

## User guide for *FluvialCorridor* toolbox

### Metrics assessments

Toolset name : *METRICS*

Tool's names : *Elevation and slope*

*Morphometry*

*Watershed*

*Width*

*Contact length*

*Discontinuities*



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***FluvialCorridor* package for ArcGIS**  
Version V01 - 2014

CNRS - UMR5600 Environnement Ville Société  
Alpine Space Program - Sedalp

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**For each use of the *FluvialCorridor* GIS package leading to a publication, a report, a talk presentation or any other document, please refer to the following paper :**

*Roux, C., Alber, A., Bertrand, M., Vaudor, L., Piégay, H., submitted. "FluvialCorridor" : A new ArcGIS package for multiscale riverscape exploration. Geomorphology.*

Hydrological, geological or morphological metrics extraction is a crucial step for the fluvial corridors characterization. This guideline describes all the *FluvialCorridor* tools available into the *METRICS* toolset enabling to extract such metrics.

All methods involved into the presented tools have been developed thanks to a GIS software (ArcGIS 10.0).

Six metrics can be extracted : topological metrics (e.g. the elevation and the slope), morphometric metrics (e.g. the streamlines sinuosity, the half-amplitude), the drainage area, the fluvial width (of the valley bottom and the active channel) and the contact length between two different ecosystems along the active channel. Moreover, a last tool is included enabling to assess the points of discontinuities and the ratio between two consecutive segments (DGOs or AGOs).

That technical document describes successively each one of these tools :

- I. Elevation and slope
- II. Morphometry
- III. Watershed
- IV. Width
- V. Contact length
- VI. Discontinuities

## I. ELEVATION AND SLOPE

### I.1 Concept and method

From a DEM, *Elevation and slope* tool enables to extract topographical data such as the elevation and the slope of a set of polylines (e.g. a hydrographic network or a network of centerline). It is based on the *Add Surface Information (3D Analyst Tools)* and can be applied over an undisaggregated linear network (i.e. UGO) or over a disaggregated network (i.e. DGO or AGO).

### I.2 General algorithmic framework

The algorithmic scheme developed for the *Elevation and slope* tool is presented in the Fig. 1.

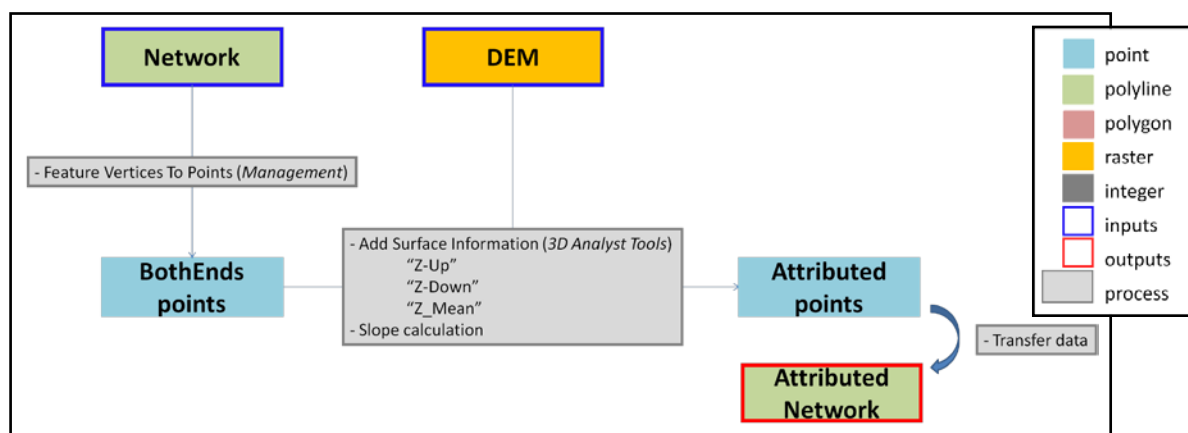


Figure 1 General algorithmic framework used in the *Elevation and slope* tool.

Output network includes 4 new fields :

- « Z-Up » : the upstream elevation of a segment
- « Z-Down » : the downstream elevation of a segment
- « Z-Mean » : the mean elevation over a segment
- « Slope » : the slope of a segment

These fields are directly extracted from the information contained into the input DEM. The “Z-Up” and “Z-Down” elevations are punctually calculated at the ends of a segment. The “Z-Mean” elevation is calculated over the entire segment. Finally, the « Slope » field is the ratio between the upstream and downstream difference of elevation and the segment length.

### I.3 Screen user interface

Into the screen user, several fields have to be filled (Fig. 2). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Elevation and slope*, if a field is available, that means that it **must be filled**.

User has to give the linear entity he wants to attributed, the related DEM and then, the pathname of the output shapefile.

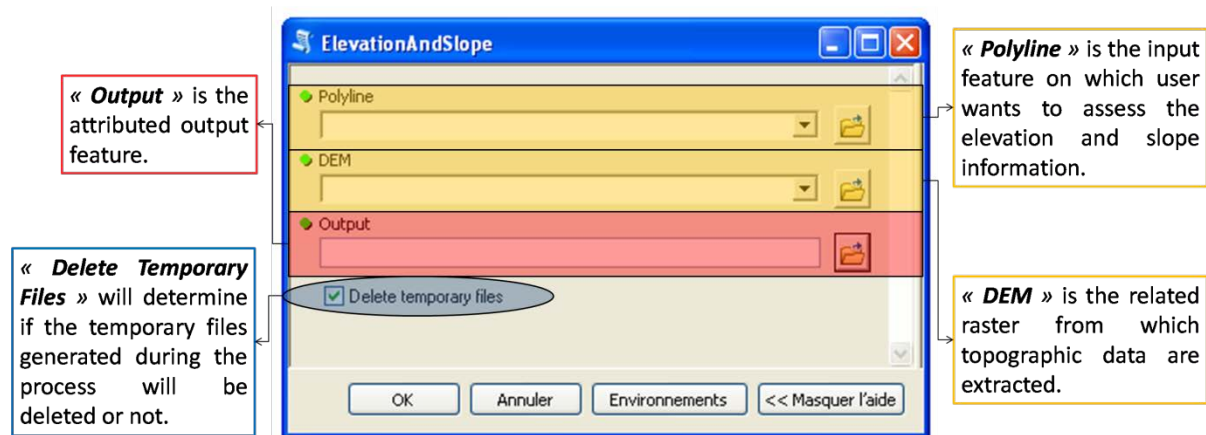


Figure 2 Screen user interface of the *Elevation And Slope* tool.

### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%ScratchWorkspace%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\<user>\My Documents\ArcGIS\Default.gdb. With the box “*Delete Temporary Files*”, the user has the choice to keep or erase temporary files.

## II. MORPHOMETRY

### II.1 Concept and method

Morphometric metrics are crucial data for the planimetric analysis of a fluvial system. For a linear entity such as the hydrographic network, several ones can be extracted thanks to the *Morphometry* tool of the *FluvialCorridor* toolbox (bend-length, half-amplitude, half-length and sinuosity). That entity must be first sequenced (i.e. *Sequencing* tool) to ensure an optimal use. The tool is based on a geometric analysis of the input network and the *Menaderbelt* tool output (i.e. inflection points and the inflection line).

### II.2 General algorithmic framework

The algorithmic scheme developed for the *Morphometry* tool is presented in the Fig. 1.

