

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

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Dear Editor, We thank you for the attention given to our paper. The changes suggested by the reviewers were carefully addressed; therefore we would like to submit a revised version of the paper. The main concern of referee 1 was related to the evaluation procedure, which was addressed by two types of changes. First, as the referees recommended, impact results of climate change are now tested using absolute changes instead of relative changes. Final results are now presented and evaluated by means of absolute changes for temperature, and both absolute and relative changes for rainfall. This led to more clear conclusions. It also met the comment of the referee on

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whether the results are disturbed when comparing changes at different locations. Second, a more sound, step-wise evaluation was performed based on the following three steps. First, the changes obtained directly from the GCM-RCM simulation results without downscaling were analyzed. This allowed obtaining information on the large scale changes provided by the GCM simulations, to evaluate the differences in GCM results (uncertainty assessment by an ensemble approach) and to compare the changes derived from the GCM simulations with the ones derived from the RCM simulations. The latter was giving us insight in what controls the local changes: the large scale circulation, or the local topography. In a second step, the spatial and temporal variability of the absolute temperature and rainfall values were analyzed based on the observed series. This gave us insight in how local (topographical and other) conditions control the local temperature and rainfall. In a third step, the temperature and rainfall values and changes are analyzed based on the GCM-RCM outputs but after statistical downscaling. Comparing the changes before and after statistical downscaling and comparing this with the changes obtained from the GCM versus RCM results, indicated that the statistical downscaling method performs well: the changes are mainly controlled by the large/regional scale circulation (hence by the relative changes obtained from the GCM-RCMs) whereas the spatial differences in absolute temperature and rainfall values are primarily controlled by the local (topographical) conditions, as reflected by the current climate observations. Both are found well represented in the downscaled series. We reorganized the paper accordingly, considering three subsections: i. Spatio-temporal patterns in observed series, ii. Impact indicators obtained directly from the GCM-RCM outputs, and iii. Impact indicators obtained from the downscaled series. The same structure is followed in the discussion of the results and in the conclusions section. Note that the downscaling technique was not questioned by the referee #1. Despite the promising results obtained after application of the downscaling method applied in this paper, we agree with referee #2 that many questions and reservations reg. the use of coarse scale climate model results and statistical downscaling methods can be formulated. We agree with the editor that a full discussion on this is beyond the scope

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of this paper, but we added now some in the discussion and conclusions section of the paper. Therefore, the authors would like to ask the editor to consider this revised version of the paper.

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