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Interactive comment on "Reconstructing glacier mass balances in the Central Andes of Chile and Argentina using local and regional hydro-climatic data" *by* M. H. Masiokas et al.

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Dear Editor,

Please find below our replies to the reviewer comments and the revised version of the paper entitled "Reconstructing the annual mass balance of glaciar Echaurren Norte (Central Andes, 33.5°S) using local and regional hydro-climatic data".

We believe this revised version has improved in many aspects compared to the first version of the manuscript, and would like to thank the reviewers very much for their insightful comments and suggestions. The additions to the text are marked in yellow in

the attached manuscript.

In our opinion, and based on some of the points made by reviewers #2 and 3, the original manuscript needed a more detailed description on the data availability and particular characteristics of Glaciar Echaurren Norte. For this reason we have now included a closer view of the glacier to show its morphology and main characteristics (see Fig. 1C), together with a diagram showing the estimated climatology at the glacier based on data from the El Yeso meteorological station (Fig. 1D).

Another important point we would like to make is that, when compared to similar studies in other regions with a much greater quantity and quality of basic meteorological and glaciological information (e.g. Marzeion et al. 2012a), our study is much simpler and only capable of addressing a few basic issues regarding the glacier's sensitivity to climate and its mass balance variations in recent decades. In this respect it is important to note that despite being the longest ongoing mass balance record in the Southern Hemisphere, the ECH data reported to the WGMS is limited and only includes the seasonal and annual components of the mass balance of this glacier. Many in-depth analyses necessary for a proper understanding of the energy balance or the climate sensitivity of the glacier are unfortunately hampered by this lack of data at the site. In this regards and to address the comments from reviewer #3 now make clear that the results are based on reference-surface mass balance estimates, and include a discussion of the uncertainties involved in using this approach and the simplistic modeling adopted in our study.

In the revised version of the manuscript we have tried to better explain this situation and highlight the main objectives of the study which were a) to use a simple model to identify the first order forcings modulating the annual mass balance at ECH, and b) to reconstruct the history of annual mass balance variations of this glacier using a reliable and well-correlated regional streamflow record.

We have also trimmed several portions of the text that were not entirely relevant for our

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study.

More detailed assessments and on-glacier data are of course highly recommended and clearly needed in this water-scarce region. It is our intention that the manuscript highlights this need and hopefully provides an initial set of working hypotheses for future studies and glacier monitoring programs in this region.

We would like to thank you very much for your assistance in editing this manuscript, and hope it is now suitable for publication in The Cryosphere.

Best regards,

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Please also note the supplement to this comment:
http://www.the-cryosphere-discuss.net/9/C2477/2015/tcd-9-C2477-2015-supplement.zip

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Interactive comment on The Cryosphere Discuss., 9, 4949, 2015.