

More of the Chinese population will be exposed to heat waves

13 June 2018

One of the major concerns in climate change studies is how the thermal conditions for the living environment of human beings will change in the future. In a paper recently published in *Atmospheric and Oceanic Science Letters*, Prof. Xuejie Gao from the Institute of Atmospheric Physics, Chinese Academy of Sciences, and his coauthors, try to answer this question based on their recently completed and unprecedented set of high-resolution (25 km) 21st-century climate change simulations. These simulations were produced using the regional climate model RegCM4, driven by four global model simulations over China—the country with the world's largest population.

The index of effective temperature (ET), which considers the aggregate effects of temperature, relative humidity, and wind on human thermal perception is used in the analysis. "Based on ET values, we classify thermal perception into different categories, ranging from very hot, hot, warm, comfortable, to cool, cold, and very cold," explains Gao.

The authors found that a general increase in ET in the future leads to a large increase in population exposure to very hot days, a China-aggregated six-fold increase in "person-days" by the end of the 21st century under the RCP4.5 scenario. The largest increase in very hot person-days is found in the region extending from the Yangtze River valley to North China, along with the southern coasts and the Sichuan Basin.

"To be more specific," says Gao, "the number of people with no exposure to very hot days will drop from the present-day figure of 0.6 billion to 0.2 billion, while those with exposure to more than one and two months of very hot days will increase from 2.7 million and zero to 165.7 and 22.7 million, respectively."

Meanwhile, a decrease in comfortable day

conditions by 22 percent of person-days is found, despite an increase in climate-based comfortable days (12 percent). This shows that fewer people will benefit from the improved thermal conditions. In fact, the population with over 2 months of comfortable days by the end of the century is projected to be only 55 percent of the present-day value. A general decrease in cool, cold, and very cold person-days is found, as expected in this country dominated by cold thermal [conditions](#).

"Thus, overall, even a mid-level warming scenario is found to increase the thermal stress over China," says Gao, "although there is strong geographical dependency in this result."

More information: Xue-Jie GAO et al, Future changes in thermal comfort conditions over China based on multi-RegCM4 simulations, *Atmospheric and Oceanic Science Letters* (2018). [DOI: 10.1080/16742834.2018.1471578](https://doi.org/10.1080/16742834.2018.1471578)

Provided by Chinese Academy of Sciences

APA citation: More of the Chinese population will be exposed to heat waves (2018, June 13) retrieved 15 June 2019 from <https://phys.org/news/2018-06-chinese-population-exposed.html>

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