Response to the Editor's comments.

The authors are grateful for the most helpful comments. We have incorporated all suggestions (except one where explanation is provided) and made some additional changes to the estimations of uncertainties. We hope that this is satisfactory and the paper is now ready for publication.

Our detailed response is given below. We have not highlighted the relevant lines in the paper but we show the lines, in which corrections have been made, below together with the corrected text.

- Include the calculated uncertainty to all relevant numbers and not only to the per cent change. Please also do so for table 2 (and 4) as requested by a reviewer.

Done. The uncertainty has been added to all the relevant numbers. The errors have been recalculated to include glaciers which have not exhibited any change. This does not change analysis and the content of the paper.

Changes are made in the Abstract; relevant lines in Results and Discussion; and in tables 2 and 4.

Do not show two decimal digits for numbers where not needed (especially for values >10.0 km²) as this implies an accuracy which is not true (e.g. abstract L. 18, Tables 2 and 4).

Done

- You mainly present information about area and length changes. Area and length changes are, as you write correctly in lines 435ff, a delayed signal to climate. This fact has to be mentioned earlier and better taken into account when presenting and discussing the climate data.

The response time of reference glaciers is briefly addressed in the Discussion and in our view, this is where this comment belongs as it binds information on glacier change and climatic fluctuations. Bringing this issue up at the earlier stage is not justified except as a standard comment that glaciers are sensitive indicators of climate change (and that's what we say at the opening paragraph). In order to discuss response time of glaciers in depth, modelling is required and this work is ongoing for Djankuat and Marukh glaciers at IGRAS and should result in a separate publications. Data presented in this paper does not justify a more in-depth discussion and further comments will not improve the paper. We, therefore, have not made any changes.

- L. 113: You write later that you used pansharpend Landsat images. Please state here if you used the 15 m panchromatic images or the pansharpened multispectral images.

The phrase on pansharpening has been removed.

- L. 124: This justification not to use Corona is a weak one. Even if the theoretical error would be comparable with the signal you can likely see changes. Either provide a better justification or omit.

This phrase has been omitted.

- L. 126: Provide more information about the "preliminary assessments". What have you done? Is the data from Katalog Lednikov and WGI different? If not, please state so.

'Preliminary assessments' referred to a comparison between the Catalogue / WGI glacier areas with those derived from the original aerial photographs recently. However, as we do not intend to show and analyse these comparisons because they are out of scope of the paper, this phrase has been removed.

- L. 165: Provide more information why extensive manual corrections are required when automatically mapping small glaciers (see e.g. Paul et al. 2013 as cited few lines above; you may also interested to read Fischer et al. 2014)

Explanation provided; paper by Fischer et al. 2014 cited; Lines 161-166:
"Potential relative error strongly increases with decreasing glacier area and manual corrections are required when automatically mapping small glaciers because automated techniques tend to omit mixed (clear ice – debris cover) pixels along the glacier perimeter resulting in a systematic

negative bias in glacier area calculation. Paul et al. (2013) and (Fischer et al., 2014) have shown that bias significantly increases for the glaciers with areas less than 1 km^2 (which constitute about 85% of all glaciers in the Caucasus) reducing the advantages of automated techniques."

- L. 187/189: Repetition of "was applied".

Done

- L. 194f: You need not to cite two times a work by F. Paul as the method used for both studies is the same. Rather refer to Schiefer et al. (2008) or Bolch et al. (2010, which is anyway cited in the manuscript) who present a different and more automated approach.

The suggested references have been added. Lines 192-193.

- L. 198f. The reviewer stated that it would be interesting to know the effect on area changes when including the surging glaciers. I agree that the area changes of these glaciers are not forced by climate. However, the information about the area changes is a very valuable asset to this paper and could easily be calculated for the 7 glaciers.

We have corrected the text: there are 5 surging glaciers, not 7 (two are outside the assessed area). The following has been added; Lines 196-202:

"Within the study area five glaciers have been identified as surging by Rototaeva (2006). These glaciers, were excluded from the analysis with the exception of the Kyukyurtlyu glacier located on Mt. Elbrus. Although this glacier can exhibit changes that are not forced by climatic variations, there was no evidence of surging within the assessment period. Of the remaining four, three surging glaciers did not exhibit measurable change and one (Cheget-Kara) lost 0.04 km^2 or 1.5% of its area despite advancing by approximately 40 m between 2000 and 2003 (Rototaeva, 2006)."

- L. 235: "Most debris-covered glacier snouts do not merge with periglacial landforms" Be more precise.

An extended explanation has been added; Lines 235-238:
"Most debris-covered snouts do not merge with periglacial landforms, exhibit a marked change in topography and are characterised by the presence of patches of clear ice and/or thermoscarst thus making identification of glacier margins on the satellite imagery easier".

- L. 269ff: It would be suitable to consider here Hall et al. (2003)

Done; Line 271.

- L. 314: The fact that the smallest glaciers show the lowest relative change is interesting. Put a bit more emphasis on this fact especially in the discussion. Is this true for both regions? Is it due to topographic effects?

The paper already reports that this difference is stronger in the central MCR than in the western sector. We added additional comment to the Discussion; Lines 462-469:

"Topographic effect and geographical distribution of glaciers are the most likely explanation. Larger glaciers are valley glaciers, whose tongues open to sunlight exhibit a stronger retreat. Smaller glaciers are mostly cirque glaciers whose recession is restricted by topography and shading provided by the cirque walls. Slower wastage of small cirque glaciers due to the shading effect was reported by Shahgedanova et al. (2012) for the Polar Urals. In the central MCR, the difference is more pronounced than in the western sector because larger valley glaciers are located on the southern slope where negative precipitation anomalies contributed to stronger glacier retreat (Table 3)."

- L. 396. Paul et al. (2004) used Landsat not ASTER images.

Corrected

- L. 400. It would be appropriate to cite Paul et al. (2013) also here.

Done

- L. 448: It would be interesting to mention here also the recent study by Fischer et al. (2014) who investigated are change in the Swiss Alps until 2010.

Done; Lines 451-452:
"Fischer et al. (2014) reported 33% (1.1% a^{-1}) and 11% (1.3 % a^{-1}) shrinkage for the eastern Swiss Alps for the 1973-2003 and 2003-2009 periods respectively".

- Please provide a conclusion at the end of the study and not a summary.

Done

- Figure 1: This is not a good use of space. Reduce the white space and the size of the coordinates. Position the coordinates as you did in Figs. 4 and 5. The real area of interest would then be better visible without using more space.

Done

- Fig. 5. Include a scale bar.

Done