**Point-by-point responses to the reviewer comments on the manuscript**

**Morphometric analysis of river basins using GIS and remote sensing of an Andean section of Route 150, Argentina. A comparison between manual and automated delineation of basins.**

Comments for the Authors:

**Reviewer #1:**

Are there any similar exercises published elsewhere? Pleas provide references for any similar comparisons...Done

It strikes as odd why the basin delimitation was not runner North of Hwy 150?. Please explain reason.

This is because the highway was projected only for the southern section of the Agua Negra River

Are the basin algorithms implemented on the standard Arc tools or were they user coded specifically for this excercise?. Please be more clear on their implementations.

We used the pre-established algorithms of arctool

Can you propose a reason why the number of basins are not the same? is this a result of the apriori conditions by the automated GIS tools? This is specally relevant for those very small basins as presented.

The manual on-screen digitalized method is ultimately based on human interpretation of satellite imageries, that is why, the manual method is actually more prone to errors because it depends mainly on the experience and human judgment

The Results and Description section is hard to follow because not all parameters discussed here are properly referenced in the text and on the table caption. Rewriting this section to better integrate and point to the specific columns in Table 1 would make it easier to follow... Done

The initial (and final) question still remains unanswered.. in this excercise which method proved to be better/more precise?

Delineating basins and measuring morphometric parameters by the traditional manual method require time, precise workmanship and judgments by specialists. In contrast, for the same analysis, the automated techniques reduce the computation to just few minutes.

Figures

Table 1 captions are missing the parameters decription and codes making difficult to analyze the table.... The authors believe that the reviewer has confused Table 2 by Table 1. Table 1. List of derived parameters, equations and references.

Figure 3, X axis, replace Atomatic -> Automatic... Done

Define Q on bottom right panel... Done

In general improve captions throughout by giving more information about shown parameters for figures and tables. ... Done

Cite source and attribution for maps (e.g. DEM source) ... Done

Specific comments were made as annotations directly on the pdf file

Figure 2 has no location for the pour points.... Corrected

Reference

Department of Public Works. 1995. *California culvert practice*, second, Sacramento, CA: DPW, Division of Highways. 87p

However this may be counter argued by the fact that the automated method detected fewer basins... any explanation for this? or is the manual method more prone to errors?

The manual method is actually more prone to errors because it depends mainly on the experience and human judgment

Please explain this... was data edite dfor voids? or else? "sink" may not be the correct term? please rewrite or rephrase... Corrected

Figure 1, show geographic coordinates , state the age of the lithologic units as defined elsewhere in the text, replace legend for "Highway 150"... Done

Figure 2, include a symbol for the pour point location on each basin... Done

**Reviewer #2:**

Details about field work are required.

The methodology applied in this paper is based mainly on the work in front of a computer, the field work only refers to a visit to the Agua Negra River basin and the taking some photographs

Spot and Ikonos images cannot be downloaded from Google Earth.

These images can effectively be captured at great resolutions with google eahrt pro free license

Explain why the morphometry parameters are used: perimeter, length, mean width, main channel length, basin relief.

Discharge estimation of hydrological basins based on rainfall-runoff analysis is a very frequent practice of Hydrology Engineering. But, also quite often, basin discharge measurements are not readily available for statistical analysis. This lack of information can be satisfactorily overcomed in most instances by using basin delineation and *drainage morphometric* analyses which provide resources for describing the hydrological behavior of a basin and are a prerequisite for runoff modeling (Magesh et al., 2011; Thomas et al., 2012).

Why the number of basins in the digital method is different than the manual method?

The manual on-screen digitalized method is ultimately based on human interpretation of satellite imageries, that is why, the manual method is actually more prone to errors because it depends mainly on the experience and human judgment

Figure 2 does not show the pour points...Corrected

How morphometry is calculated? A model of morphometry based on the above mentioned parameters is considered? The morphometry was calculated using the formulas described in Table 1, a model was not considered for this study.

Explain how such parameters indicate the intensity of the erosion process operating on the slope of the basins.

The intensity of the erosion can not be explained satisfactorily with these parameters.

Explain why the overall vertical precision of the DEM is satisfactory for spatial analysis at this scale.

The smaller the cell size, the greater the resolution. Therefore, smaller basins require a smaller cell size to accurately represent the basin area. In the Agua Negra river basin, there are not smaller basin than a 1km2. The ASTERGDEM whit 30m of resolution and a overall accuracy of the ASTER GDEM, on a global basis, that can be taken to be approximately 20 meters at 95 % confidence.

All other correction included in the comments was without a doubt right and I proceeded to correct them.

M. Y. Esper Angillieri and Mario Fernandez

CONICET -UNSJ