**The Cryosphere
Discussions**

Interactive comment on "Landsat TM and ETM+ derived snowline altitudes in the Cordillera Huayhuash and Cordillera Raura, Peru, 1986–2005" *by* E. M. McFadden et al.

M. Pelto

mauri.pelto@nichols.edu

Mcfadden et al (2010) provide a detailed analysis of changes in snowline altitude on Peruvian glaciers in two ranges utilizing satellite imagery. This paper is valuable in establishing the variability of SLA temporally and spatially. I look forward to an expanded discussion of this valuable glacier data set. The following comments focus on the Results section of the paper. I recommend further attention to this section with more detailed presentation and more robust analysis. The discussion section presents no new climate data and presents no annual climate data for that is the minimum for initiation of discussing the cause of SLA change. The resulting discussion is interest-

ing, but is largely speculative with too little data to support any robust analysis of the controls of SLA from either precipitation or temperature changes.

1939-15: Table 4 is a critical table in the statistical analysis of changes in snowline temporally and spatially in the Huayhuash. With this in mind it would seem that Caramarca and Rasac Glacier should be eliminated due to data availability being limited to two years. Similarly 1991 has too many missing values to be of use. Table 5 has the same role for the Cordillera Raura, 2005 should be eliminated. The resulting statistics would be more robust without the rows and columns with considerable missing data. Figure 4 makes these gaps most apparent too. With this change are some of the trends more robust are they different? It would also be crucial to include a Table with some aspects of each glacier: size, orientation, mean slope, accumulation sources, to go along with mean altitude.

1941-2: Contours on Figure 3 if possible would provide a key visual reference to this otherwise somewhat blurry image.

1941-14: This paragraph needs considerable work. Do not confound annual variation and long term SLA variation. Jahuacocha is the outlier in terms of annual variability and assessment error, quantify both in second sentence.

1941-18: It is not reasonable to declare an SLA rise for Jahuacocha, since the 30 m change is so much smaller than the error, this suggests no significant SLA change.

1941-19: Comparison of the changes from year to year on Chaclan Glacierto to Jahuacocha Glacier is good, but stick to this analysis do not compare overall trend of one glacier to one year change of the other. It would be more interesting so observe the specific deviations in response to annual climate conditions for the two glaciers.

1941-22: No temperature graph is presented so the question of SLA relation to temperature change on the annual scale cannot be addressed without presenting temperature data.

1942-12: Remove. . . are evident

1943-8: We eliminated all images.

1944-19: Can a more steady rise in SLA for the Raura be concluded from only five data points with significant data?