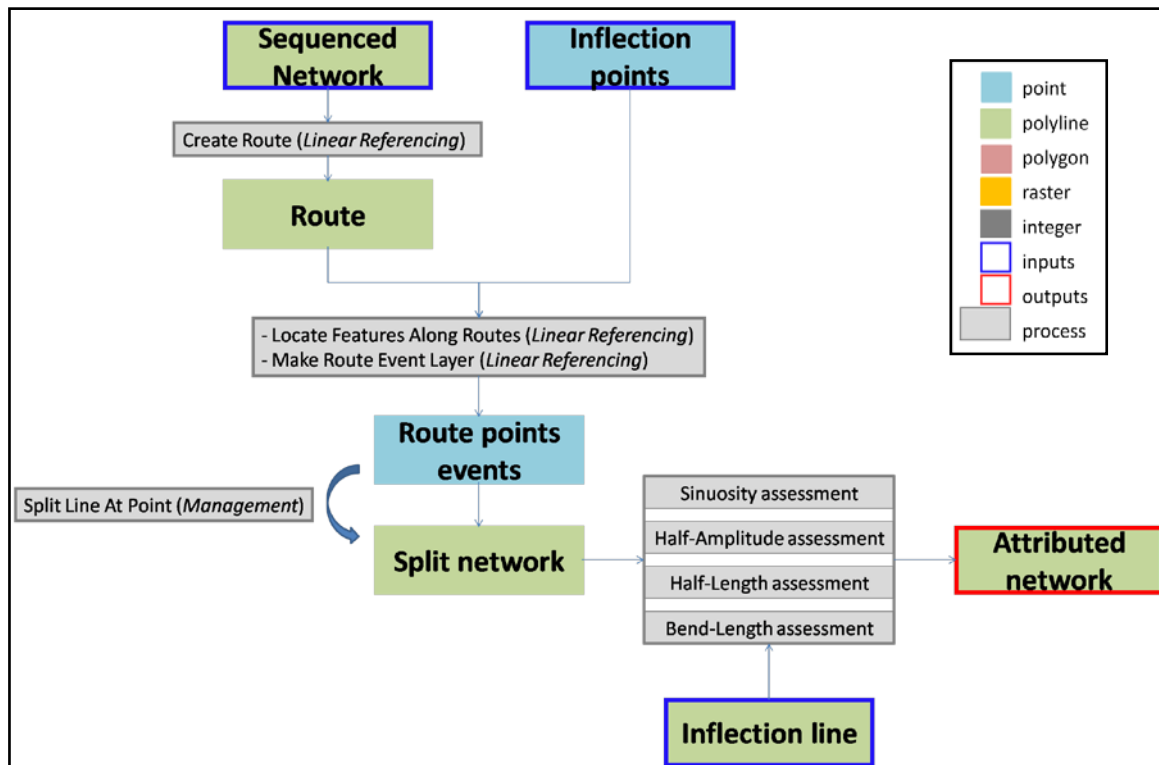


Figure 3 General algorithmic framework used in the *Morphometry* tool.

Over a network of polylines, the *Morphometry* tool enables to assess morphometric data for each segment between two inflection points. The input network, firstly sequenced, must not be disaggregated.

In a first hand, the input network is converted into routes thanks to the *Create Routes* ArcGIS tool. That step enables to locate inflection points along the polylines of the network. This network can then be split with the inflection points, maintaining the upstream to downstream streams orientation (*Split Line At Points* ArcGIS tool). Finally, each segment includes the ordination fields “*Order\_ID*”, “*Rank\_UGO*”, “*Rank\_DGO*”, “*Distance*”.

Figure 4 shown the different metrics assessed with the *Morphometry* tool :

- The bend-length  $\sigma$  which is the length of each segment of the disaggregated network (i.e. DGO).

- The half-amplitude  $\theta$  which is the maximal length between the inflection line and a DGO. To extract that metric, the tool converts the inflection line into points thanks to the *Feature Vertices to Points* ArcGIS tool. Each resulting point has the “*Rank\_UGO*” field, so that a spatial analysis can be conducted to find the maximal length for each DGO.
- The half-length  $\lambda$  of a DGO which is the euclidean distance between its two ends (i.e. inflection points).
- The sinuosity assessed for each DGO as the ratio between its bend-length  $\sigma$  and the length  $\delta$  of the related segment of the inflection line.

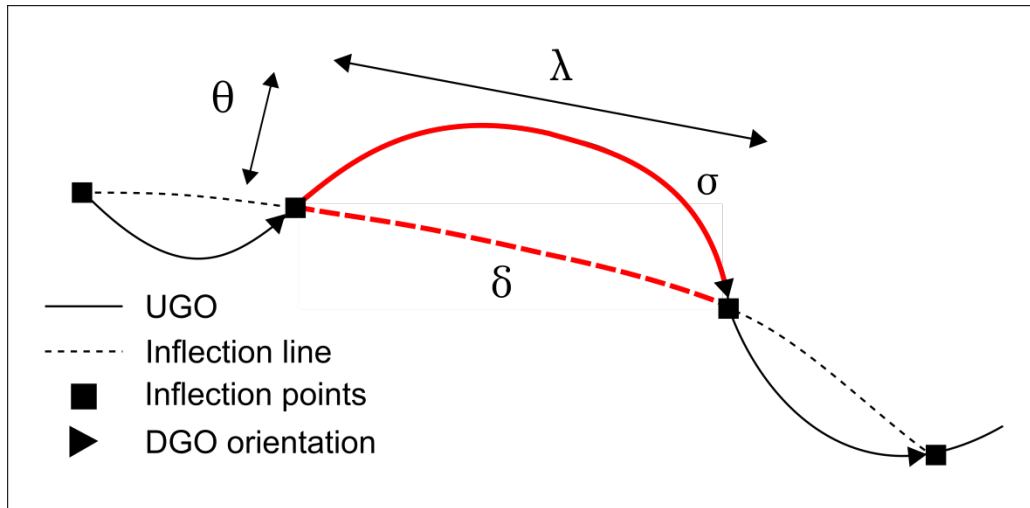


Figure 4 Morphometric units assessed by the *Morphometry* tool : bend length ( $\sigma$ ), half-amplitude( $\theta$ ), half-length ( $\lambda$ ) and the sinuosity which is the ratio  $\sigma/\delta$

### II.3 Screen user interface

Into the screen user, several fields have to be filled (Fig. 5). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Morphometry*, if a field is available, that means that it **must be filled**.

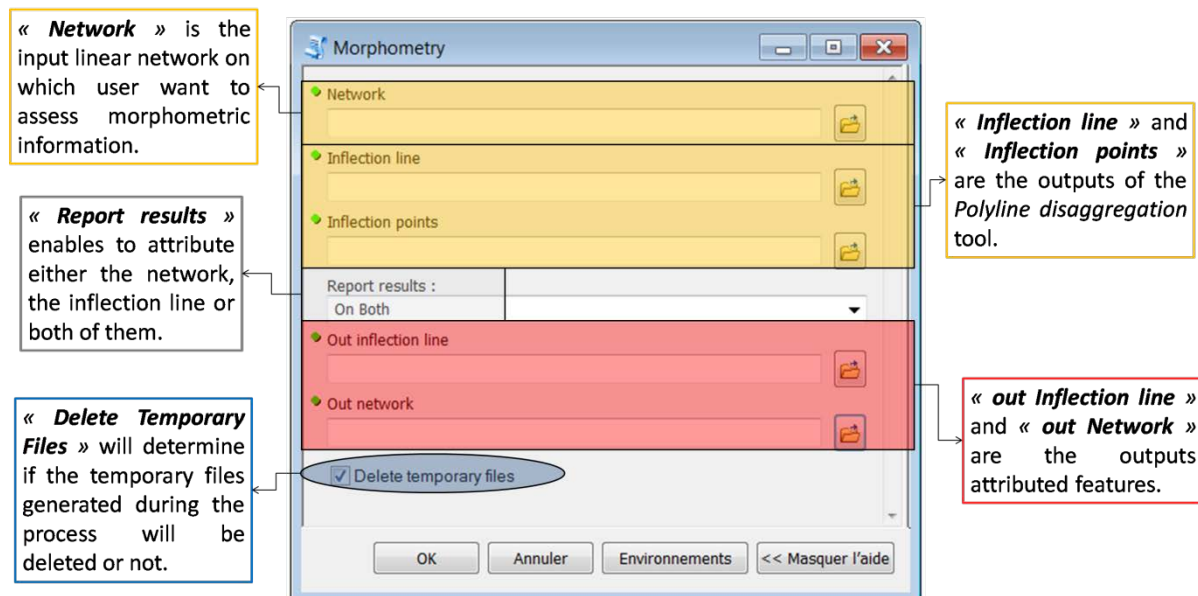


Figure 5 Screen user interface of the *Morphometry* tool.

Firstly, user must provide the network he wants to attribute. It can be a hydrographic network or a network of centerline, including one or several branches. This entity must first be sequenced to ensure a complete run of the tool. Then, “*Inflection line*” and “*Inflection points*” refer to the two output shapefiles of the *Polyline disaggregation* tool. It is the inflection points of the input network and the related inflection line. User can then choose which entity he wants to attributed thanks to the “*Report results*” field :

- « *On both* » : the input network and the input inflection line
- « *Only on the network* » : only the input network
- « *Only on the inflection line* » : only the input inflection line

Then, the output shapefile(s) pathname(s) is asked.

### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%*ScratchWorkspace*%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\<user>\My Documents\ArcGIS\Default.gdb. With the box “*Delete Temporary Files*”, the user has the choice to keep or erase temporary files.



### III. WATERSHED

#### III.1 Concept and method

Area drained at points is also important information for fluvial system dynamics. Therefore, the *Watershed* tool enables to determine the drainage area along a continuum. It is based on the extraction of data included into a flow accumulation raster, provided by the user and derived from a DEM. That tool can be used either for a linear continuum (e.g. hydrographic network) or for a polygon continuum (e.g. valley bottom), disaggregated or not.

#### III.2 General algorithmic framework

The algorithmic scheme developed for the *Watershed* tool is presented in the Fig. 6.

