



Present and Future Human Thermal Bioclimatic Conditions and Impacts on Cardiovascular Admissions in Crete Island, Greece

Anastasia Blea and Panagiotis Nastos

National and Kapodistrian University of Athens, Geology and Geoenvironment, Climatology and Atmospheric Environment, Kaisariani Athens, Greece (ableta@geol.uoa.gr)

The goal of this study is to assess and quantify the possible relationship between biometeorological conditions and daily counts of cardiovascular problems in Heraklion city, Crete Island, Greece, during a five-year period 2008-2012. The thermal environment was analyzed by means of the Physiologically Equivalent Temperature (PET) and Universal Thermal Climate Index (UTCI), which are two of the most popular human thermal indices derived from the human energy balance.

Generalized linear models (GLM) with Poisson distribution were applied to time series of daily counts of outpatients with cardiovascular problems against present and future bioclimatic conditions, after controlling for possible confounders and adjustment for season and trends. The medical data sets, considered in six classes (total, men, women admissions, young patients until 35 years old, patients aged between 36 and 64 years old and elderly above 65 years old), concerned the dependent variables, while air temperature, relative humidity, wind speed, cloudiness, mean radiant temperature, PET and UTCI the independent.

Future changes in meteorological parameters such as air temperature, relative humidity, wind speed and cloudiness (used as input variables in the estimation of PET and UTCI) were derived by the simulations of the regional atmospheric climate model KNMI under SRES A1B, for the near (2021-2050) and far (2071-2100) future with respect to the reference period 1961-1990.

The interpretation of the extracted results suggests a significant association between cold weather and increased cardiovascular admissions. For the near future, the projected increase of 1.6 oC for PET may result in reducing the incidence of cardiovascular problems by almost 2%, against 4% taking into consideration an increase of 4oC for PET in the far future.