

Interactive comment on “Glaciers change over the last century, Caucasus Mountains, Georgia, observed by the old topographical maps, Landsat and ASTER satellite imagery” by L. G. Tielidze

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Dear Referee #1 Thank you very much for your comment. I have read carefully them. I myself made comments, because there are some issues on which I think differently.

Page 3778 Line 11 change “space images” to “airphotos” =I agree

Page 3778 Line 13 change “glaciological catalog” to “glacier inventory” = I agree

Line 13-15 (The Catalog of Glaciers of the USSR, Vol. 8–9, 1975), where the statistical information about the glaciers of Georgia was obtained on the basis of the space images of 1970–1975. - Inventory of Georgia glaciers (The Catalog of Glaciers of the

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USSR, Vol. 9, 1975) was based on the topographic maps published in 1960s , air photos (1955 ,1957) and results of field studies by Vakhushti Bagrationi Institute of Geography (1958-1968yy) – See Catalog lednikov USSR, Volume 9, Issue 1, parts 2-6, Vakhushti Institute of Geography , 1975, page 3, last paragraph. =Please, see my answer below on your comments - Page 3782

Page 3780 Line 19 change “svaneti” to “Svanety” = You probably mean the first letter “s”, because the term “Svanety” is not correct. “Svaneti” is correct.

Page 3781 Line 20-23 “of the data showed that there are some defects in the shape of the glaciers of that time; particularly the inaccessible Arn valleys of the valley glaciers are depicted incorrectly. Naturally, this fact will cause a slight error in the identification of precise areas of the glaciers of that time,” Errors have to be estimated and taken into an account in the final results. = To estimate mentioned errors is practically impossible. Podozerkiy’s maps are so old that we can’t get other, more precise information about glacier outlines. Also, with my opinion to give detail description and list of unnamed glaciers on which small errors are made is scientifically less important.

Page 3782 Line.1-3 “with the depiction of quite precise contours of the glaciers of the Caucasus. R. Gobejishvili gave us new statistical information about the glaciers of Georgia” Evaluation quality of glacier area estimations has to be added to the text. Line 7-8 - “the statistical information on glaciers of Georgia was obtained based on the satellite images of 1970–1975” - Inventory of Georgia glaciers (The Catalog of Glaciers of the USSR, Vol. 9, 1975) was based on the topographic maps published in 1960s , air photos (1955 ,1957) and results of field studies by Vakhushti Bagrationi Institute of Geography (1958-1968yy) – See Catalog lednikov USSR, Volume 9, Issue 1, parts 2-6, Vakhushti Institute of Geography , 1975, page 3, last paragraph. = As you told the data of Dr. Gobejishvili and The Catalog of the glaciers of the USSR are almost of the same period (despite of large differences between glacier number and area). In this case in my paper I can use only Dr. Gobejishvili’s data and not USSR glacier catalogue’s one, because I know for sure that Dr. Gobejishvili has made detailed researches for

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determination of quantity and area of Caucasus glaciers. (Gobejishvili, R. G. Glaciers of Georgia, Monograph. Publ. "Metsniereba", Tbilisi, 1989 (in Russian). Accordingly his data is more reliable for me than USSR glacier catalogue's one, where errors are made for the river basins: Bzipi, Kelasuri, Khobisckali, Liakhvi, Aragvi and Tergi, where the temporary snow spots and snow areas are considered as glaciers and therefore the number and area of the glaciers are increased (See my article - Page 3782 Line.7-14).

Line 15-19 "As we had the information of the last century only in printed form and not electronically. After maps scanning, we used standard transformation parameters (for both period maps 1911, 1960) to re-project the maps in Universal Transverse Mercator (UTM) zone 38-North on the WGS84 ellipsoid, to facilitate comparison with modern datasets (ArcGig 10.2.1 software)" Errors of transformation - ? Have you delineated glacier boundaries and estimated glacier areas from old maps or evaluated quality of Podozerski and Gobejishvili statistical results? = Please, See my article - Page 3783 Line 12-15

Page 3784 Line 14 – "Landsat aerial images.." – remove aerial = I agree

Page 3785 Line 8 change "central" to "Central" = I agree

Line 9-11 "There are the river basins within the Central Caucasus such as the Enguri, Khobisckali, Rioni, Liakhvi and Aragvi river basins." – edit the sentence = I agree

Line 13-15 "Here can be found the largest glaciers of Georgia such as Lekhziri (23.3 km²), southern and northern Tsaneri (12.6/11.5 km²)" –give the source and the year of glacier area estimation = I agree

Page 3792 Line 26 remove "aerial" = I agree

Fig. 1 ASTER 1B – 1B means the level of image processing. Change "ASTER 1B" to "ASTER" = I agree

Interactive comment on The Cryosphere Discuss., 9, 3777, 2015.

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