SURFACE ANALYSIS

Hydrology models
• It consists of the representation of the surface runoff model of the water with the creation of flow surfaces of the flow, accumulation of the flow and the drainage network.

• Other elements can be elaborated from these models, such as watersheds.
DIGITAL MODEL OF ELEVATION

- The hydrological model has as initial start a digital elevation model that is a representation surface of the topography of the terrain considering the existing features of the territory.

- Methods of obtaining:
  - Quoted Points
  - Level contours
  - Images (ASTER DEM, SRTM, Stereo pair of satellite images)
HYDROLOGICALLY CORRECT DEM

- Correct the digital model of elevation, adjusting the bad values (sinks and peaks) to allow the correct calculation on flow direction or flow accumulation.
FLOW DIRECTION

- Define the flow direction of the water in the surface.
FLOW ACCUMULATION

- Creates a raster of accumulated flow into each cell.
DRAINAGE NETWORK

• Based on the flow accumulation, it is possible to identify the drainage network.

• It is possible to generate the file “drainage network” based on the values of the flow accumulation.

• You can use conditional tools to answer: from what value of accumulation we are going to consider the pixel as a element of the network drainage?
STREAM ORDER

• Stream ordering is a method of assigning a numeric order to links in a stream network. This order is a method for identifying and classifying types of streams based on their numbers of tributaries.

• Shrever

• Strahler
WATERSHED

- Determines the contributing area above a set of cells in a raster.
MORPHOMETRIC ANALYSIS
STUDY OF THE SHAPE BASED ON THE SIZE.

WATERSHED AREA

• Calculation of the area of the watershed.

DENSITY OF THE RIVERS

• Total drainage network length by basin area.

• According to Christofoletti (1980): (...) the drainage density of the channel network has long been recognized as the most important variable in the morphometric analysis of drainage basins,

BASIN SHAPE FEATURE

Calculate the area in m² and perimeter. Create a column named KC of type double. Calculate the field with the expression

\[ k_c = 0.28 \frac{\text{Per}}{\sqrt{A}}. \]

Relation between the perimeter of the basin and a circle of the same area.

\[ 0.28 \times \left( \frac{\text{Perimeter}}{\sqrt{\text{Area}_m^2}} \right) \]