

Changes in glaciation of the Shelek River basin from 1955 to 2014

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The Shelek River is a left tributary of the Ile River and it flows in the southern part of Almaty province, between two ridges of north Tien-Shan: Ile-Alatau and Kungey Alatau. This river is one of the biggest rivers in the southeast Kazakhstan. Since 1960's glaciation of this basin was observed by many researchers in different years. Available catalogues of glaciation were created by Vilesov E.N., Cherkasov P.A. and Uvarov V.N. There is a difference in results of calculations and methods of assessment by the materials of aerial photography. Nevertheless it was shows that this difference is not big. In our research we have considered changes only for visible part of glaciers. Analysis and creation of new catalog of glaciation by processing and interpretation of satellite images (Landsat 8) for this basin let us to compare our results with previous catalogs and to give an assessment of changes. Area of visible part of glaciers has reduced by 28-30% from 277.9 km^2 to $193.3 \pm 6.96 \text{ km}^2$. Volume of ice calculated by formulas, proposed by Macheret et al. is equal to $\approx 11.8 \text{ km}^3$, which gives us reduction compare at about 15%, since year 2000. Our results also showed how big the difference of changes for sub-basins is. We have revealed 1 sub-basin which share in total glaciation has not changed, 1 which share has increased, and 5 which shares have reduced but with different magnitudes, which in our case mainly due to exposition of glaciers. This shows that analysis of big glacial systems and modeling by using data from one representative glacier like for example Tsentralniy Tuyuksuyskiy from our point of view should be done carefully, because in future can be reached a moment when it cannot be possible anymore apply one model to the entire glacial system, because difference even between small parts of glaciation could be very big.