII file where the distance of the CSs from the outlet is given (option 5G, that will be presented in Tutorial 3).
3. Finally, by specifying the end-point UTM coordinates (option 5B, discussed in Tutorial 1)

Here we select the end-points by using the mouse (5A). Clicking on the corresponding button the following panel is shown.



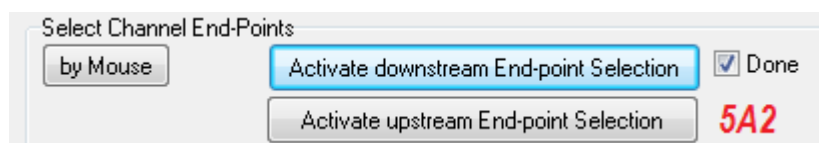
By pressing the 5A1 button, the selection of the downstream end-point of the CN is made possible. After pressing on 5A1, the button turns light blue, showing that the selection is active. The user can select this end-point by clicking on it or on a cell nearby (the program uses a snap-to-point algorithm to identify the end point along the CN). Immediately after that the CN end point has been selected, a yellow dot marks the end point on the CN,



and a ticked check-box appears beside 5A1.

The program uses a snap-to-point to locate the end-point along the CN. If the left key of the mouse is pressed on a point that is too far from the CN, the end-point identification fails and the selection is turned off. In this case the ticked check-box does not appear and also a message **WARNING ! Point not found: repeat selection** is shown in the Task List panel. In such a case, the button 5A1 must be pressed again and the selection repeated before going on.

When the downstream End-point selection is accomplished, button 5A2 appears

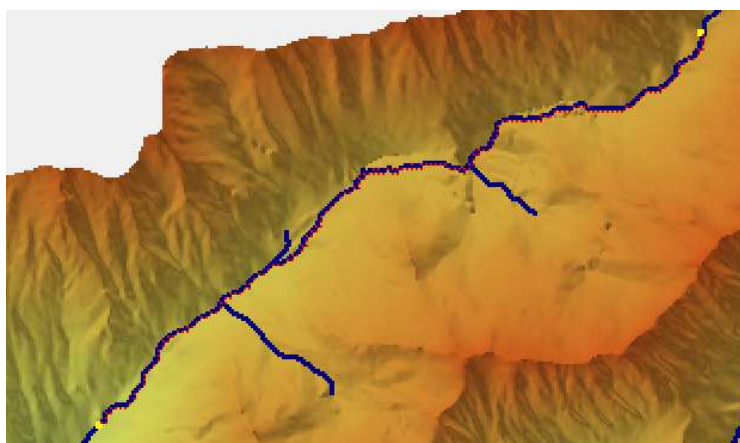
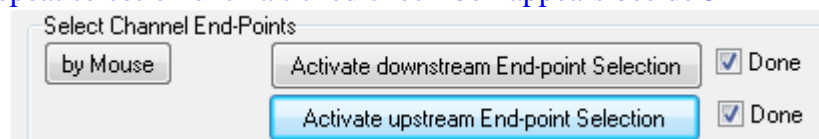


By clicking on 5A2 button, the upstream end-point can be selected, as already done for the first end-point. The selected stretch of the CN is shown on the screen as a dotted red line and the CS will be computed between the two yellow end-points.

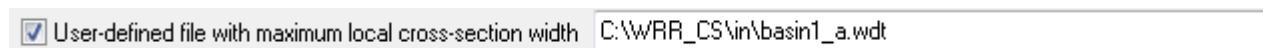
If only the yellow point is shown on the screen without the dotted red line and the message appears in the Task List panel

WARNING ! Point not found: repeat selection

then the selected end point is too far from the CN and the selection must be repeated. Click again 5A2 button and repeat selection until a ticked check-box appears beside 5A2



Now the user has to provide some criteria to guide the CS extraction, as discussed in the paper. One can control the lateral extent of the CS by providing a maximum elevation with respect to the local thalweg (value in 5C; by default it is set at 150 m above the local thalweg) and a user defined file with the maximum local width (5E). Let us click on the 5E button and let us select the *basin1_a.wdt* file



The *.wdt files are ASCII files with couples (distance from upstream end-point, local CS width). The data are in meters. For instance the *basin1_a.wdt* file

```
0      300
25000  300
```

specifies a constant CS width of 300 m. Note that the station can exceed the actual length of the selected CN, as in this case where the actual length of the selected CN is 17000 m. In order to tune the CS width in a more refined way, additional lines can be added as in the *basin1_b.wdt* file, whose first 5 lines are shown in the following

```
0      400
383    400
390    300
1470   300
1480   400
```

The program calculates the local CS width by linear interpolation as a function of the distance from upstream.

