



Present and Future Human Thermal Bioclimatic Conditions and Impacts on Respiratory 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 objective of this study is to assess and quantify the association between present and future human thermal bioclimatic conditions and daily counts of respiratory problems in Heraklion city, Crete Island, Greece. The bioclimatic conditions were analyzed in terms of the Physiologically Equivalent Temperature (PET) and Universal Thermal Climate Index (UTCI), which are two of the most popular human thermal indices based on the human energy balance. The PET and UTCI analysis was performed by the application of the bioclimate model, “RayMan”, which is well-suited to calculate radiation fluxes and human biometeorological indices.

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. Generalized linear models (GLM) with Poisson distribution were applied to the time series of daily numbers of outpatients (total, males and females) with respiratory problems against present and future bioclimatic changes, after controlling for possible confounders and adjustment for season and trends.

The interpretation of the results of this analysis suggests a significant association between cold weather and increased respiratory admissions. For the near future, the projected increase of 1.60C in PET may result in reducing the incidence of respiratory problems by almost 3% against 7.5% in the far future, when PET is projected to increase by 40C.