

We would like to thank both referees for their valuable and positive comments that help us to improve our manuscript. We also appreciate their support to our findings. We fully agree with their comments, suggestions etc and therefore we will take into account all of them in the revised version of our paper.

Below we respond to their comments.

Response to Referee 1:

- *Along the manuscript the authors write several times the pronoun “We”, “we found...”, “we present...” etc. In my opinion, it would be recommended to use, in all cases, the impersonal form, in order to improve formality of the paper: “It was found”, “is presented”, etc.*

We shall follow this recommendation in the revised version.

- *Figure 1 (caption): It is written “Green line: Black sea, Lake Ladoga (lines: pink, cyan, blue, deep pink),...” it would be better to keep the same structure, i.e. colour line: place. In this case it would be “Green line: Black sea, (pink, cyan, blue, deep pink) lines: Lake Ladoga, ...”*

We will perform this change in the revised version.

- *Figure 4: It is hard to assign each second-order polynomial fit to the corresponding curve. In order to improve it, the connection of each equation with the corresponding curve by means of arrows is recommended.*

We will revise Figure 4 adding the connection of each equation with the corresponding curve by means of arrows.

- *Section 3.3.1.: It is written “This is due to the fact the snow state...”. It would be better to write “This is due to the fact that the snow state...”.*

We will make this correction in the revised version.

- *Section 3.4.: A comma is missing in the sentence “As mentioned in the Introduction surface albedo plays a crucial role...”. It would be better “As mentioned in the Introduction, surface albedo plays a crucial role...”*

We will make this correction in the revised version.

- *Section 3.4.: The same typo in an identical sentence can be found two paragraphs below. A comma is missing in the sentence “As mentioned in the Introduction surface albedo plays a crucial role...”. It would be better “As mentioned in the Introduction, surface albedo plays a crucial role...”*

We will also make this correction in the revised version.

Response to Referee 2:

Page 3, line 22-23: Replace “Moderate-resolution” with “Moderate Resolution”.

We will make this change in the revised manuscript.

Page 3, line 22: Replace “Seidel and Popp, 2011” with “Seidel and Popp, 2012”.

We will replace “2011” with “2012”.

Page 4, line 22: Give “GCMs” in full.

We will replace “GCMs” with “general circulation models (GCMs)”.

In the main text (after page 4) replace “ultraviolet” with “UV”.

We will perform this change in the revised version.

Page 11, line 15: Add in parenthesis the date just after “brown line”.

We shall add “(29 April 1985)” just after “brown line”.

Page 17, line 8-9: Replace “2011” with “2012” and then replace “4, 7725–7750” with “5, 1653–1665”.

We will make this change in the revised version.

Page 26, line 6, in the caption of Figure 2: Insert “and” before “17 May 1984”.

We will insert the word “and” at this point.