

Interactive comment on “Uncertainties in climate change projections and regional downscaling: implications for water resources management” by W. Buytaert et al.

Anonymous Referee #2

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General comments:

The methodology applied to study the impact of climate change on water resources in the study region of the tropical Andes in Ecuador is very basic:

The delta approach has been applied for statistical downscaling in its simplest form: no seasonal dependency of the change factors, or dependency on the probability or return period has been considered, while these dependencies could have been easily incorporated (the excuse of limited ground station data cannot be used here).

The argument that statistical downscaling or disaggregation could not be applied because of lack of long records and because of low density of ground stations (pages 3

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and 4), does not completely hold. Given that the rainfall-runoff modeling applied does make use of rainfall input from 13 gauges only, the statistical downscaling could have been limited to those 13 stations. Due to the limited length of these series, the statistical downscaling relationships could indeed be of limited accuracy, but still applicable (although I guess longer series are available for that region).

However, given that (i) this is among the first studies dealing with climate change impact analysis on water resources in the Tropical Andes, more specifically in the mountainous Paute basin area in Ecuador, which is of high socio-economical importance for the region (hydropower and water supply), (ii) the methodology (although simplistic) has been applied carefully, and (iii) the paper is well written, I recommend publication of the paper.

Specific comments:

Paper title: I suggest to add information on the study region (tropical Andes of Ecuador) in the title

Page 8: change in potential evapotranspiration was calculated after adapting only the average monthly temperature for future conditions. Why was this done? Climate models normally also produce results on radiation, humidity, etc. Given that the historical potential evapotranspiration series were obtained by the FAO-Penman Monteith method (end of page 8), I do not see why changes in radiation, humidity, etc. could not have been taken into account.

The runoff simulations have been carried out with a daily time step, but only results at monthly aggregation time have been shown. It would be good to report also on the daily runoff results (as this is of relevance as well for the water resources management in the region).

Technical corrections:

On page 7 “Third and Fourth Assessment Report” are spelled out in full, while on page

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5 the abbreviations TAR and AR4 were used. I suggest reversing the order: spell out the first time the abbreviations are mentioned, and use the abbreviations on page 7.

Caption Figure 2 and first paragraph page 10: specify that annual averages are considered

Caption Figure 2: specify that the “anomalies for the A1B emission scenario” reflect the changes (in % for P, °C for T) from the reference period 1961-1990 to the scenario period 2070-2099.

Last two points also apply to the caption of Figure 3; last point also to Figure 4.

Page 15: spelling error in “dependent”

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1821, 2010.