

上海近50年气温变化与城市化发展的关系

曹爱丽,张浩,张艳,马蔚纯*

复旦大学环境科学与工程系, 上海 200433

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摘要 根据上海地区2个气象站近50年的年均气温数据,采用回归分析、滑动平均和Mann-Kendall检验法研究上海地区气温的年代际变化与跃变,城郊温差的年际变化;采用趋势拟合与相关分析,研究城郊温差与城市人口、GDP、能源消耗量、建成区面积和住宅竣工面积等各项城市发展指标的关系.结果表明:(1)近50年来,上海地区年均气温缓慢上升,20世纪90年代后城郊温差呈锯齿状上升趋势,若以徐家汇代表城区,奉贤代表郊区,则近50年来,城郊温差增温率为 $0.23^{\circ}\text{C}/10\text{a}$ 。(2)1989~1990年为上海城区气温的跃变年份,而郊区的气温跃变出现在20世纪90年代中期。(3)各项城市发展指标均与上海城郊温差有着显著的相关性,表明它们与上海城市热岛的发展关系密切,其中,住宅建设是上海城市热岛最主要的驱动因素,城市人口和经济发展也具有重要影响。

关键词 [年均气温](#) [城市热岛](#) [城市化](#) [城郊温差](#) [上海](#)

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Decadal changes of air temperature in Shanghai in recent 50 years and its relation to urbanization

CAO Ai-Li, ZHANG Hao, ZHANG Yan, MA Wei-Chun*

Department of Environmental Science and Engineering, Fudan University, Shanghai 200433, China

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Abstract Based on annual mean air temperature data of recent 50 years at 2 meteorological stations in Shanghai region, and employing methods of regression analysis, running mean and Mann-Kendall test, this paper studied the decadal changes of air temperature, jumping year and the temporal variations of the temperature differences between urban area and suburbs in Shanghai. The indicators for urban development including urban population, GDP, energy consumption, built-up area and area of dwelling house were also considered for correlation analysis to the heat island effect in Shanghai. Based on the research work above, we concluded that (1) the annual mean air temperatures in Shanghai region have been ascending slowly, while the temperature differences between urban area and suburbs have been ascending serrately after 1990s. If Xujiahui Station is regarded as the representative of urban area and Fengxian Station as that of suburbs, the increasing rate of temperature differences is $0.23^{\circ}\text{C}/10\text{a}$ in recent 50 years. (2) 1989~1990 is the jumping point of air temperature for the urban area of Shanghai, while the mid-1990s for the suburbs. (3) There is a significant correlation between all the indicators for urban development and the temperature differences, which means that all the indicators are closely related to the development of heat island effect in Shanghai. In all the indicators, the construction of dwelling house is the most important driver, while the urban population and economic development are both the important factors for the development of heat island effect in Shanghai.

Key words [Annual mean air temperature](#); [Heat island effect](#); [Urbanization](#); [Temperature differences of urban area and suburb](#); [Shanghai](#)

通讯作者:

马蔚纯 wcma@fudan.edu.cn

作者个人主页: 曹爱丽;张浩;张艳;马蔚纯*

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