

Interactive  
Comment

## ***Interactive comment on “Glacier contribution to streamflow in two headwaters of the Huasco River, Dry Andes of Chile” by S. Gascoïn et al.***

**M. Pelto**

mauri.pelto@nichols.edu

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Gascoïn et al. (2010) present a valuable quantification of the glacier runoff contribution to streamflow in an arid region of the Andes where to date glacier runoff information has been lacking. This is a unique setting. In combination with Rabatel et al. (2010) a detailed portrayal of glacier mass balance and runoff can be provided. The important data in this paper is the specific ablation and streamflow measurements. The streamflow data is reasonably reported, while the ablation data is presented in to cursory a fashion. In Figure 4 ablation is given as a mean of all of the stakes on each glacier. A key observation made is the relation of ablation to area of the glacier. This indicates the importance of reporting the ablation observed at specific stakes on each glacier to demonstrate that this observation is a key parameter versus proximity to the edge of

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the glacier, for example. It is stipulated that the glaciers lack specific ablation and accumulation areas and that this indicates ablation and accumulation across the glacier is uniform. Hence, it is critical to indicate the degree to which ablation varies from stake to stake across the glacier. Rabatel et al (2010) in their Table 1 indicate there are 55 ablation stakes on these glaciers so it can be done. Without this the assumption that ablation is uniform across the glacier cannot be made. The uniform ablation if valid is a very useful, and demonstrating this is a worthy objective in and of itself. presentation of ablation data from 14 stakes on Guanaco alone would be quite interesting. Another figure should be added indicating the location of ablation stakes on Guanaco and one of the smaller bodies. A table or figure should be added indicating the specific ablation at each stake for various time periods. Is the variation uniform one year on Guanaco and not in another? The Lysimeter measurements are also valuable and understandably short in duration. It would be interesting if any basic climate data could be reported with the specific lysimeter measurement periods.

2375-5: identify the human activity as mining.

2378-26: “implied” refers to what?

2380-8: In most alpine glaciers settings, glacier runoff reduces minimum melt season streamflow causing a reduction in the relative variation of monthly discharge. This is indicated to not be the case here in the Andes. The particular mechanism should be explained briefly here.

2382-7: Fusion, is not a typical term. Fusion is normally a latent heat term, not a measure of a quantity of melt.

2382-16: Add in a figure indicating stake locations on specific glaciers. Include a figure or table of the observed ablation from these same stakes. It is crucial to identify the variability of ablation from stake to stake.

2383-6: Just because there is not a typical ablation and accumulation area does not

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suggest that they are uniform. If the previous comment is addressed, then the ablation variation will already be presented. It is also critical to indicate at least on a specific date or two that accumulation variation is relatively uniform. Since the mass balance has been examined there should be some measure of this.

2387-14: Other months do not have this diurnal variation?

2388-13: Why are these estimated, instead of reported measured values?

2392-5: This is a key point. If there is any data collected to date that can shed light on the amount of refreezing report it.

Table 3: Is there any climate information such as temperature or humidity to accompany the lysimeter measurement periods?

Figure: A picture of Guanaco would be invaluable particularly if it could be annotated to indicate the stake locations and any other measurement sites.

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Interactive comment on The Cryosphere Discuss., 4, 2373, 2010.

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