



Investigation of the climate change within Moscow metropolitan area

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As the urbanization continues worldwide more than half of the Earth's population live in the cities (U.N., 2010). Therefore the vulnerability of the urban environment – the living space for millions of people - to the climate change has to be investigated. It is well known that urban features strongly influence the atmospheric boundary layer and determine the microclimatic features of the local environment, such as urban heat island (UHI). Available temperature observations in cities are, however, influenced by the natural climate variations, human-induced climate warming (IPCC, 2007) and in the same time by the growth and structural modification of the urban areas. The relationship between these three factors and their roles in climate changes in the cities are very important for the climatic forecast and requires better understanding.

In this study, we made analysis of the air temperature change and urban heat island evolution within Moscow urban area during decades 1970-2010, while this urban area had undergone intensive growth and building modification allowing the population of Moscow to increase from 7 to 12 million people. Analysis was based on the data from several meteorological stations in Moscow region and Moscow city, including meteorological observatory of Lomonosov Moscow State University. Differences in climate change between urban and rural stations, changes of the power and shape of urban heat island and their relationships with changes of building height and density were investigated. Collected data and obtained results are currently to be used for the validation of the regional climate model COSMO-CLM with the purpose to use this model for further more detailed climate research and forecasts for Moscow metropolitan area.

References:

1. U.N. (2010), World Urbanization Prospects. The 2009 Revision.Rep., 1-47 pp, United Nations. Department of Economic and Social Affairs. Population Division., New York.
2. IPCC (2007), IPCC Fourth Assessment Report: Climate Change 2007 (AR4) Rep.,Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.