

## ***Interactive comment on “Climate changes of hydrometeorological and hydrological extremes in the Paute basin, Ecuadorean Andes” by D. E. Mora et al.***

### **Anonymous Referee #2**

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This paper investigates the influence of future climate change projections on the hydrology of the Paute basin in the Andes of Ecuador, using a delta-approach to adjust biases in GCMs, combined with a quantile perturbation approach, which takes into account precipitation intensity and wet/dry spell distribution. The paper is interesting, but there are a number of issues that should be addressed and clarified before the paper is ready for publication.

Although the downscaling approach is technically accurate and commonly applied in hydrologic studies, it is, from a climate dynamics standpoint, ill suited for this region. GCM have large errors in simulated precipitation over this region of complex topog-

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raphy and using GCM precipitation as input into the downscaling procedure will lead to a propagation of this error. Statistical-empirical downscaling, taking advantage of observed relationships between precipitation and the large-scale circulation aloft, and then deriving these circulation-indices from future scenarios in GCMs would almost certainly yield much more realistic results. GCMs are capable of realistically reproducing the large-scale circulation for the region, but not regional-scale precipitation. As such I have little faith in the projected changes in rainfall.

The English grammar needs some improvement. While generally OK, in many instances sentences are unclear or the wrong use of words makes the interpretation of sentences ambiguous. Examples such as: 'temperature is despicably lower...' or 'highest monthly temperature values are experimenting lower changes' make it difficult to discern what the authors meant to say.

Table 2, Figure 5 and discussion in the text: temperature changes in % are not very useful nor indicative. Please provide results in common units (deg. C or K) throughout. This is also important to verify whether the projected (absolute) temperature changes are indeed larger at higher elevation, consistent with reports in previous studies.

Figure 5: more description is needed to explain what is shown. For example which scenarios belong to which Figure?

The paper suffers from an unequal weight given to methods and discussion of actual results. The methodology is explained on six pages, while the results are discussed on only three (with one page left for conclusions). It would make the paper much more appealing to a broader audience if more emphasis was given to discuss the results and their implications in more detail. For example the authors mention the stronger increase in maximum as compared to minimum warming or the larger warming rates projected for higher elevations. Why is this the case? A lot of interesting results emerge from the study, but they are not put into a useful regional and thematic context.

It is very strange that the projected temperature increase is higher in A1B than in A2,

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given the lower radiative forcing. Why is this the case? After all CMIP3 models show larger warming in the A2 than in the A1B scenario (not just globally averaged, but also over the Ecuadorian Andes).

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