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This publication is a collection of abstracts submitted to the International Geographical Union Thematic Conference "Practical Geography and XXI Century Challenges dedicated to the centennial of the Institute of Geography of Russian Academy of Sciences and held in June 2018. The conference provided an opportunity to make an overview of the domestic and international trends in geography's development – to analyze the aggravation of global problems, changing theoretical paradigms, radical renewal of research methods and predictions' validity, as well as to strengthen the integration between social and environmental branches of geography. The scientific programme of the conference comprised the sessions proposed by nine IGU Commissions and by groups of scholars – altogether 105 time slots of 90 minutes each, as well as 11 plenary lectures. The programme included also few symposia – on Geospatial Health, on "Big Eurasia" and the Chinese "One Belt – One Road" Initiative, and on the innovative potential of geographical education (lifelong learning). The largest number of presentations concerned climate change, shrinking glaciation in different parts of the world, optimization of land use and protection of land resources, Arctic, international borders, migrations and territorial governance, etc.

Compliers: S. Suslova, A. Sebentsov, N. Semenyak, V. Kuznetsova, M. Zotova, A. Nagirnaya, Y. Konoplianikova, N. Karpukhina, K. Filippova, S. Ivanov, A. Khropov
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BACK

MODELING OF DJANKUAT GLACIER EVOLUTION UNDER CLIMATE CHANGE

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In general, Caucasus glaciers lost approximately one-third of the area and half of the volume during the 20th century. Prediction of their further degradation in changing environment is a challenging task because rivers fed by glacier melt water provide up to 70% of the total river run-off in the adjacent piedmont territories. Therefore accurate assessment of future glacial run-off is a key problem of sustainable development in the regions where hydrological regime is dependent on glacial run-off. The problem is solved by dynamical modeling of mountain glaciers. Because of lack of regular observations, it is feasible to focus on several reference glaciers in the region and to further extrapolate modeling results on the whole glaciated area.

We employ a 3D higher-order ice flow model coupled with a surface mass-balance model to perform prognostic numerical experiments aimed at simulation of future dynamics of Djankuat Glacier. It is a typical valley glacier on the northern slope of the main Caucasus chain. Djankuat is one of the most well studied glaciers in Russia (and, perhaps, in the World) which has been continuously monitored during the last fifty years. Considerable parts of the ablation zones of Djankuat are covered with debris. Heat and physical properties of the debris layer are very different from those of ice. Debris layer determines ablation rate and ice run-off regime. Dependently on thickness, it can accelerate ablation or totally isolate ice cover from melting. To correctly describe ablation rate, we incorporated an algorithm for calculation of ablation rate under the layer of debris.

To validate the model, we utilize observations from the nearest weather stations (Terskol and Mestia), as well as flow velocity, radio echo-sounding, accumulation and ablation measurements. In the prognostic numerical experiments, we simulated possible Djankuat evolution until the year 2100.