OBTAINING A HYDROGRAPHIC ACCOUNT THROUGH THE USE OF A SOFTWARE TO BE TRADEDTO THE "ARCGIS AND THE USE OF A FREE RE SOFTWARE"S A GA". C A SO DE ESTUDIO MUNICIPALITY OF PORCESITO, ANTIOQUIA

Brian Steve Castro Benavides Cadastral
and Geodesist Engineer
Student of specialization in geomatics Universidad Militar Nueva Granada

Bogota, Colombia
U3101343@unimilitar.edu.co

SUMMARY

The geographical locationof Colombia, the geomorphological conditions and The country, together with the abundant water supply, make the country an ideal territory for

carrying outmulticriteria studies and analysis of the environment, and for the anthropological impact of the mediumand longterm.

Due to the technologicalvance both in soft w are licensed s of difer e nte s co s to s as it e s Arcgis and also of software libre de cod i fication gratuita and Open to be installed from the intern et, the analyses mentioned abovecan bemodeled, dynamically reflected in a wide range of the same range. As a pr o fesionales in geomatics, with the theoretical and practical criterion s the need to apply comparation methodologies, which cumplan normativeand technical criteria, specifying the way of dealing with the spatial informationl , taking into account how to obtain the softwar e, installation and handling, in order to give a concept of the same depending on the is c enary of the pro and ectos to work and el objectivevo by the cual is usedor any of the p r r Ograms. To make the applied comparison of the result of hydrographic analysis of basin obtained with the do s software, it was implemented for a zone of the municipality of Porcesito of the department of Antioquia, s provided with data from the zona as it son thedigital models of elevation and base cartography.

Palabras clav e: Cuenca, área hidrográfica, caudal, SAGA, Arcgis.

ABSCTRACT

The geographic location of Colombia, the geomorphological and terrain conditions, together with the abundant water supply, make the country an ideal place to carry out multi-criteria and varied analysis studies for decision-making in environmental projects with short anthropomorphic impact, medium and long term.

Due to the technological progress of licensed software of different costs, Arcgis and also offers free and open coding software to be installed from the internet, the analyzes mentioned above can be modeled, dynamically expressed in a wide range of them. As professionals in geomatics, with the theoretical and practical criteria arises the need to apply comparison methodologies, which comply with normative and technical criteria, specifying the way to treat spatial information, taking into account how to obtain the software, installation and management, in order to To give a concept of the same depending on the scenario of the proj ects to work and the objective for which one of the programs was used. In order to make the applied comparison of the result of hydrographic analysis of basins obtained with the two software, it was implemented for an area of the municipality of Porcesito of the department of Antioquia, supported with data of the zone as they are the digital models of elevation and base cartography .

Ke y words: Basin, hydrographic area, flow, SAGA, Arcgis.

INTRODUCTION

Se utilizan diversos soft w are par a obtener c uencas hidrográficas, ¿Qué sería el result a l compare a soft w are licensed, which has specific libraries and complements with a soft w Is it free of free development, contemplating factors such as time, complejidad of the procedimiento and development of the same?, having as a foundation theoretical tools and withthe current a v ancesof l a Geomatics , itis imperative to make an analysis of these means, and thus to focus them on the environment, and on the particular of thehydrological cycle and in obtaining a basin.

The present study seeks to applythe tools acquired in a discipline such as geomatics, through the systems of geographic information, digital image processing, mapping of network analysis, among other bases of knowledge and purpose To make a comparison of dos software known, but focused onaspecific productthat is the obtaining of basins.

ARCGIS DESKTOP 10.4:

ArcMap and ArcGIS Pro, the two primary desktop applications for PRorGIS professionals, are part of ArcGIS for Desktop. ArcMap and its accompanying application, ArcCatalog, as well as ArcGlobe and ArcScene, work witha view to a GIS performance or performance. This s applications s on the basis of es te system of aand uda. Marco, P.P. (2011, October). 2

A link of Arcg is on another s soft w are, is the technical soporwhich offers c obertura continua every day of the week and with fast and efficient responsess, addslmente the applications s v A

modi ficando depending on the needs of the user and the market. Due to the name and reputationof the developerESRI has wide diffusion and is well knownin the market.

