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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Climate change over the high-mountain versus plain areas: Effects on the land surface hydrologic budget in the Alpine area and northern Italy" *by* Claudio Cassardo et al.

Anonymous Referee #2

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The manuscript 'Climate change over the high-mountain versus plain areas: Effects on the land surface hydrologic budget in the Alpine area and northern Italy' presents climate change impacts on evapotranspiration, precipitation and soil moisture over the Alpine and northern Italy using regional climate model and land surface process model. Authors well deliver the changes of hydrological budget under climate change. However there are a few concerns described below.

Major comments 1. Authors used RegCM3 in this study. Newer version model dose not necessary mean that having better performance but authors need to justify why older version model with older scenario (AR4) was employed in this study. 2. In this study,

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authors employed single RCM and single land model. Authors need to discuss about model uncertainties comparing to the multi-model approaches. 3. I do believe there are quite a few previous studies over the study region. Authors need to introduce them. 4. Authors discussed about possible agricultural impact due to the lower soil moisture. However, in this study, vegetation type in UTOPIA were set single type of vegetation (short grasses) all over the domain. Have you done any sensitivity test on vegetation types?

Minor Comments. 1. Page 1. Remove all acronyms in abstract. 2. Page 2, line 15. Global circulation models. Is this different one as GCMs previously defined? 3. Page 3, line22-24. Related with major comments 1. EURO-CORDEX has RegCM4 with higher resolution. 4. Page 4, line 5-19. Move to methods section. 5. Page 4, line 20. Energy variables are critical part of your argument. Please include the figures as a supplementary. 6. Page 4, line 25. I cannot find the PR minimum shifts in the figure. 7. Page 4, line 26. ET of FCB2 shows double peaks rather than shifting in Fig2b. 8. Page 4, line 29-31. It looks like the large variation stems on future PR variation. Can you explain why PR has large variation? 9. Page 6 line 27-29. Can you include the names of geographical location on the map (e.g. Fig. 1)

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