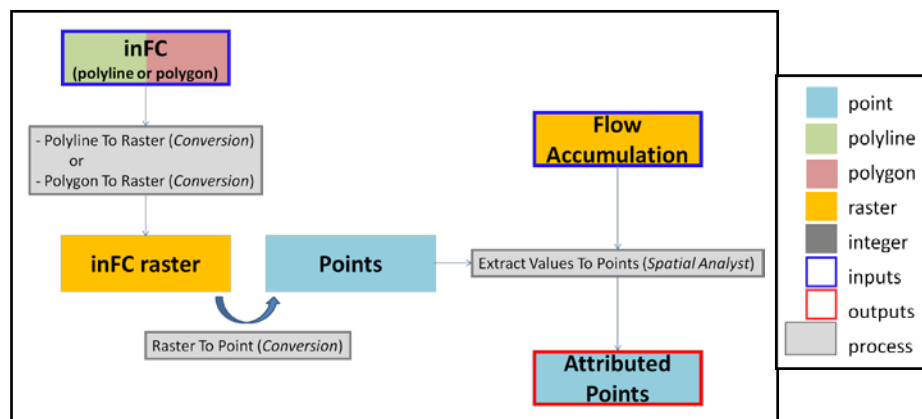


Figure 6 General algorithmic framework used in the *Watershed* tool.

The *Watershed* tool enables to generate a set of points overlaying the input entity (Fig. 7). Each of these points has :

- a “*Watershed*” field : in km<sup>2</sup>, area drained into a point;
- a “*Join\_Field*” field : numerical field enabling to join each output point to an input line or polygon.

The set of points is extracted thanks to the input entity, firstly converted into raster (with a same resolution than the flow accumulation input raster), thanks to the *Raster To Points* ArcGIS tool. Each resulting point can be joined to the input entity with the “*Join\_Field*” field. Within the input entity, the related field is “*OBJECTID*” (or “*FID*”). Then, the *Extract Values To Points* tool (*Spatial Analyst*) is used to extract flow accumulation values according to these points. Finally, these values (cells number) are converted into a km<sup>2</sup> area.

#### Note

User is free to choose the join method he wants to apply in order to attribute the input entity. However, all points do not overlay a stream so that some points do not have a relevant drainage area value. It is highly recommended to apply a join between the output set of points and the input entity thanks to the maximal value of the drainage area.

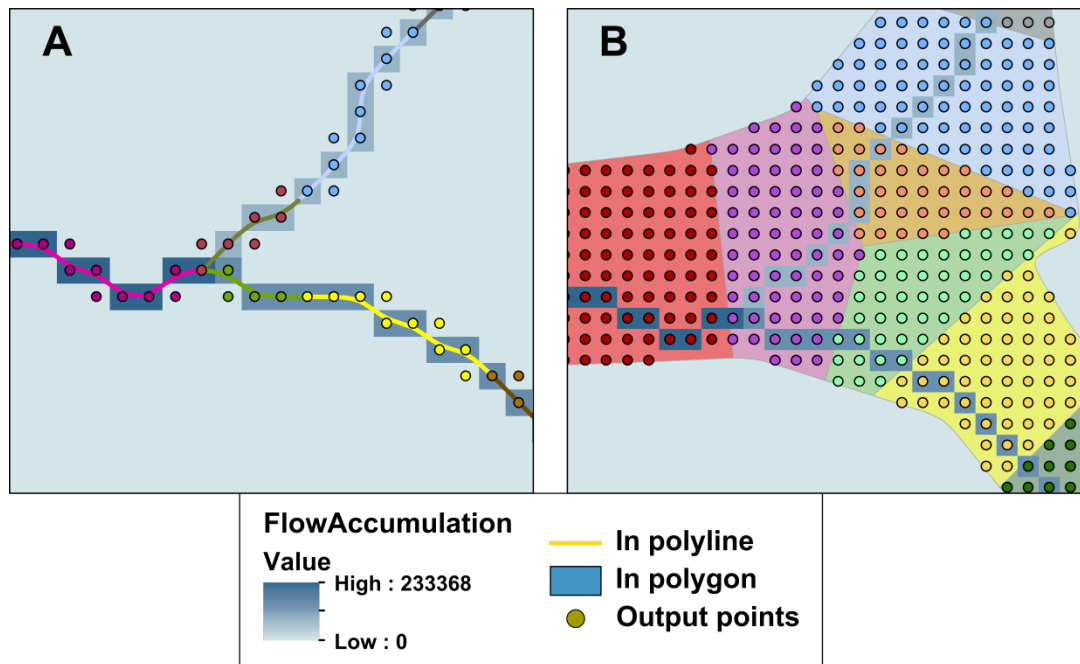


Figure 7 *Watershed* tool output : set of points attributed with the drainage surface. With a linear input (A) and with a polygon input (B).

### III.3 Screen user interface

Into the screen user, several fields have to be filled (Fig. 8). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Watershed*, if a field is available, that means that it **must be filled**.

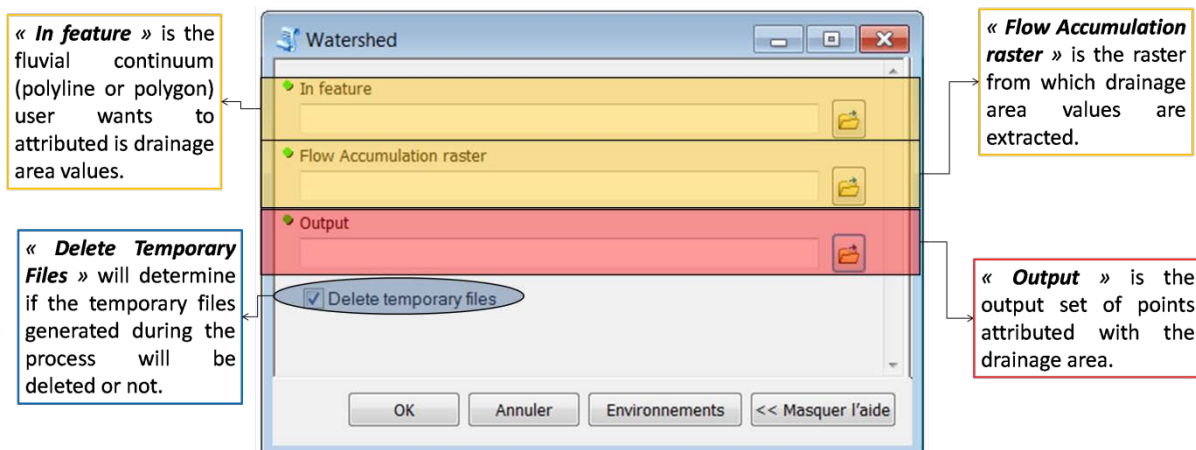


Figure 8 Screen user interface of the *Watershed* tool.

User has to provide the fluvial continuum he wants to attribute (polyline or polygon entity), the flow accumulation raster related to the study area and the pathname of the output set of attributed points.

#### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%ScratchWorkspace%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\\My Documents\ArcGIS\Default.gdb. With the box “Delete Temporary Files”, the user has the choice to keep or erase temporary files.

### III.4 Caution for use and limitation

Only one limitation had been noted for the *Watershed* tool. As shown in Figure 9, a bias occurs if a part of the input entity is smaller than the resolution of the flow accumulation raster. This segment could not be converted into a raster cell and then, into a point. Such a segment will be ignored during a further join and will not be attributed in term of drainage area.

That limitation occurs both for polylines (Fig. 9) and for polygons (if a DGO area is smaller than the area of a raster cell).

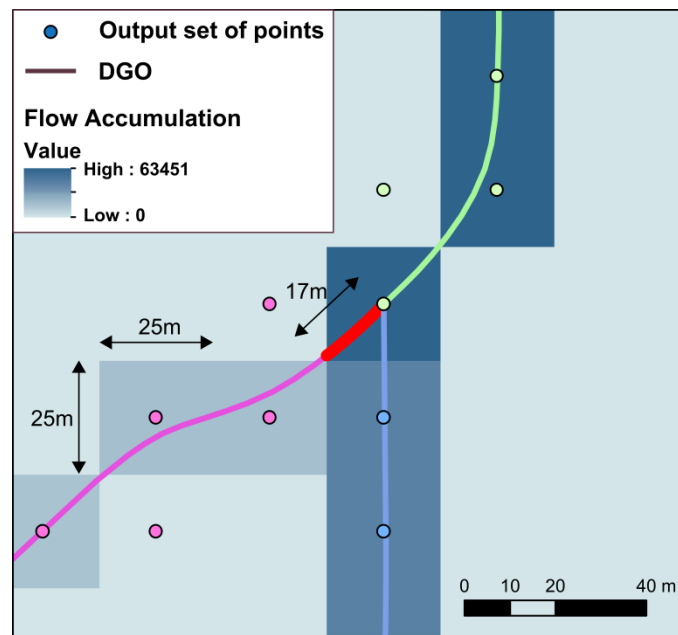


Figure 9 Limitation for the use of the *Watershed* tool : if a DGO is too small compared to the flow accumulation resolution, there will be no related output point with the drainage surface information.

