Geophysical Research Abstracts
Vol. 17, EGU2015-4552, 2015
EGU General Assembly 2015

Estimating climate change for Southeast Europe: a dynamical downscaling approach

Rafaella-Eleni P. Sotiropoulou (1,2), Efthimios Tagaris (1), Andreas Sotiropoulos (3), Ioannis Spanos (3), Panagiotis Milonas (4), and Antonios Michaelakis (4)

(1) Environmental Research Laboratory, NCSR Demokritos, Athens, Greece (rsotiropoulou@uowm.gr), (2) Department of Mechanical Engineering, University of Western Macedonia, Kozani, Greece, (3) Terra Nova Ltd., Environmental Engineering Consultancy, Athens, Greece, (4) Benaki Phytopathological Institute, Dept. of Entomology and Agricultural Zoology, Kifisia, Greece

Mediterranean region is considered to be the most prominent climate response Hot-Spot since it is located in a transition zone between the arid climate of northern Africa and the wet climate of central Europe. Even a minor change in large scale climatic factors might impose large impacts on the climatic conditions of different Mediterranean areas. Furthermore, the complex topography and the vast coastlines suggest a fine scale spatial variability of the climatic conditions. Because of these, there is an increasing interest for this area. The objective of this study is to estimate the changes in climatic parameters (such as temperature and precipitation) over southeast Europe in the near future at a very fine grid resolution. The NASA GISS GCM ModelE is used to simulate current and future climate at a horizontal resolution of $2^\circ \times 2.5^\circ$ latitude by longitude. The model accounts for both the seasonal and the diurnal solar cycles in its temperature calculations. It simulates the emissions, transport, chemical transformation and deposition of several chemical tracers. Sea surface temperatures (SST) are calculated using model-derived surface energy fluxes and specified ocean heat transports. The simulations cover the period from 1880 to 2061. Greenhouse gas concentrations up to 2008 are prescribed using ice-core measurements, while for the period 2009-2061 the GHG levels are supplied from the IPCC A1B emissions scenario. Since the outputs from the GCM are relatively coarse for applications to regional and local scales, the Weather Research and Forecasting (WRF version 3.4.1) model is used to dynamically downscale GCM simulations. The domain covers the south – southeast Europe in 273 x 161 horizontal grids of 9 km x 9 km, with 28 vertical layers. Because of the time needed for the downscaling procedure meteorological conditions are presented, here, for five current (i.e. 2008 – 2012) and five future (i.e. 2058-2062) years. Annual temperature is estimated to be higher in the future all over the domain. Annual precipitation is estimated to be lower in the major part of the land at the south east and south west of the domain. Seasonal analysis suggests that precipitation change varies locally.

Acknowledgement: This work was supported by the EU co-funded LIFE-CONOPS project through grand agreement LIFE12 ENV/GR/000466.