

## ***Interactive comment on “Quantifying changes and trends in glacier area and volume in the Austrian Ötztal Alps (1969–1997–2006)” by J. Abermann et al.***

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Received and published: 7 July 2009

Abermann et al., (2009) examine changes in glacier in the Ortztal Alps from 1969–2006. The comprehensive documentation of glacier area, volume and length changes provides a valuable record of glacier change in the region. The record is of further values since two different periods with differing climates are examined. Going forward the information from the DEM's developed will provide further insight into the differences in glacier responses and likely future responses. The number of parameters reported makes for a paper that in parts is difficult to follow, particularly in the relative % change section. The following comments are made in order of appearance not importance. I

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encourage the authors to continue to improve the description of this worthy study.

Page 421 10: This long sentence require at least one reference as to the response to climate change.

Page 422 15: Why divide overall volume change for 1969-1997 by the 17 years with losses and the 1997-2006 period by the 8 years of losses? On page 415 the area change for 1997-2006 is divided by all 9 years.

Page 423 6: What were the original sizes of the three glaciers lost?

Page 424 3: The contrasting change between Rotmoosferner and Wasserfallferner (Figure 5) indicates an important contrast between a glacier that has a healthy accumulation zone, equilibrium response to climate versus thinning over almost the entire glacier area indicating a potentially disequilibrium response (Paul et al., 2007 and Pelto, 2006).

Page 425 12: The statement. . . “This means that for large glaciers the absolute area loss is slightly stronger in the time period 1997 to 2006 than for the 14 years with net area reduction (within a total of 28 years) before.” Again it does not seem appropriate to compare loss rates of area or volume for 1997-2006 to a segment of the 1969-1997 years, when the data is for the whole period. If the relative change terms are not applied to the entire period I do not see the value.

Page 425 22: Last sentence confusing. . . deceleration trend and acceleration trend of absolute area. . . The meaning can be discerned but not easily.

Page 427 18: can be further noted that the greater relative percent reduction in volume than area indicates downwasting, which provides for future rapid area losses.

Figure 4: This is an important diagram. What would increase the value to show the relative area change for an elevation band. That is divide the absolute area change by the absolute area. The paper has tended to emphasize relative changes. This is an important relative change. It is noted on Page 427 10, that area losses have increased

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more strongly at lower elevation than higher elevations. This is in terms of absolute area change, but would it be the case in terms of relative % area change? Does volume change follow this same trend? It is easy to imagine that the same volume change-thickness decrease would lead to more area loss at lower elevations.

Figure 7: Is this relative change 1967-1997 versus 1997-2006 with no trend being 1.0, correct? Or does the relative percent change reflect rates from selected years as discussed on Page 425.

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Interactive comment on The Cryosphere Discuss., 3, 415, 2009.

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