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Interactive comment on "A 10 yr record of black carbon and dust from Mera Peak ice core (Nepal): variability and potential impact on Himalayan glacier melting" *by* P. Ginot et al.

M. Pelto

mauri.pelto@nichols.edu

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Ginot et al (2013) provide a fascinating and detailed description of the impurities in a 10 year firn core form Mera Glacier in the Nepal Himalaya. They further utilize modelling to identify the likely impact of black carbon and dust on the mass balance of the glacier. Most of the comments below are minor. The two most important are the need for a better qualitative description of where on the glacier surficial impurities can meaningfully impact albedo and ablation. Second is a better examination of the progression of ablation seasonally, putting in context the ablation during the pre-monsoon versus monsoon season. This also necessitates identifying the percentage area of the Mera

Glacier that could be influenced.

6003-9: that to than

6003-14: Quantify the melt rate from mass and energy balance.

6003-17: reword- the rBC variability in the ice core signal is primarily reflecting the variability of the monsoon signal compared to emission intensity variation.

6004-10: current emissions globally? Define emissions of what better.

6005-13: profits not ideal word choice.

6006-5 and/or 6022-9: Additional discussion is needed on where dust and black carbon may play a role and where it will not. The particles in snow and ice reduce the surface albedo increasing ablation. This can only occur if the BC is at or very close to the surface. On Himalayan glaciers BC will not alter albedo in regions that are debris covered or in areas with frequent accumulation events that bury the BC. Since the glaciers in this region are summer accumulation type glaciers, with the highest solar radiation during a period when frequent new snow would bury BC, there is a limited role for BC in the accumulation zone. Since most of the larger glaciers have significant debris cover in there lower reaches, this also limits the role of BC in the lower ablation zone. Hence, the region on Himalayan glaciers where BC can alter albedo by remaining at the surface is in the clean ice zone of the mid-upper ablation zone, and the area around the snowline, where accumulation events are not as frequent. Bolch et al (2011) have previously noted this region as the area of greatest thinning.

6006-22: precipitation is.

6006-24: Hence, Mera Glacier is a summer accumulation type glacier with peak accumulation and ablation occurring simultaneously. Temperatures at NCO-P are highest June-August.

6010-19: New paragraph.

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7, C2932–C2935, 2014

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6010-22: Quantify the range of NH

6012-25: lack of seasonality in both in overall quantity and size distribution.

6014 4-21: This paragraph could be eliminated if paper is deemed too long.

6016 4-10: This paragraph is a confusing topic change, is it needed or should it be relocated?

6017 9-22: An interesting note on dust composition, but does it dilute the main focus?

6020-12: all days

6020-21: How substantial is ablation on Mera and other glaciers in area during the pre-monsoon season? The temperature at NCO-P has a relatively low mean for the March-May period, below 0 C, Figure 2 Wagnon et al (2013). Also worth observing the potential impact of rain during the monsoon for surficial BC deposition since the aforementioned note that on Mera up to 28% of the monsoon season precipitation may fall as rain at 5500 m. This rain potential is also noted for Yala Glacier by Yasunari et al (2010). Thayyen and Gergan (2010) and Singh et al (2010) for example illustrate how minor glacier discharge is in Himalayan catchments until June. This is important to note as a measure of pre-monsoon ablation,even though you do not have specific data to quantify the potential ablation role for BC during pre-monsoon season from Mera Peak.

6021-24: How much of Mera Glacier is in this zone of limited melting? Wagnon et al (2013) indicate the ELA near 5500 m with a modest change in net balance above 5700 m, which suggest limited ablation.

6025-6-20: The conclusion is too long, and contains review of assumptions etc, that do not belong here.

6025-26: Sounds like a sales pitch not concluding lines in a paper.

Figure 2 is excellent, would like to see it stretched vertically for better resolution.

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7, C2932–C2935, 2014

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