



Heat Stress and Mortality in Athens: Impact Model Construction and Validation

C. Giannakopoulos, B. Psiloglou, M. Petrakis

National Observatory of Athens, Greece

Climate change can have direct impacts on human health, including increased mortality due to heat stress and heat waves. In this study, an empirical-statistical model for heat stress is constructed for the city of Athens, using the summer months of the observational period 1992-2006. Two approaches were taken in order to calculate excess deaths i.e. deaths beyond those expected for a specific period in that population: a. Use of a fixed mean of daily mortality for each summer month, for the period 1992-2006. b. Use of a 30-days running mean, which smoothes the fluctuations in the death data. In each case, daily excess deaths were calculated by subtracting the expected from the observed daily death values. The methodology followed can be summarized as follows: Each number of excess deaths was then grouped into the corresponding 1C interval of maximum air temperature for simplification purposes. All excess deaths in each 1C interval for the entire period were added in order to find out where heat-related deaths were no longer detectable. In this way only temperatures over a certain threshold were regressed. Finally, the sum of the excess deaths in each interval was divided by the frequency of occurrence of that temperature interval in the 1992-2006 period, to give the number of deaths per day for a particular temperature interval. Our study has so far shown that there have been considerable heat-related deaths in the city of Athens, both from moderate and extreme heat, during the summer months of 1992-2006. The empirical-statistical model constructed is shown to reproduce well the observed heat-related deaths. This makes the model more reliable for the quantification of the potential impacts of climate change on health to be studied using available regional climate model output.