Its main and most important and most of having used it prior to the exercise is the cost of both the softw are, and the training of each of its modules for optimal use.

2.3 PREPARATION OF INFORMATION

- It was usedor a DEM ASTER par a zona with a spatial resolution of 5 meters of pixel, as a base input for obtaining the cuencas.

- For the calculation of l flow, s e utilizo the information of the models of precipitation and evapotranspiration of the estaciones hidrometeorological of the IDEAM for the year 2015.

2.3.1 Obtaining a river basin by meansof A rcgis

The methodology for obtaining a micro-basinin Arcisbased on the size of pix that of a digital elevation mode(DEM).

The delimationof Arc g is carried out with the DEM prev iamente loadedgado and was openedArcToolbox, with the following route:

ArcToolbox > Spatial Analyst Tools >

Hydrology > Fill

This tool is filling, takes the raster and removes all the gaps, ie s pixeles null or without information, because in a superficie in the modeling of the real vida, the account covers all thearea that you want to study.

2.3.2Obtaining ariver basin by means ofSAGA

It is loaded g o the Digital Model of elevation, which is the m ismo u sadoto the elaboration in Arc g is, it can be aclalarar that SAGA admits c arg ar only l os archivos .sgrd, parto it followed the ruta:

File / Grid / Load

As the DEM can have huecos or points of vacio without information, SAGA catalogs the

raster information such as a pr or hydrological pipeline viable, ie s a model, to obtain continuously the information of all elevations s is used or the tool "Fill Sinks" referred to below:

Geoproccessing / Terrain Analisys /

Preprocessing / Fill Sinks (Wang Liu)

Since only theDEM loadgado was available, the following window opened:

The output of yourproduct is generated in that format. Atthe time of savingdar you can exportar as an archivo formato shape.

2.3.3Average flow calculation

With regard to the es timation of the caudal medio, the area of the accounts obtainedby means of the two softwares, and the Raster of precipitation and evaporation annual par to the region of the study area, was used in order to analyze zar si hay una d iferencia significativ a in the r esultados of the flows obtained, making the clarification that has and diversas formulas and mode l aciones to make the calculation of theflow of a basin. As the objective of the development press to make a comparisonbetween the two software, a statistical estimate is made to obtain weighted values and to be able to apply in order to Direct the formula for calculatingthe flow rate. Therefore with the statisticsobtained s eapplied:

3.1451E-05 * AC * (PP - PE) Donde:

- -AC= Area of the Cuenca.
- PP= Average of the precipitation.
- P= Average of the evaporación.

Taking as valor of the balance

hydrologicalpair to the zona of study el obtained from the IDEAM for the year 2017.

RESULTS

In this section youcan see the final obtaining of the c uenca generated from each of the softwareware usedmentioned above.

3.1 Basin obtainedby the software ARCGIS

The digital elevation model of the zona obtained by applying the filling tool to have a surfy, with continuous information and with which it was possible to obtain the cuenca in ARCGIS is apreci a in Figure 11.

In relationto the direction of the flowby means of "flo w direction" the image generada por el software se evidencia in Figure 12, m i i ss that the calculation of accumulation ofthe flow med i Before "flow accumulation" can be seenin Figure13. On the other hand, s e generated the construction of the water red, in shape format (fig. 14).

Finally, the resulting basincan be shownin Figure 15.

3.3 Flow calculation

The calculation of the caudal medio is usedor

the for mula presented in the method l ogía, and using the v alores med i os de precipitation evapotrans piration med i a para l a zona, using data from the climatological seasons of l IDEAM 3. The significant differencebetween the differences can be identified .

