

[...] more evidences should be presented and discussed to assess whether wind redistribution and snowfalls are negligible during spring, when melting is the dominant process, but not the only one. This could help also to explain some models underestimations in SWE in Fig. 3(a) at the end of the melting season, which could be also due to these neglected processes, and not only to cold temperatures.

This is now discussed in Section 3.4.

In particular, it could be interesting to discuss in a deeper way the implications of neglecting the full coupling between the accumulation and the melting periods, and to assess quantitatively if neglected mass fluxes are relevant or not (e.g., which is the average air temperature during winter? Is there evidence of snow events in spring? etc.).

More information on the winter and springtime conditions was added in Section 2 and possible effects on results are discussed in Section 3.4.

#### **Minor comments:**

**1. Abstract:** I would suggest reorganizing the second part (the one dealing with the results of the study) since it seems to be a bit dispersive;

The abstract was re-written.

**2. Line 9, page 225:** I think it could help adding some quantitative references to be compared with  $3 \text{ Wm}^2$  per decade, since at this stage it is difficult to understand how much relevant this rate is, if it is reported all alone;

Done.

**3. Line 20, page 225:** please define “snow-holding capacity” since this process seems to be quite relevant in this paper;

The sentence was re-written for clarity.

**4. Sites and Data (Section 2):** maybe consider inserting a map with the location of the GB site, and improving current Figure 1 with contours (or the elevation of relevant points).

A contour map was added to Figure 1.

In the same Figure, four crosses are visible, which should refer to four instrumental sites (1 to 4, line 12 page 229). Nonetheless, at line 1, page 229, it is stated that station ‘3’ is actually composed by two different stations, so that the number of stations (5?) does not match with the number of crosses (5 stations, but only 4 crosses). Please clarify.

The station described in bullet point 4 in the previous version of the manuscript was a replacement of the one described in bullet point 2, therefore they share the same cross on Figure 1. These two stations are now combined in the same bullet point to make this clearer.

**I would also appreciate if you could provide some specifications about instrumental resolutions and accuracies;**

A table with specifications of instruments was added.

**5. Section 3.1:** according to my opinion, current Appendix could be more significant if incorporated in the main text, namely in this Section;

Agree. Done

**6. Section 3.2:** since snow plays an important role in this analysis, I think more details are due about the parameterization used to model snow settling, albedo and phases dynamics in the snowpack;

The snow scheme section was expanded.

**7. Lines 17-19, page 233:** I would consider adding a quantitative comparison between the outcomes reported here and those by Bewley et al. (2010), such as maximum differences

**between the two predictions and the data etc. In this way, it would be possible to understand the improvements of your model without looking for the paper by Bewley et al. (2010);**

The quantitative results presented in Bewley et al. (2010) were added to Table 2 and the improvements provided by 3SOM to process representations are now more thoroughly discussed. Please note that results changed slightly between this and the previous version because 1/ the  $F_s$  parametrization was changed following a comment by Reviewer #2 2/ the reference height for wind speed was modified (snowdepth was not previously subtracted); the description of the resistances was added to the revised manuscript.

**8. Figures: as a general suggestion, I would consider reporting more labels in the Figures (such as in Fig. 9 and 10).**

Done.