## IV. WIDTH

### IV.1 Concept and method

Fluvial width can be defined in different ways (e.g. water channel width, active channel width, bankfull width, etc.). The *Width* tool enables to assess two kinds of fluvial width : (i) the valley bottom width, and (ii) the active channel width. These two different metrics relate to two different fluvial units : the valley bottom and the active channel. The first one can already be extracted with the *FluvialCorridor* toolbox whereas the second one is still in development.

*Width* tool provides two workflows, according the width user wants to assess. That choice is possible thanks to the first parameter “*Type of Width*”.

#### a. Valley bottom width

##### General algorithmic framework

The algorithmic scheme developed for the *Width* tool and used to extract the valley bottom width is presented in the Fig. 10.

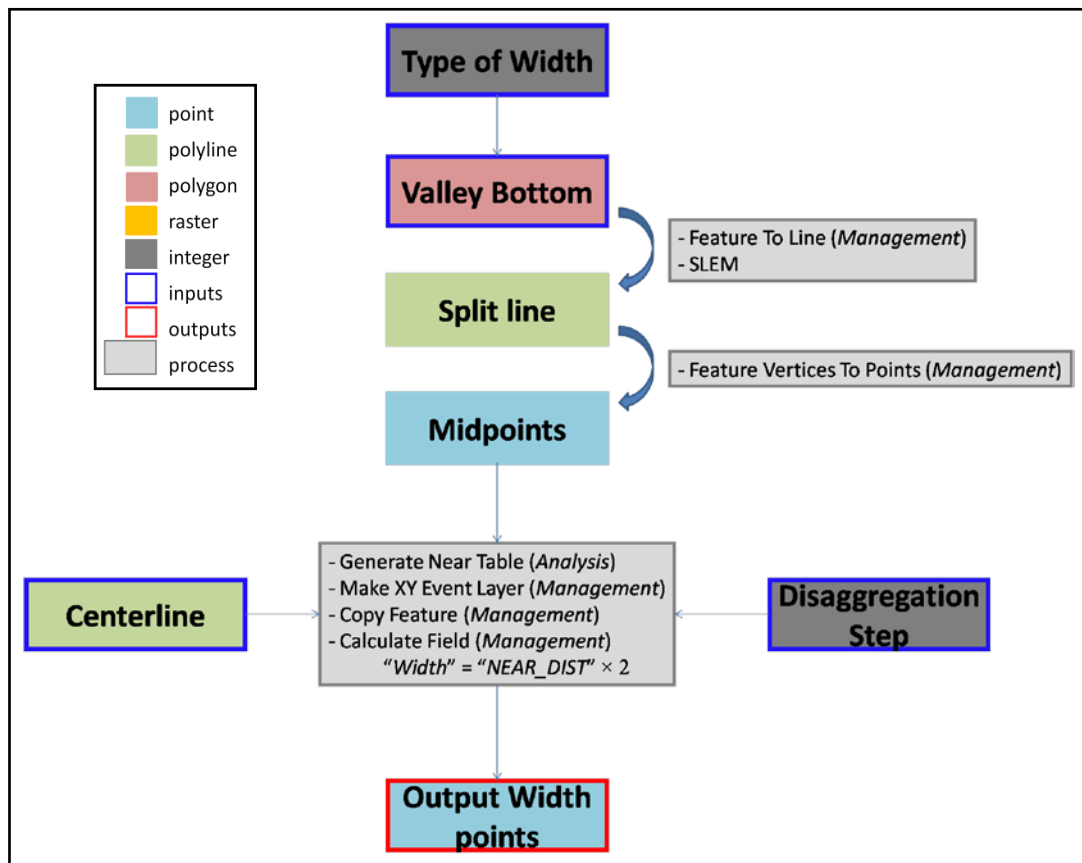


Figure 10 General algorithmic framework used in the *Width* tool to extract the valley bottom width.

The valley bottom width is defined as the length between the lateral boundary of the input valley bottom polygon and the input centerline. Firstly, the input polygon is converted into lines and then split thanks to the *SLEM* tool of the *FluvialCorridor* package (for *Split Line Each Meters*) with a constant user defined length. The set of resulting segments is converted into points. Then, a near table is generated between this set of points and the input centerline (Fig. 11A). Each point is attributed with the length between itself and the centerline (i.e. half

width of the valley bottom). This first set of points is then projected on the centerline to create a second set of points which is attributed with the half width, times 2 (Fig. 11B).

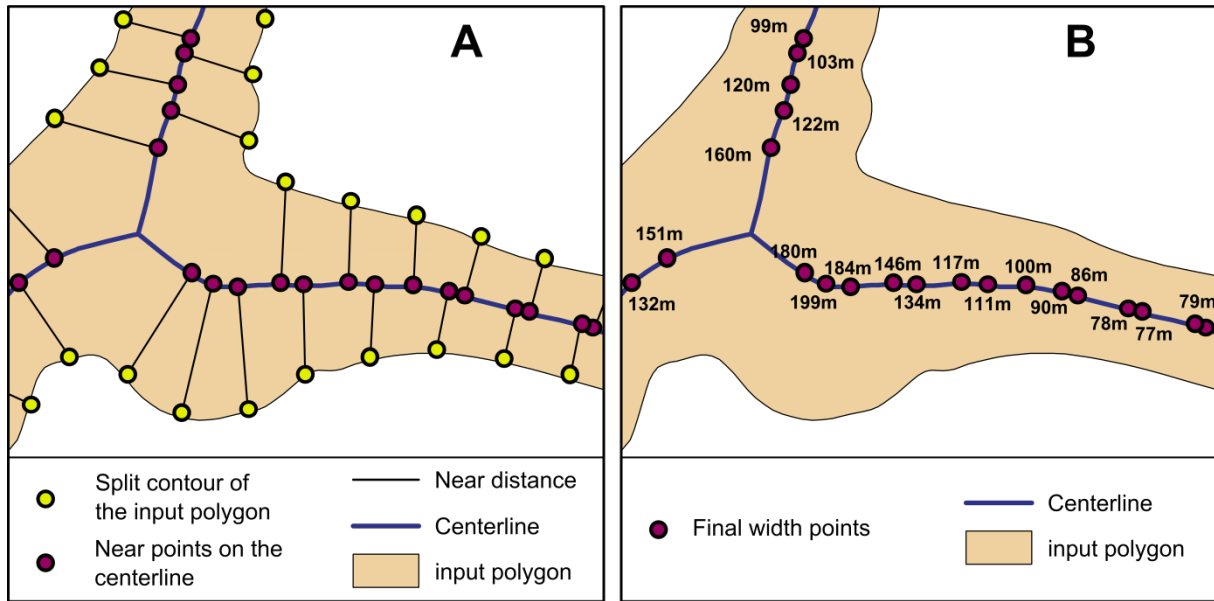


Figure 11 (A) : Near Distance between points from the disaggregated contour of the input polygon and its centerline. (B) Transfer width information into final output points.

#### Caution for use and limitations

Some inaccuracies can occur, especially at extremities of the valley bottom or at sharp bends or meanders.

However, an important bias can be observed : network confluences generally do not have width points. This is due to geometric considerations. Junction is usually the furthest point from the valley bottom boundary (Fig. 12).

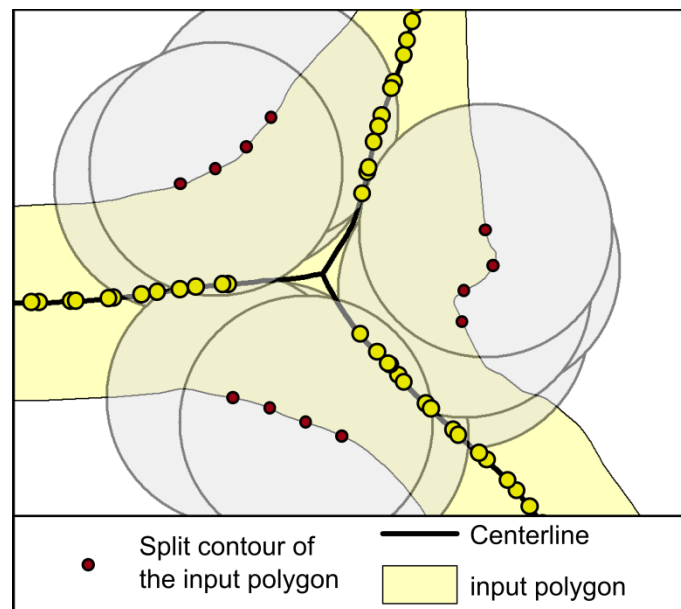


Figure 12 Limitation at confluences : there is no output points due to a too long distance with input polygon contour.

