



Development of the real-time system for thermal comfort conditions monitoring in Moscow metropolis

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Motivation



http://www.geogr.msu.ru/

 Therefore, the question arose about the need to monitor the conditions of thermal stress exerted on humans in real time.

- Due to the urban heat island effect, heat waves are most intense in cities. As a result, the mortality rate is also higher.
- Prolonged exposure to unfavorable thermal conditions leads to great risks to human health



Personalized heat alerts and rest /hydration advice

LISE WER VERSION



Main issue of the research

Main issue: Development of the technology for modeling thermal comfort

conditions in a weather monitoring system in Moscow

Objectives of the research:

- To develop a technology for calculating comfort in the monitoring system,
- To test the model's sensitivity to changes in the sky view factor,
- To assess the repeatability of various thermal comfort conditions in summer, taking into account the sky view factor for selected stations in Moscow and the Moscow Region.

Real-time calculation and visualization of thermal comfort indices



Visualization of thermal comfort indices for Moscow region



Sky view factor

 SVF (sky view factor) is the fraction of the sky open from obstacles, visible from a certain point. The values of radiation fluxes are weighted by this factor.



Evaluation of the repeatability of thermal stress levels for different stations, taking into account SVF



Conclusions

- For the first time in Russia, a system for monitoring thermal comfort conditions was created for the territory of the Moscow Region. It is part of a large project for the development of a cartographic web service for monitoring meteorological parameters.
- A test was carried out for the sensitivity of comfort indices to changes in the sky view factor. The most sensitive to SVF variation is PET, the least sensitive to variations in SVF is UTCI.
- All stations in the Moscow region were ranked according to the frequency of occurrence of extremely unfavorable gradations of heat stress, taking into account the SVF coefficient. Most of all cases are observed in open areas of airports: Sheremetyevo and Domodedovo (38% jointly).
- In the future, it is planned to integrate the unit for calculating the comfort indices into a common web service for monitoring weather conditions in Moscow and adjacent territories.

Thanks for your attention!