EMS Annual Meeting Abstracts
Vol. 14, EMS2017-621, 2017
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Climatology of thermal comfort conditions in Russian big cities during heat wave events in 1966-2015

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Rapid urbanization in Russian Federation led to cities growth and its economic advance. On the other hand population of big cities (>1 000 000 inhabitants) is quite vulnerable to heat wave events due to intensive urban heat island event.
In July and August 2010 in the biggest city in Russia – Moscow, where more than 11 million people live, the longest and the strongest heat wave as well as the warmest day (29th of July 2010) were recorded since the meteorological observations in Russian (Malinina, Konstantinov; 2014).

There were close to 11 000 excess deaths from non-accidental causes during this period, mainly among those older than 65 years. Increased risks also occurred in younger age groups (Shaposhnikov et al.,2014).

The main goal of study is an assessment of modern bioclimatic conditions (1966-2015) for determining the level of comfort in large Russian cities based on observations at meteorological stations, including:

- An estimation of accuracy, reliability and an opportunity of the quantitative analysis of bioclimatic parameters
- Calculation of indices of bioclimatic comfort, based on direct measurements of meteorological parameters (predominantly Heat Index, Wind Chill Temperature) and taking into account the model of the energy balance of human body (Physiological Equivalent Temperature);
- A comparative analysis of the level of comfort in large cities of the Russian Federation on the basis of calculated indices.

PET index is calculated using RayMan model (Matzarakis et al, 2007). This model calculates the radiation temperature, average radiation fluxes and biometeorological indices (PET, PMV, SET) at a particular point at a particular time.

Selected cities locate within territory from 40N to 70N latitude and from 20E to 160E, and during study authors describe thermal comfort patterns depending on geographical location of the city.

The reported study was partially supported by RFBR (Russian Foundation for Basic Research), research project No. 15-35-70006, and 13-05-41306-RGO_a

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