## b. Active channel width

The algorithmic scheme developed for the *Width* tool and used to extract the active channel width is presented in the Fig. 13.

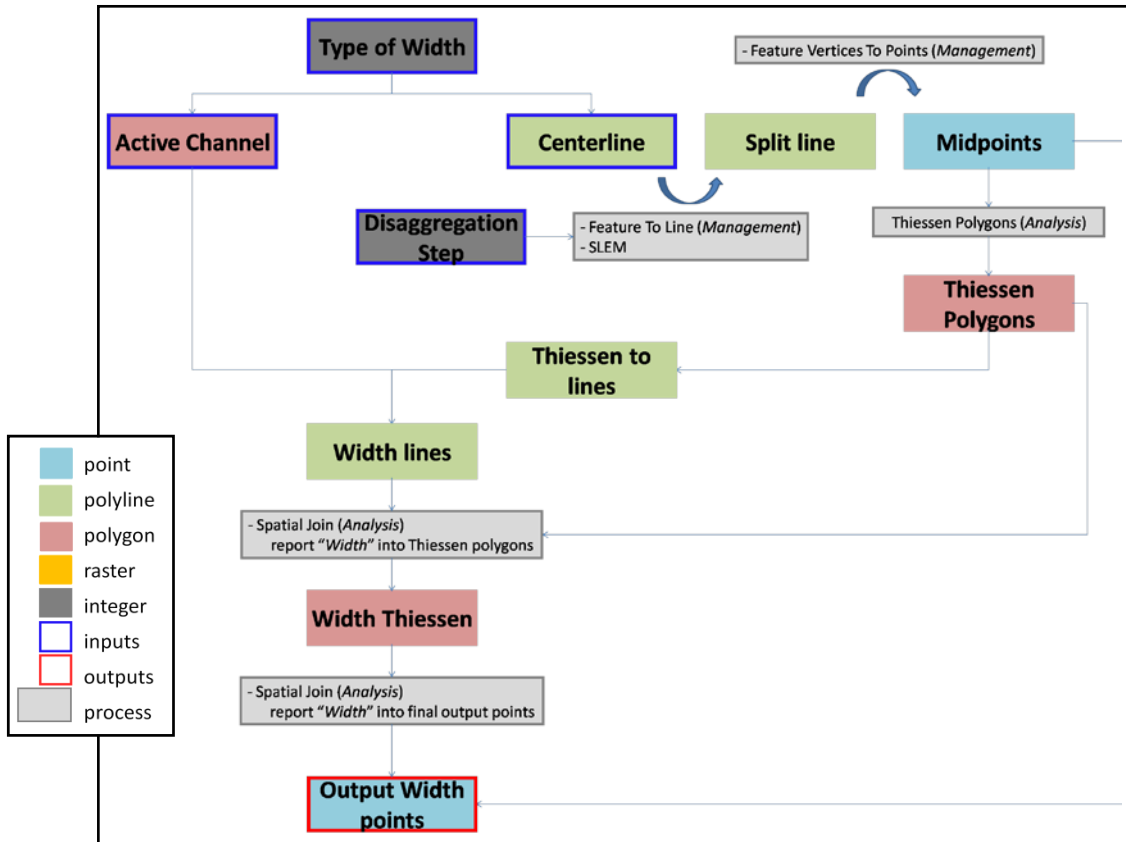


Figure 13 General algorithmic framework used in the *Width* tool to extract the active channel width.

The assessment of active channel width is more complicated due to the discontinuous and inhomogeneous shape of the input polygon (Fig. 14A).

Thanks to the centerline, segmented with a constant user defined length, a set of points is extracted. Thiessen polygons are then created from this set of points. They are converted into lines which are intersected with the active channel polygon, in order to keep only segments overlying a polygon (Fig. 14A). A spatial join is done between this layer and Thiessen polygons so that each polygon is attributed with the mean length of segment it includes. This mean length is defined as the mean active channel length and it is then transferred to the set of point created from the centerline (Fig. 14B).

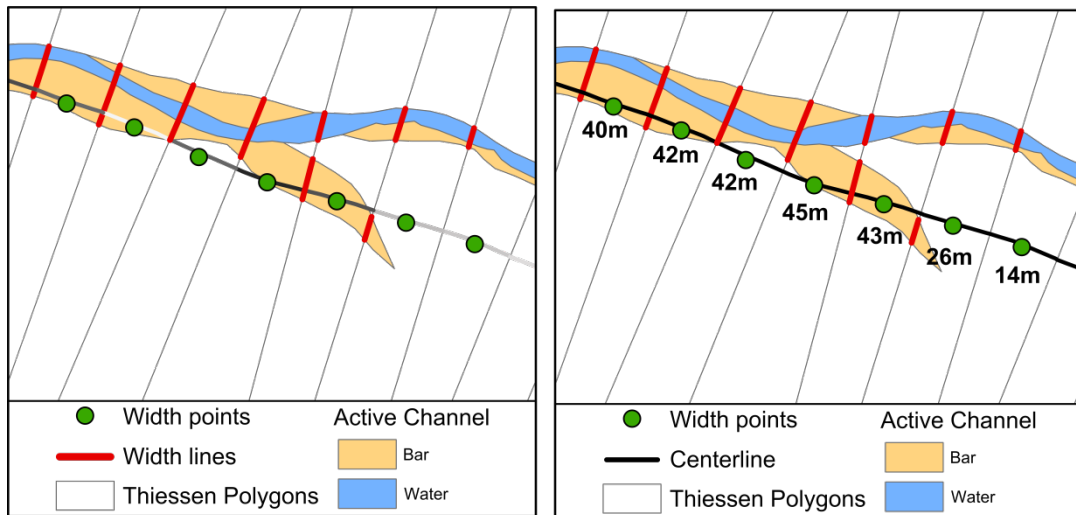


Figure 14 Process involved in Width, during the extraction of the active channel width. (A) : creation of Thiessen lines intersecting the active channel polygons. (B) : Transfer of the mean width information into final output points.

### Caution for use and limitations

Some inaccuracies can occur, especially at extremities of the active channel (Fig. 15A) and at confluences (Fig. 15B).

### Note

The most important observed biais comes from the discontinuous and inhomogeneous shape of the input active channel polygon. Usually, a high number of output points are unattributed so that the “Width” field is “Null” (Fig. 15C).

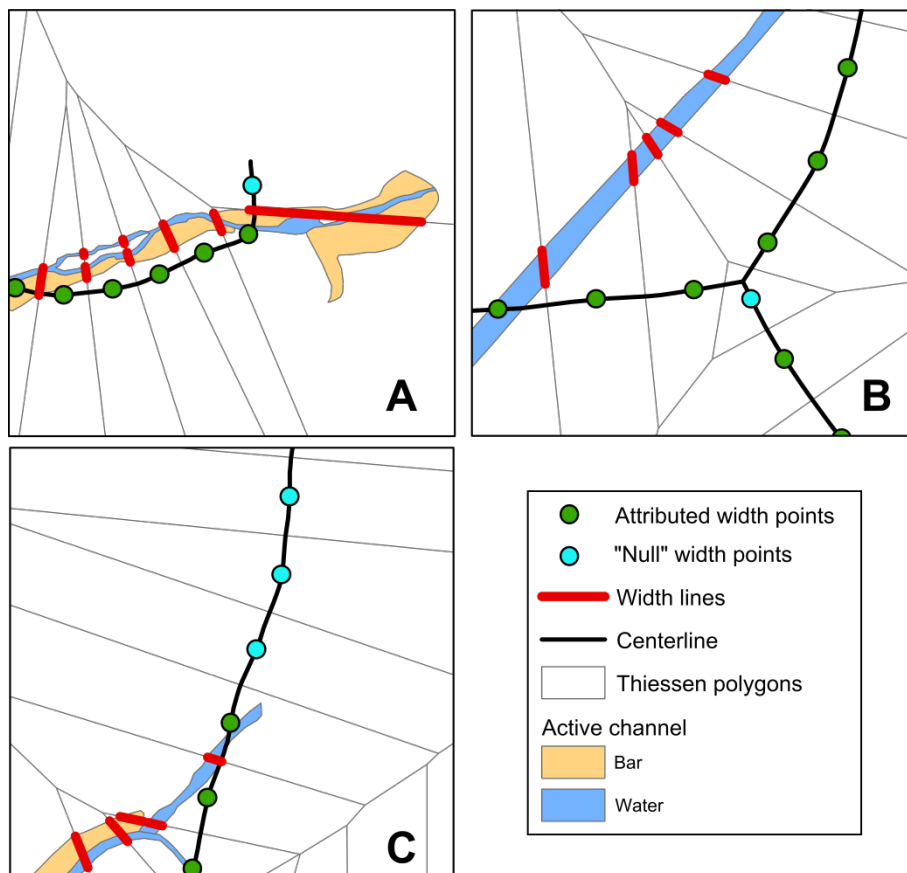


Figure 15 Limitations of the Width tool for the assessment of the active channel width. (A) at extremities, (B) at confluences, and (C) where active channel is incomplete.