3.4 Comparison of the software

Visual: Figure 22 shows the graphic comparisontoeach of the uses used, there are clear differences in terms of definition and detail. Well, with the use of Arcgis better definition and more and ornumberof accounts, while SAGA generalizes both in these respects. Similarly in the network of drains cr eada by Arcgis found both ma and or consistency and number compared to the network of drains obtained with SAGA.

Statistics: Thepercentages of variationare significantlyhigh(Table, which means that no model guarantees the effectiveness of the process, although, in the visal verification, it is possible to distinguish the superiority of Arcg It was expected that the sum of allthe caudalis of both processes weremun and similar, due in the first instance to the area covered by the DEM and to the v alores of evapotranspiration and precipitation, although it has also beennoted that the ma and oria of the valuesof caudal for theaccountsobtained by SAGA are mu and similar (observar figure 23), and as they are not homogeneous areas, the attitude and precision of the same is questioned by not having a modelor reference para poder compare them, and the algorithm us ado by SAGA to obtain áreas.

CONCLUSIONS

In carrying out the comparative analysis, the objective of being able to make a comparison between the two programmes, in terms of statistical and indication, was strengthened,which made it possible to achieve a comparison between the two programmes. Weaknesses and weaknesses of eachof the programs s a compara r, and knows r so in determinado moment which e s el best s oftware utilizar.

The most complete software in terms of quality and product, is guaranteedto a more detailed below, and can becarried outwith its results of analysis of more quality, precision and xattitude, and in Part VIsual presents procthose more elaborate.

However, it is not recommended that the softwareisArcgis for activities thatrequire premura, ni parto people who are starting in geomatics orgeographic information systems, you must have a minimum basic To be able to operate it and obtain the desired products, in addition to itsoperations and tools that, although they are automatic processes, can become complex and costly for new users.

The softwareware SAGA presenta less detailed products con r with regard to Acgis, a few large ones is not recommended its uso, dueto the generalizationof sus products, thus being a good option for small scales and have an approved referenceonthe different areas of study.

The softwareware SAGA, es much easier to handlefor people who do not have manyknowledge of GIS, in the case of the c uencas only required to obtain the DEM, and in this way you can obtain the products in less than three steps, saving time and providing users with a toolthat is easy to understand and use.

In the analysis of indicators, the softwis best suited to determina r cuencas es ARCGIS, however,in the final balanceobtu v o this ventaja por little; the cual we are ableto have two options at the timeof realizar works related to basins, as long as it isan analysis of the detail, the execution time and the costs of the proand ecto. The user will be able to carry outan analysis of these parameters and thus decide which program he uses the most.

SAGA is a goodchoice for studentswho are not very large, reconnaissance or reconnaissancewith a small budget, and which has a large rangeof useful libraries and tools, and as in the As a study, it is even a good input for a realizationof comparative studies if it is required, taking into account that to be an open sourc e program is andvolucionando constantly.

On the other hand if you have the r ecurso s to develop any type of pro and ecto the most aconseejable will be used r Arcgis, which guaranteesa muand good product, and management in different s ba s e s of data s and fo r Matos.

REFERENCES

- Corporación AutónomaRegionala l de Cundinamarca CAR. (2010). Updatingof the Surface WaterSupplyfor the Basins. Up to Fifth Order for the Jurisdiction of CAR. Bogotá: CAR.

- HIMAT. Institute of Hydrology, Meteorology and Land Adequacy. (1985). Inventario de Cuencas Hidrográficas en Colombia. III Congreso de cuencas hidrográficas en Cali-Bogotá.

- -LopeZ, J. and Delgado, P. (2009, September). "Parametric Characterization of the Basins". Presented in Jornadas sob r e Hidrología de Superficie en Tener i fe, Santa Cru z de Tenerife,Spain.
- Marco, P.P. (2011, October). "Methods of Interpolationion in Arcgis 10". Presented in UNAM Geography, Mexico City, Mexicoico.
- US Army Corps of Engineers, Hydrologic Engineering Center. (2013). HECGeoHMS