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Faster increase in apparent temperature under climate warming

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Apparent temperature, an indicator of temperature human perceives, is mainly determined by air temperature, humidity and wind speed. Global warming indicated by increasing air temperature alters climatic and hydrologic circulations, and hence changes humidity and wind speed, which jointly influence apparent temperature. Here we study the global changes in apparent temperature and compare these changes with air temperature to investigate how human feels about continuous global warming. Results show that under climate warming, apparent temperature increases faster than air temperature. This phenomenon is especially remarkable in the tropics and subtropics and under high emission scenario. During 1981-2000, apparent temperature in the tropics is 0-4°C higher than air temperature, and then increases to 3-6°C higher during 2081-2100 under Representative Concentration Pathway 8.5. The apparent temperature in the tropics is projected to reach >35°C, implying severe health impacts. Continental average of apparent temperature is 1.5°C lower than air temperature in 2000, and turns to 0.25°C higher by the end of 21st century. The faster increment in apparent temperature is a combined effect of stronger heat stress and weaker cooling effect caused by increasing air temperature with negligible changes in relative humidity and wind speed.

Biography

Yongqin David Chen is a Professor for the Department of Geography and Resource Management at The Chinese University of Hong Kong. His research and teaching areas include hydrology and water resources management, meteorology and climatology, environmental assessment and modeling, and regional development. In recent years his research activities have been focused on hydrologic impacts of global climate change and regional land-use alteration, low-flow hydrology in the Pearl River basin, hydrologic changes in the Pearl River Delta, and urban water management in Hong Kong and strategic environmental assessment in China.

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