Finally, we need the local roughness coefficient, that is used to compute the local stage-discharge relationship. By clicking on the 5F button let us select the *basin1.stk* file

<input checked="" type="checkbox"/> User-defined file with maximum local cross-section width	C:\WRR_CS\in\basin1_a.wdt
<input checked="" type="checkbox"/> User-defined file with local cross-section roughness	C:\WRR_CS\in\basin1.stk

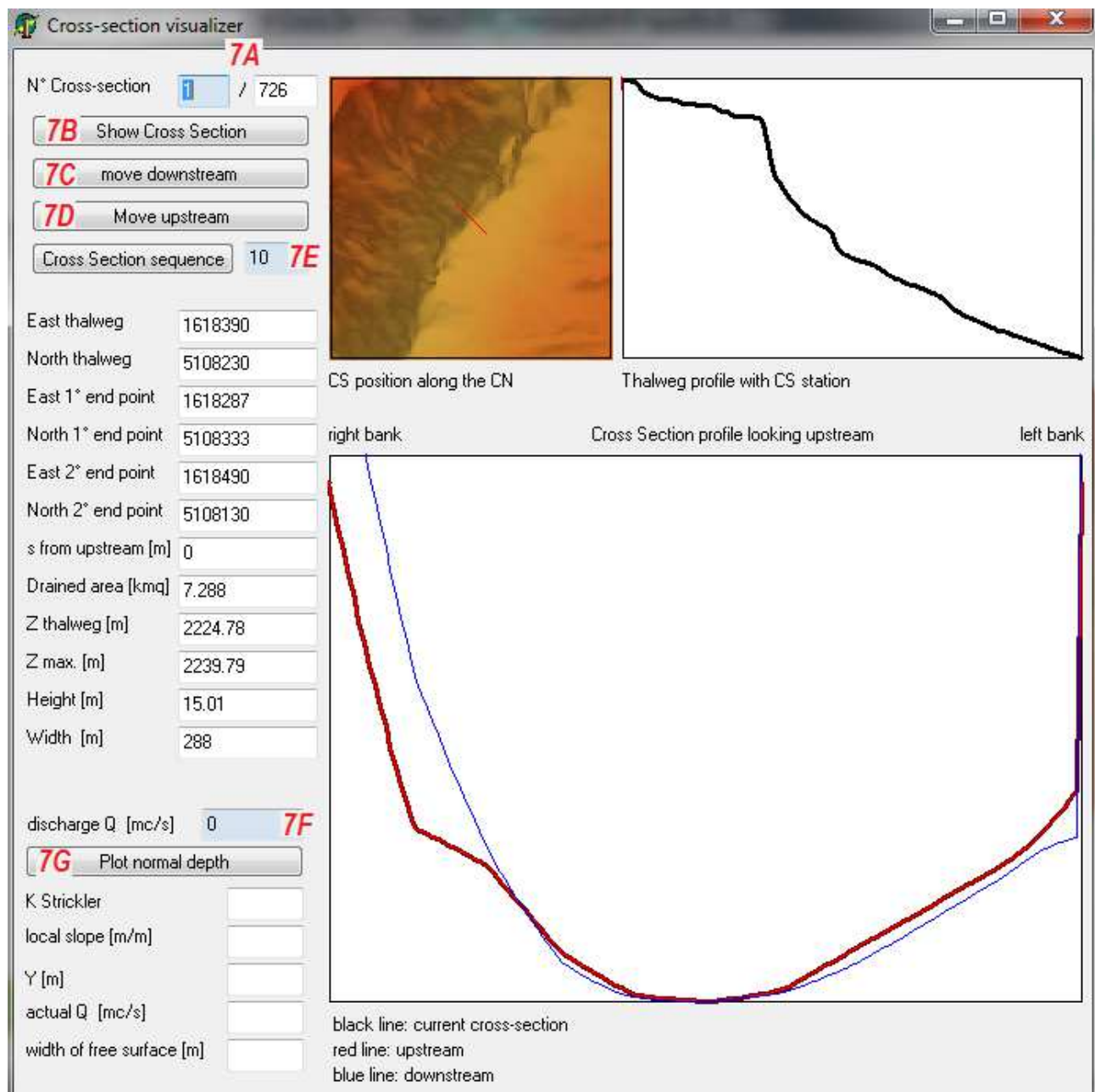
The local roughness coefficient is given by the Gauckler-Strickler coefficient ($m^{1/3}s^{-1}$) and is supposed constant within each CS. The *.stk files are ASCII files with couples (distance from upstream end-point, local CS Gauckler-Strickler coefficient). For instance the basin1.stk contains the two lines

```
0      15
25000  25
```

according to which the Gauckler-Strickler coefficient will vary linearly between 15 and 25 with distance from the upstream end-point. More detailed description are obviously possible as mentioned above for the local CS width.

Now, by clicking the 5H button, the CS extraction process starts. The list of CS is shown on the Task panel, as shown in Tutorial1.

Again, in order to explore the computed CSs, select command 7 above: the CS visualizer panel appears



In this panel the CS whose number is in 7A is shown, along with its planimetric position with respect to the valley and the thalweg vertical profile. Values that can be changed by the user (7A, 7E and 7F) are shown against a pale blue background.

The user can browse the CSs both sequentially (press 7C or 7D) or with a direct access, by specifying the CS number in 7A and then by clicking 7B. A sequence of n CS in the neighborhood of the current CS can be shown by changing the number in 7E and by clicking the corresponding button. It is possible to specify the discharge in 7F (in m^3/s) and show the corresponding normal depth plotted on the CS, as shown below