### c. Screen user interface

Into the screen user, several fields have to be filled (Fig. 16). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Width*, if a field is available, that means that it **must be filled**.

Firstly, user has to choose what kind of width he wants to assess thanks to the “*Type of Width*” field. Then, he has to filled the fields related to :

- the polygon he wants to attribute with width values ;
- the centerline of the related input polygon ;
- a constant length  $x$ , in meters, used to assess the width every  $x$  meters ;
- the pathname of the output set of attributed points.

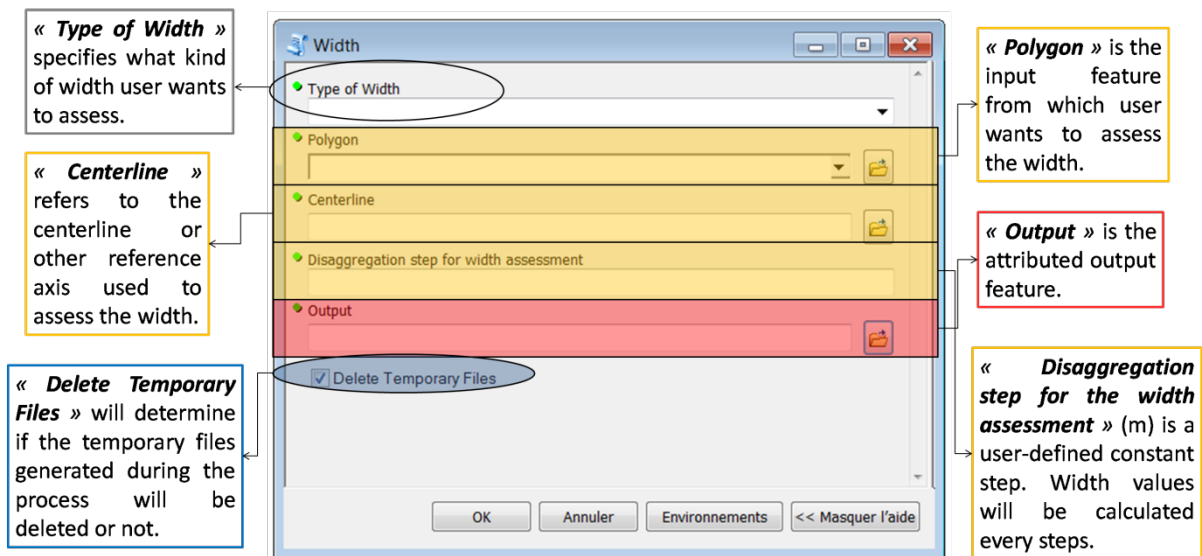


Figure 16 Screen user interface of the *Width* tool.

### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%ScratchWorkspace%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\<user>\My Documents\ArcGIS\Default.gdb. With the box “*Delete Temporary Files*”, the user has the choice to keep or erase temporary files.



## V. CONTACT LENGTH

### V.1 Concept and method

The contact length refers to the transitional border shared by two different ecosystems. Called “ecotone” in fluvial geomorphology, it can be a boundary between water and vegetation, deposition bars and water or vegetation and deposition bars. Several authors have shown the interest of such areas especially in terms of ecological quality of fluvial corridors.

The *Contact length* tool enables to calculate this metric along a fluvial corridor. In that way, a shapefile of the active channel and another one of the disaggregated valley bottom are needed. The output shapefile is the disaggregated valley bottom attributed with an “*contactL*” field.

### V.2 General algorithmic framework

The algorithmic scheme developed for the *Contact length* tool is presented in the Fig. 17.

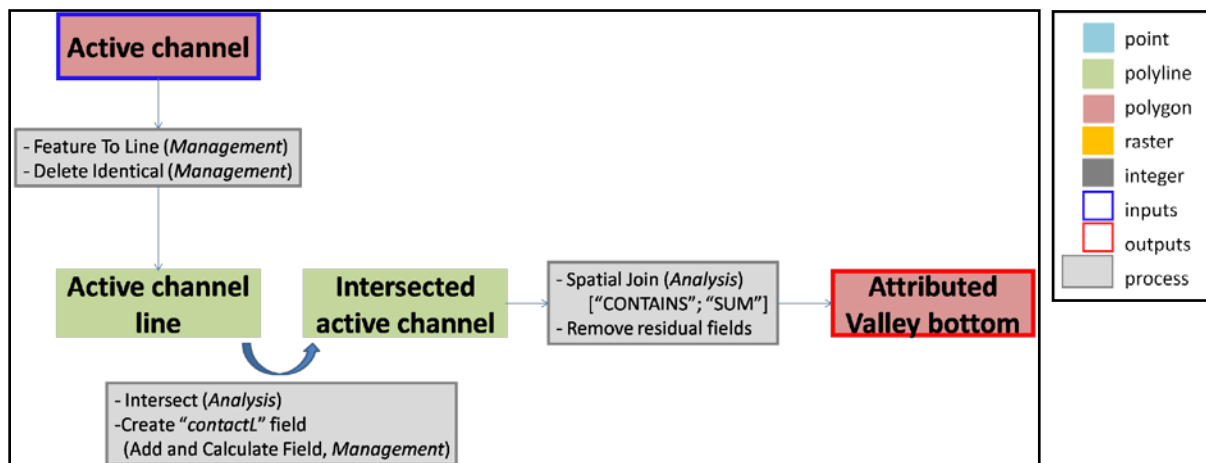


Figure 17 General algorithmic framework used in the *Contact length* tool.

The metric calculated with the *Contact length* tool is the sum of all active channel boundaries included into each DGO of the disaggregated valley bottom. Firstly, the active channel polygon is converted into lines. The *Delete Identical* ArcGIS tool ensure to remove all duplicate lines. This entity is then intersected with the disaggregated valley bottom. Finally, the length of all segments included into a DGO is summed into the “*ContactL*” field.

### Note

The *Contact length* tool does not discriminate different kinds of contact.

### V.3 Screen user interface

Into the screen user, several fields have to be filled (Fig. 18). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Contact length*, if a field is available, that means that it **must be filled**.

User has to provide the active channel shapefile he wants to assess the contact length metric, the disaggregated valley bottom he wants to attributed and the pathname of the output valley bottom.

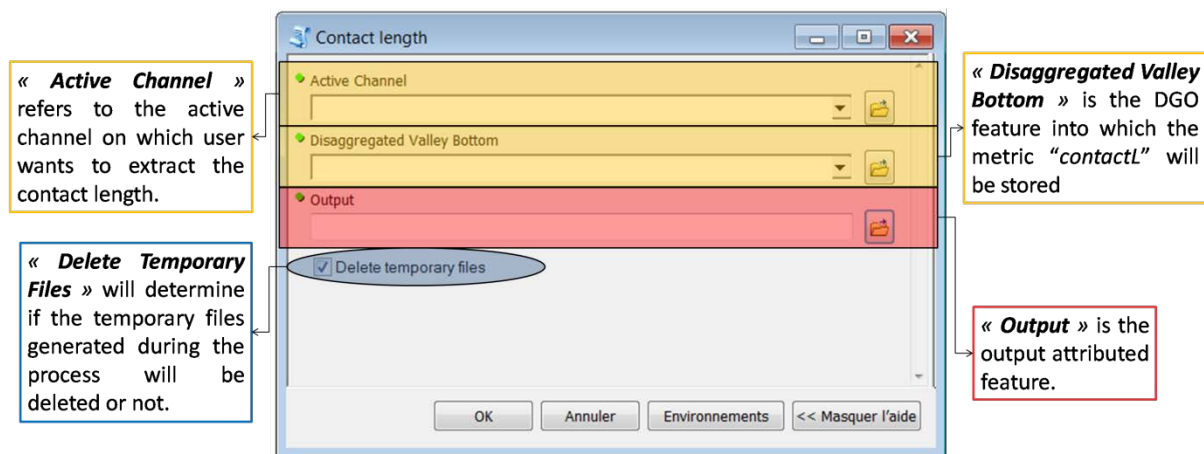


Figure 18 Screen user interface of the *Watershed* tool.

### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%ScratchWorkspace%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\<user>\My Documents\ArcGIS\Default.gdb. With the box "Delete Temporary Files", the user has the choice to keep or erase temporary files.

