

## ***Interactive comment on “Impact of debris cover on glacier ablation and atmosphere-glacier feedbacks in the Karakoram” by E. Collier et al.***

### **Anonymous Referee #2**

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#### General comments

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In this paper, authors quantitatively evaluated debris layer impact to glacier ablation using coupled model (WRF-CMB). The evaluated result would largely contribute regional mass balance evaluation over glaciated area with large amount of debris-covered glacier such as Karakoram Himalayan range. The well organised manuscript makes possible to understand contents easily. And their careful comparison between their result and field-based validation data also makes higher science credibility. I have found only few small problems which should be modified (see specific comments).

#### Specific comments

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levels make problem? Is it possible to show the reference (e.g. developers forum) ?

Figure 2: Is X axis title in Fig. 2c correct? Is it debris thickness values? You explain the color in Fig. 2b and 2d are the distance down-glacier over debris-covered areas. Why all of debris-covered glaciers, where located outside of red line, are orange color (8-10 km in color scale) ? You did not mentioned constant distance of 10 km but mentioned constant thickness 10 cm. Please clarify.

Figure 5: Grey-square markers is a little confusing because the shape is same with 1-5 cm debris thickness of DEB. I recommend to change the shape to other shape. For example solid grey circle, which is slightly larger than solid black circle, might be better.

Figures 8&9: I suggest to overlay boundary line of the region where centerline information available from Rankl et al. (2014). I would be helpful to judge effect of constant debris thickness assumption.

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Interactive comment on The Cryosphere Discuss., 9, 2259, 2015.

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