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Development of future extremes scenarios for Georgia

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The last decade has shown that the process of global warming has intensified and this tendency is expected to continue in the foreseeable future. Society's perception of climate variability and climate change is largely formed by the frequency and the severity of extremes. Georgia is a mountainous country in the South Caucasus, which contributes very insignificantly to the global climate changes (less than 0,1 percent of greenhouse gas emission). Georgia is situated at the border of subtropical and moderate climate zones and creates part of Mediterranean climate region. However, Georgia's climatic peculiarities are largely conditioned mountain range, to the west - the Black Sea. The Likhi Range stretches from the north to the south and divides the country into two different climatic regions. Due to its location, Georgia very sensitive to climate change. Significant changes are observed in the country, such as the increase in temperature, change in the redistribution of precipitations, decrease in the area of glaciers, rise in the sea level, changes in the river sedimentation. Studies conducted by us revealed that against the background of climate changes extreme climate phenomena have become more frequent: droughts, strong winds, torrential rains, floods as well as extreme temperatures and other phenomena which significantly affect agriculture, economy, health of the population and even the security of the country. It is expected that climate change will further intensify in the future. However, the global climate change is not the only cause of such problems. Climate change is contributed by the human activity as well, such as the destruction of windbreaks, irrigation systems, land degradation (by improper use of pastures), illegal felling of woods. One should also note that at present, there is no state regulation and control imposed on such a human-activity impact. In these conditions Georgia is very much exposed to the changes in the intensity and frequency of climatic extremes. To minimize the impact of climate changes on the environment, economy and the society and to take into account the effects in long term planning and sustainable development, which cannot be avoided, it is necessary to be aware of "future scenarios". Climate change scenarios, particularly those for extremes, are needed for all aspects of future design (e.g., water resources, agriculture, irrigation, storm and land drainage, road, railway and building design and other sectors such as tourism) where the weather and climate are key determinants of everyday life. Some results of potential future changes in temperature's and precipitation's extremes in Georgia have been discussed in this paper. Reliable high-resolution scenarios on the basis of findings of available regional model's output and the climatic data archive obtained by applying the method of statistical downscaling of global models have been constructed for Georgia first time and potential risks associated with changes in these natural phenomena have been evaluated. based on ensemble of scenarios constructed by various methods those uncertainties that are characteristic for a long-term forecasting of climate because of flaws existing in studying global models, regionalization methods, social-economic scenarios and extreme events have been evaluated.