



Climate variability of heat wave and future warming scenario in Taiwan

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In this study, the heat wave definition and climate variability of HW days according to air temperature are conducted in order to find out the local threshold and variation trends in the past 40 years (1971-2010), in three major cities, Taipei (TP), Taichung (TC) and Kaohsiung (KH) in Taiwan. As for Taiwan's high humidity atmospheric condition, the heat stress index wet-bulb globe temperature (WBGT) is also employed in the past (2003-2012) and future warming scenario in 2075-2099. The simulation WBGT in the past (2003-2012) and future warming projection (2075-2099) are deduced from the results of ECHAM5/MPIOM-WRF (ECW) dynamic downscaling 5-km resolution in these three cities. Box plot analyzing shows the differences between observed and simulated WBGT distribution at 25%, 50% and 75% percentiles are all within 0.7 °C in 2003-2012. Even the extreme values, the differences are all within 0.9 °C. In other words, the ranges of the WBGT variation from observations are reasonably captured by the ECW in three cities. According to the good performance of ECW in the WBGT simulation, the projection of future WBGT in these three cities has been evaluated under IPCC A1B scenario by using ECW. It is estimated that nearly 50% of the days in summer (July and August) are all at the level of danger (WBGT>31 °C) at the period 2075-2099. It is a significant increase because they are only 10.74%, 4.22% and 11.28% above this level in the past in 2003-2012 in TP, TC and KH, respectively. From public health point of view, the impacts are huge and worthy to pay attention under the global warming trend.