## VI. DISCONTINUITIES

### VI.1 Concept and method

The *Discontinuities* tool enables to assess the upstream to downstream ratio of two consecutive metric values. It can be applied over a set of DGO or a set AGO. This tool materializes longitudinal discontinuities between two DGO or AGO. It enables to provide breaks as real physical and geographical objects.

Both for polylines or polygons input, the output will be a set of break points located at the boundary between two DGO or AGO.

### VI.2 General algorithmic framework

The algorithmic scheme developed for the *Discontinuities* tool is presented in the Fig. 19 for the case of a DGO-scale database. For AGO-scale databases, the process is quite similar, just some fields names change (e.g. “Rank\_DGO” → “Rank\_AGO”).

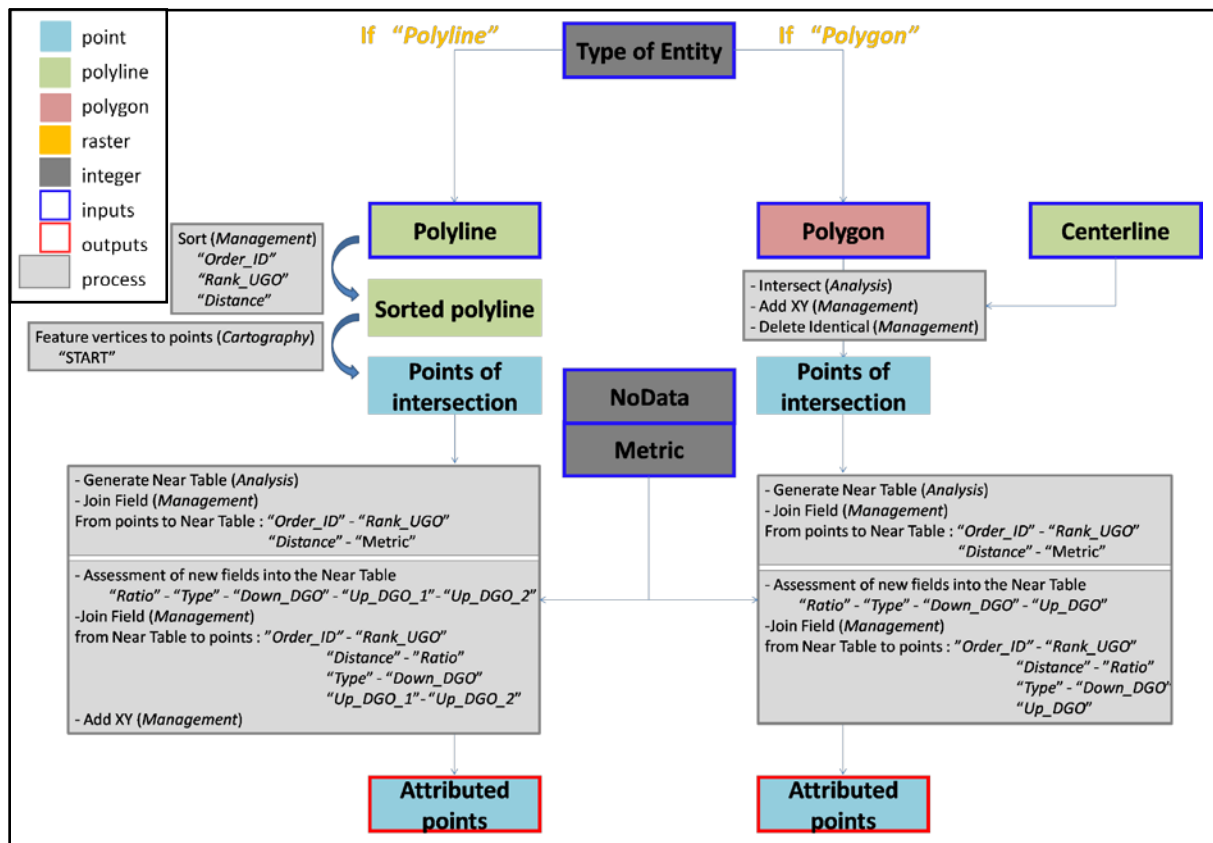


Figure 19 General algorithmic framework used in the *Discontinuities* tool.

The *Discontinuities* tool includes two frameworks, one for linear inputs and another one for polygon inputs.

1. For linear inputs, the first step is to sort segments according to the ordination fields “Order\_ID”, “Rank\_UGO” and “Distance”. The upstream point of each segment is then extracted thanks to the *Feature Vertices To Points* ArcGIS tool. The ratio metric will be calculated from this set of upstream points. This assessment is done within the attribute table of the near table generated between the previous set of points and the linear input. In addition to the ordination fields, 4 fields are added to that table :

- “*Ratio*”, which includes the ratio of two consecutive metric values ;
- “*Type*”, with “*confluence*”, “*contact*” or “*extreme point*” value according to the point nature ;
- “*Down\_DGO*”, which includes the id of the upstream DGO ;
- “*Up\_DGO\_1*”, which includes the id of the upstream DGO ;
- “*Up\_DGO\_2*”, which includes the id of the second downstream DGO if the point is located at a confluence between two UGO.

Once these fields attributed, they are transferred into the attribute table of the set of point (Fig. 20). The (x,y) coordinates of each points are also added to that final output shapefile.

- For polygon inputs, the framework is quite similar. The only one remarkable difference is the process used to extract breaks points between two consecutive polygons. In that way, another input shapefile, the centerline of the input polygon has to be provided. Then, the input polygon is intersected with the centerline. (x,y) coordinates are added to the attribute table of the resulting point shapefile and duplicates are removed. Finally, as for linear inputs, a near table is generated between this set of points and the input polygon. The process is then the same. “*Ratio*”, “*Type*”, “*Down\_DGO*” and “*Up\_UGO*” are calculated and transferred to the output points shapefile.

OBJECTID *	Order ID	Rank UGO	Distance	Rank DGO	Ratio	Type	Down DGO	Up DGO 1	Up DGO 2	POINT X	POINT Y
1	1	1	0	1	<Nul>	confluence	1	26	41	1010200	6418050
2	1	1	199,99999	2	0,996813	contact	1	2	<Nul>	1010017,546	6418075,243
3	1	1	399,99998	3	0,996158	contact	2	3	<Nul>	1009824,493	6418104,886
4	1	1	599,99995	4	0,996052	contact	3	4	<Nul>	1009639,896	6418150,035
5	1	1	799,99997	5	0,995649	contact	4	5	<Nul>	1009439,896	6418150,012
6	1	1	999,99992	6	0,996914	contact	5	6	<Nul>	1009239,896	6418150,211
7	1	1	1200,00000	7	0,996877	contact	6	7	<Nul>	1009045,525	6418124,677
8	1	1	1400,00000	8	0,998057	contact	7	8	<Nul>	1008869,006	6418041,492
9	1	1	1599,99999	9	0,999215	contact	8	9	<Nul>	1008695,643	6417949,966
10	2	2	0	1	<Nul>	confluence	10	80	96	1011425	6420875
11	2	2	200,00003	2	0,963185	contact	10	11	<Nul>	1011267,544	6420767,567
12	2	2	400,00000	3	0,976535	contact	11	12	<Nul>	1011139,714	6420616,697
13	2	2	599,99995	4	0,991864	contact	12	13	<Nul>	1011014,204	6420463,672
14	2	2	799,99997	5	0,99597	contact	13	14	<Nul>	1010915,680	6420292,405
15	2	2	1000,00000	6	0,982675	contact	14	15	<Nul>	1010824,398	6420118,787
16	2	2	1199,99999	7	0,977658	contact	15	16	<Nul>	1010762,028	6419937,802

Figure 20 Resulting attribute table of the output break points feature.

### Note : confluences

For polygon input, the attribute table of the output points shapefile does not contain the “*Up\_DGO\_1*” and “*Up\_DGO\_2*” fields but only an “*Up\_DGO*” field. As shown in Figure 21, junctions in linear inputs always involved 3 different streams (i.e. one downstream stream and tow upstream streams). But in polygon inputs, breaks points are intersection points between the centerline and the polygon. According to those geometric considerations, confluences for polygon inputs are always represented by two breaks points.

“*Ratio*” field is not calculated at confluences.

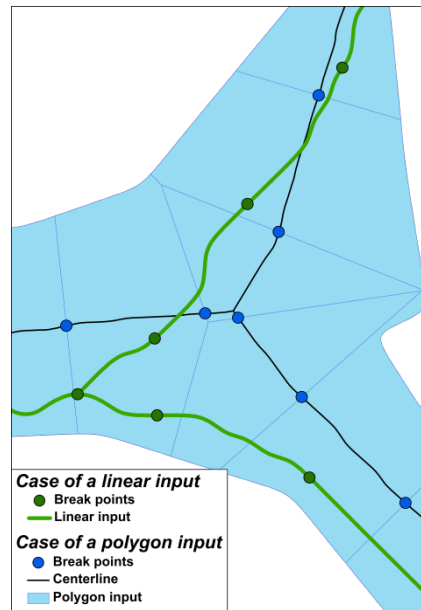


Figure 21 Creation of break points at confluences, both for linear and polygon input.

