Geophysical Research Abstracts
Vol. 13, EGU2011-5500, 2011
EGU General Assembly 2011

ENSEMBLE RCM performance in reproducing temperature and precipitation regime in Romania. Application for Banat and Oltenia Plains.

Alexandru Dumitrescu (1), Aristita Busuioc (1), Baciu Madalina (1), Sorin Cheval (2), and Liana Cazacioc (1)

(1) National Meteorological Administration,97 Sos. Bucuresti-Ploiesti, Sect. 1, 013686-Bucharest, Romania Tel: +40-21-3183240, Fax: +40-21-3167762 , (2) National R&D Institute for Environmental Protection 294 Splaiul Independentei, Sect. 6, 060031-Bucharest, Romania,Tel: +40-213182057, Fax: +40-213182001

Despite of important progress made in developing Regional Climate Models (RCMs)), these still exhibit significant systematic biases in their ability to simulate key features of the observed regional/local climate features. The main objective of this paper is to analyse 9 ENSEMBLES RCMs regarding their performance in simulating the temperature and precipitation regime in Romania, with more details for the Banat and Oltenia Plains. These results were obtained within the CC-Waters project (www.ccwaters.eu), where the RCM outputs have been used to estimate future temperature and precipitation changes for the two mentioned areas. Compared to previous studies, when the RCM validation regarding the Romanian climate has mainly been made in a qualitative way, a more quantitative approach is proposed. In this respect, in order to have a reliable comparison with observation, a grid point observed data set with same spatial grid as RCMs) was achieved, using the GIS technique applied to a high density of observed data set representing seasonal long term means at 94 stations for temperature and 104 stations for precipitation over the 1961-1990 period. The observed data were before homogenized and precipitation data were additionally adjusted considering the physical-geographic factors (mainly wind speed and the share of solid precipitation). The comparison between the RCM outputs and observed grid point values has been made by using three statistics measuring the RCM performance: bias, root- mean squared error and spatial correlation. In this way, the RCM capability in reproducing the mean climate state as well as the spatial features is analysed. It was found that, as spatial average over Romania, almost RCMs, overestimate the seasonal temperature in Romania, the highest biases being produced by the two versions of the HIRHAM RCM (driven by ARPEGE and ECHAM5 GCMs). Considering all seasons, the most skilful RCMs are represented by the RegCM3-ECHAM5, CNRM-ARPEGE, REMO-ECHAM5, RACMO-ECHAM5 and SMHIRCA-ECHAM5, almost all being driven by the ECHAM5, except for CNRM. The results are different for precipitation. Generally, the RCMs overestimate the precipitation in all seasons, except for summer when it is underestimated. The CNRM and RegCM3 reproduce well the spatial precipitation distribution but, in wintertime, they show the highest overestimation.
When we go into more details, over smaller areas, the results are sometimes different (the biases being different from one region to another). These details are shown for the Banat and Oltenia Plains by considering only three RCMs (RegCM3, CNRM and UCLM).
In order to understand the mechanisms leading some RCM failures in simulating the features of the regional/local Romanian climate (mentioned above), the large/regional scale variability of climate variables are analysed, such as: sea level pressure, geopotential heights at 500mb, air temperature and specific humidity at 850 mb. The RCM capability to reproduce the main state for these variables, as well as the modes of spatial variabiulity (given by the first two EOF patterns), are analysed. The large scale NCEP/ ERA40 data are considered as observed climate variables, showing the difference in the obtained results using these two data sets of different spatial resolution.