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Summer urban thermal comfort in Russia. Climatology. Predictability. Trends.

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Modern Russia is highly urbanized region with more than 1100 cities. So the summer thermal comfort here is an important factor for federal planning The main goal of the study is to learn differences between thermal comfort summer regime of arctic, moderate and subtropical cities using Physiological Equivalent Temperature (PET) for the main extent of thermal comfort. Also we investigate modern bioclimatic conditions (1966-2015) for determining the level of comfort in large Russian cities based on the observations at the meteorological stations. According to the distribution of thermal stress events (calculated for every meteorological fix hours, 8 times per day) the authors created the comfort diagram for each city during daytime heat wave period and evaluated their comfort conditions.
In the current research we are operating with WMO climatic data for 11 biggest cities of the Russian Federation: from the European part (Moscow, Saint-Petersburg, Ekaterinburg, Voronezh, Volgograd, Kazan, Nizhny Novgorod, Perm, Ufa) and from Siberia (Omsk and Krasnoyarsk).

The most interesting result of the comparison of the long-period (50 years) urban trends (PET-index and Air Temperature) in different parts of Russia is its extraordinary cross-shaped form in Moscow (in other cities the trends lines are practically parallel to each other). It means that at the level of the average annual values, only in Moscow-city the PET index (and, hence, potentially the thermal stress) grows faster than the regional climate warms. In other cities this tendency is much more weak (N.Novgorod) or not significant. This interesting tendency is caused by both Moscow-city related urban planning dynamics in post-USSR period and by regional climate dynamics.

In different parts of Moscow region trends are also not uniquely defined.

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