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Object: TC-2014-73: Submission of the revised manuscript

Dear Dr. Valentina Radic,

Please find enclosed the revised manuscript entitled "Processes governing the mass balance of Chhota Shigri Glacier (Western Himalaya, India) assessed by point-scale surface energy balance measurements" by Azam et al. to be submitted to The Cryosphere as well as the 'point by point' replies to two anonymous referees and four open reviewers.

This paper presents point-scale surface energy balance on Chhota Shigri Glacier, Western Himalaya, India. Initially we developed a surface energy balance model without involving the sub-surface heat fluxes and the modeled ablation was validated against stake ablation data. The main comments raised by both the referees were to include sub-surface calculations in the surface energy balance model to quantify the contribution of conductive heat flux in melting and to improve the model validation. In order to address all the comments satisfactorily for the revised manuscript, we adopted Favier et al. (2011) model that includes a scheme dealing with sub-surface heat fluxes (conductive heat flux, and penetration of short-wave radiation inside snow/ice). Vincent Favier is now one of the co-authors of this paper. We decided to keep the same terminology as given in Favier et al. (2011) to avoid any confusion and subsequently a large part of the methodology section has been re-written accordingly. The whole manuscript has been revised (all changes appear in red color to facilitate the editorial work). The conductive heat flux and short wave penetration heat flux are now shown in additional panels of Fig. 10 & 12 as well as in Table 3 and they are discussed in the related sections of the revised manuscript.

This model, involving sub-surface heat fluxes, helped to understand the sub-surface processes and, in turn, greatly improved our analysis but did not change our initial results significantly. Therefore the main findings and the conclusions of this paper remain unchanged. Now the modeled ablation and surface temperatures are validated against the observed ablation and surface temperature data. As a result of the energy balance, energy is available for melting only in summer-monsoon. Net all-wave radiation is the main heat flux towards the glacier surface accounting for 80% of the total melting energy followed by sensible (13%) and latent (5%) turbulent heat fluxes. The conductive heat flux is very small compared to the other fluxes, but still responsible for 2% of the total summer-monsoon melt. An interesting feature is observed in latent heat flux evolution that is positive during summer-monsoon indicating condensation or re-sublimation of moisture at the glacier surface. This study also highlights the impact of summer-monsoon snowfalls on glacier mass balance. Snowfall events during summer-monsoon play an important role on glacier melting via surface albedo in this part of the Himalayas.

All the referees and reviewer's major and minor comments are addressed in details. We believe that this review process has been successful (very constructive comments and suggestions) and greatly helped to improve our manuscript.

All the authors listed on the manuscript are aware of re-submission of this manuscript to The Cryosphere and this manuscript has not been published previously nor is under consideration by another journal.

We are looking forward to know your feelings about this paper.

Yours sincerely,

Mohd Farooq Azam