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Simulation of temperature regime of the Moscow region in XXI century

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In view of growing public attention to modern ecological and climatic problems, one of the most important problems of meteorology and climatology is to develop realistic scenarios of future climatic changes. The modern general circulation (GCM) and regional atmospheric (RM) models allow to reproduce meteorological fields with the spatial grid resolution about 50×50 and 5x5 km, respectively. Such model resolution is, unfortunately, not allow to enough adequately describing the climatic condition of the cities. Taking into account big differences of meteorological conditions in- and outside of the cities the prediction uncertainties provided by GCM and RM models for cities may be relatively large.

Within the framework of this study the simple model allowing to reproduce climatic conditions of the city was developed. It was applied to predict temperature regime in Moscow region in Russia for the middle and the end of XXI century. It based on the data provided by GCM and RM models and allows to predict meteorological condition with spatial resolution about 0,5 km×0,5 km.

In the study it was shown that the thermal regime of Moscow area as well as Moscow surrounding areas are well reproduced by developed model. The model allows to describe realistically a spatial heterogeneity of temperature in July both under modern and future climatic conditions. It was also shown, that the area of "warm islands" in Moscow is characterized by very high probability of extreme event occurrency. In July 2050 the probability of this occurrency of will be significantly higher than at present The same thing we can say about the climate of 2100.

Thus, in the near future the climate of Moscow during the summer period will be hotter, and it will result in different environmental problems and increased energy demand.