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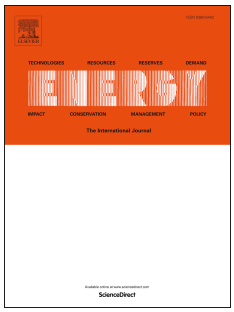

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Roberto San José, Juan Luis Pérez, Libia Pérez, Rosa Maria Gonzalez Barras

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EFFECTS OF CLIMATE CHANGE ON THE HEALTH OF CITIZENS MODELLING URBAN WEATHER AND AIR POLLUTION

Roberto San José[1], Juan Luis Pérez[1], Libia Pérez[1] and Rosa Maria Gonzalez Barras[2]

[1] Software and Modelling Group, Computer Science School, Technical University of Madrid (UPM), Madrid, Spain.

[2]Department of Physics and Meteorology, Faculty of Physics, Complutense University of Madrid (UCM), Ciudad Universitaria, 28040 Madrid, Spain.

roberto@fi.upm.es

Abstract

A dynamical downscaling tool has been implemented to understand the impacts of global climate on citizens health. We have used the WRF-Chem mesoscale model (NOAA, USA) to produce information covering Europe with 25 km of spatial resolution and two nested domains with 5 km and 1 km of spatial resolution over London. Finally, detailed simulations are carried out using the MICROSYS-CFD model to take into account the effects of urban buildings on the urban atmosphere in the Kensington and Chelsea area. The tool produces very high spatial air quality and meteorological data (50 meters) and also temporal resolution (1 hour) to estimate health impacts in the short term, using exposure-response functions extracted from epidemiological studies. The comparison shows an acceptable agreement of the modelled data with the measurements. The effects on the health of citizens by temperature change in the future are more important than by changes in atmospheric pollutant concentrations. The maps show how the effects depend on the city's geometry and how the tool can highlight the most vulnerable areas to help to design plans and implement strategic measures to mitigate the effects of global climate change on people's health.

Keywords: health, climate, downscaling, impact, urban

INTRODUCTION

There are several ways for addressing climate change effects, for example by taking actions to reduce Green House Gases (GHG) emissions from the transportation sector [1], but we need complex modelling tools that could help to support air pollution mitigation strategies [2] and develop efficient energy strategies [3]. City areas are those areas where the local response to global climate change is mostly marked. [4]. Previous studies have shown that global climate change will have a significant impact on both local climate and urban air quality [5]. Air pollution and extreme temperatures can affect human health by modifying mortality and morbidity rates [6]. The development of resilience strategies that avoid the effects of climate change on health is a major challenge to which the scientific community must contribute [7]. Urban climate patterns and air pollution are strongly influenced by topography, land use, buildings, etc., so studies of urban areas need very high spatial resolution information to capture the spatial and temporal variability of weather conditions and air pollution in a city [8].