### VI.3 Screen user interface

Into the screen user, several fields have to be filled (Fig. 22). Be careful that a green mark in front of a field is not a guaranty that this field is not optional. Into *Discontinuities*, if a field is available, that means that it **must be filled**.

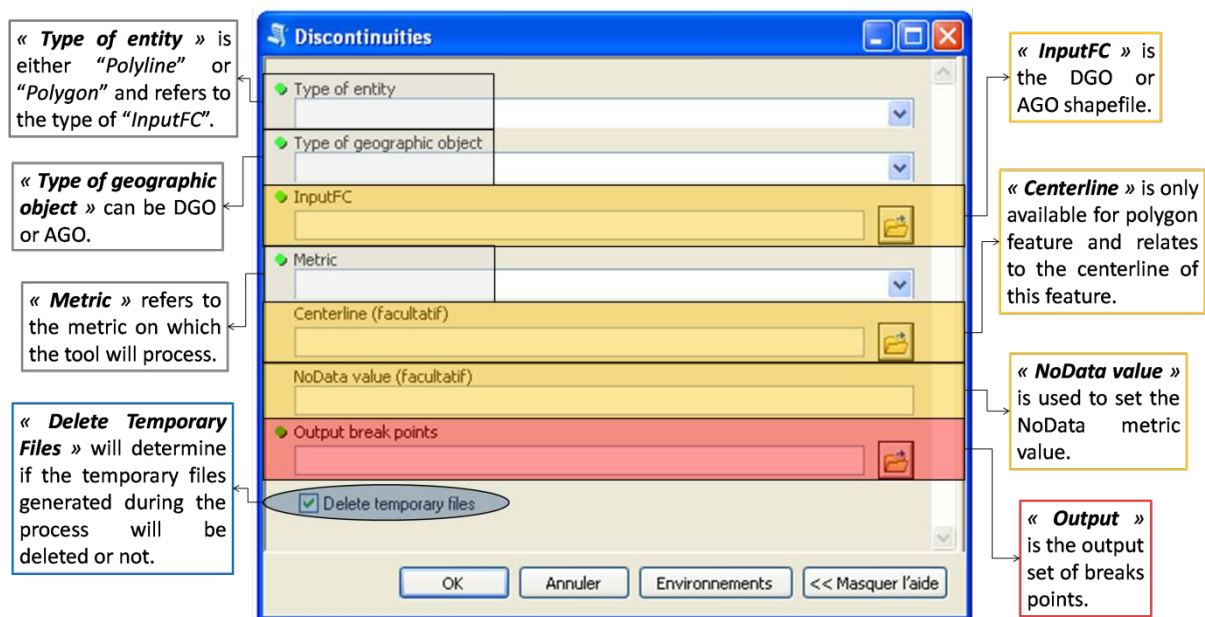


Figure 22 Screen user interface of the *Discontinuities* tool.

Firstly, user has to choose what kind of entity he wants to attributed, either a linear or polygon input, and also the type of geographical object the tool will process (i.e. DGOs or AGOs). Then, he must provide the metric against which the ratio values will be calculated. The “Centerline” is only available for polygon inputs. It refers to the centerline of the given polygon. The NoData value can be set before running the tool. In addition to the NoData value set in the “NoData value” field, each “Null” metric value will be ignored during the downstream ratio calculation. Finally, user has to fill the pathname of the output points shapefile.

### Management of temporary files

Temporary files created during the compilation are managed thanks to the ArcGIS default geodatabase (%*ScratchWorkspace*%). If the user does not modify this geodatabase in the general environment proprieties, its path must looks like C:\Documents and Settings\\My Documents\ArcGIS\Default.gdb. With the box “*Delete Temporary Files*”, the user has the choice to keep or erase temporary files.

## ANNEX 1

### List of temporary files created during the *Elevation and slope* tool

Name	Description
<i>Out</i>	Output shapefile, corresponding to the input attributed with elevation and slop values.
<i>Pts</i>	Conversion of Out into points (“Both Ends” option ).

## ANNEX 2

### List of temporary files created during the *Morphometry* tool

Name	Description
<i>CopyinFC</i>	Copy of the input entity into the default geodatabase.
<i>Routes</i>	Conversion of <i>CopyinFC</i> into routes.
<i>LocateTABLE</i>	Locate table of input inflection points along <i>Routes</i> routes.
<i>SplitinFC</i>	<i>Routes</i> , segmented with the input inflection points thanks to the “ <i>MakeRouteEventLayer</i> ” tool. This entity is sorted according the ordination fields “ <i>Rank_UGO</i> ” and “ <i>Distance</i> ”.
<i>CopyInflLine</i>	Copy of the input inflection line into the default geodatabase.
<i>SplitinFCtoPts</i>	Conversion of <i>SplitinFC</i> into points.
<i>NearTable</i>	Near table between <i>SplitinFCtoPts</i> and the inflection line.
<i>HalfAmplitudeTable</i>	Statistics table of the <i>NearTable</i> .



## ANNEX 3

### List of temporary files created during the *Watershed* tool

Name	Description
<i>CopyinFC</i>	Copy of the input entity into the default geodatabase.
<i>inFCtoRaster</i>	Conversion of <i>CopyinFC</i> into raster according to the flow accumulation input resolution.
<i>RasterToPts</i>	Conversion of <i>inFCtoRaster</i> into points.
<i>FACpts</i>	Output points shapefile, attributed with the drainage area values. These values are extracted from the input flow accumulation raster.

## ANNEX 4

### List of temporary files created during the *Width* tool

Name	Description
<i>SplitCenterline</i>	Segmentation of the input centerline according the constant user defined length..
<i>SplitCenterlineToPoints</i>	Conversion of <i>SplitCenterline</i> into points (“Midpoints” option).
<i>ThiessenPoly</i>	Thiessen polygonization generated from <i>SplitCenterlineToPoints</i> .
<i>PolygonToLine</i>	Conversion of <i>ThiessenPoly</i> into polygones.
<i>LineWidth</i>	<i>PolygonToLine</i> split with the active channel polygon.
<i>JoinThiessen</i>	Spatial join between <i>ThiessenPoly</i> and <i>LineWidth</i> .
<i>Width</i>	Output points shapefile attributed with the mean active channel width.
<i>PolygonToLine</i>	Conversion of the input valley bottom into lines.
<i>SplitLine</i>	Segmentation of <i>PolygonToLine</i> according to the constant user defined length.
<i>SplitLineToPoints</i>	Conversion of <i>SplitLine</i> into points (“Midpoints” option).
<i>ProxyTable</i>	Near table generated between <i>SplitLineToPoints</i> and the input centerline.
<i>WidthPts</i>	Output point shapefile. It is the projection of <i>SplitLineToPoints</i> on the centerline and attributed with the valley bottom width values.

	Temporary files created during the active channel width assessment.
	Temporary files created during the valley bottom width assessment.

## ANNEX 5

### List of temporary files created during the *Contact length* tool

Name	Description
<i>ACtoLine</i>	Conversion of the input active channel into lines.
<i>Intersect</i>	Lines shapefile coming from the intersection of <i>ACtoLine</i> with the input disaggregated valley bottom.
<i>Transfer</i>	Output shapefile of the disaggregated valley bottom attributed with the contact length values.

## ANNEX 6

### List of temporary files created during the *Discontinuities* tool

	Name	Description
	<i>TEMPinFC</i>	Temporary copy of the input feature.
	<i>Sort</i>	<i>TEMPinFC</i> sorted from upstream to downstream.
	<i>OutputPoints</i>	<i>TEMPinFC</i> converted into a set of break points. This is the output shapefile.
	<i>NearTable</i>	Near table between break points and the input linear feature.
DGO	<i>TEMPinFC</i>	Temporary copy of the input feature.
	<i>Intersect</i>	Intersection between <i>TEMPinFC</i> and the centerline.
	<i>NearTable_TEMP</i>	Near table between break points of <i>Intersect</i> and the input feature.
AGO	<i>TEMPinFC</i>	Input AGO-scale feature dissolved according the “ <i>Rank_AGO</i> ” field.
	<i>Intersect</i>	Intersection between <i>TEMPinFC</i> and the centerline.
	<i>NearTable_TEMP</i>	Near table between break points of <i>Intersect</i> and the input feature.
	<i>NearTable</i>	<i>NearTable_TEMP</i> sorted from upstream to downstream.
	<i>OutputPoints</i>	Output points shapefile.

	Temporary files created during the process with a linear feature.
	Temporary files created during the process with a polygon feature.