



Climate change in Moscow in different building-up scenarios (simulation with simple urban canopy model)

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One of the best-known urban effects of development is urban warming (Grimmond, 2007). Globally cities are almost always warmer than the surrounding rural area. But describing the climatic condition of the cities now is impossible with modern general circulation (GCM) and regional atmospheric (RM) models. These models allow to reproduce meteorological fields with the spatial grid resolution about 50×50 and 5×5 km, respectively. 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 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 occurrence. In July 2050 the probability of this occurrence of will be significantly higher than at present. Also, we took into account different building-up scenarios. Within the scope of experiments mean temperature of July for each administrative district of the capital was calculated. The climatic forecast of temperature in Moscow in the middle of 21th century depending on the building scenario was made. It was shown that changes in the building character can be successfully used for correction of megalopolis mean temperature (for 1-1.5 degrees). It was demonstrated that in the nearest future, provided current building style conserved, the climate of Russian capital would become warmer in the summertime which would cause corresponding ecological problems.

References:

1. Sue Grimmond. Urbanization and Global Environmental Change: Local Effects of Urban Warming 2007. The Geographical Journal, Vol. 173, pp 83-88