Geophysical Research Abstracts
Vol. 12, EGU2010-13601, 2010
EGU General Assembly 2010

Analysis of simulated future climate conditions of Central Europe using different weather pattern classifications

Judit Bartholy (1), Rita Pongracz (1), Andreas Philipp (2), Christoph Beck (2), and Aniko Kern (1)

(1) Eotvos Lorand University, Department of Meteorology, Budapest, Hungary (bari@ludens..elte.hu, 00-36 1 3722904), (2) University of Augsburg, Physical Geography and Quantitative methods, Institute of Geography, Augsburg, Germany

The main goals of the research are (i) to compare weather pattern classification methods for Central Europe (COST733 domain 07 covering 43-58°N, 3-26°E) using observed and simulated present climate (1961-1990), and (ii) to analyze the climate change effects on weather patterns for the same region using different classification methods. The observed climate is represented by the ECMWF ERA40 datasets, and the simulation experiments were accomplished for future climate conditions (2071-2100) using two emission scenarios (A2 and B2) in the frame of the EU-project PRUDENCE (Prediction of Regional scenarios and Uncertainties for Defining EuropeaN Climate change risks and Effects). High resolution (50 km $\times$ 50 km) simulated daily values of meteorological variables (mean sea level pressure, temperature, precipitation) have been obtained from the regional climate model (RCM) outputs of the Danish Meteorological Institute (DMI). DMI used the HIRHAM4 RCM (developed jointly by DMI and the Max-Planck Institute in Hamburg), for which the boundary conditions were provided by the HadAM3H/HadCM3 global climate model of the UK Met Office.
For the weather pattern classification we use the COST733 classification software (version 0.19-17). The 12 available classification methods (grouped into (i) optimization algorithms, (ii) leader algorithms, (iii) PCA based methods, and (iv) threshold based methods) are applied to the ERA40 daily mean sea level pressure database for 1961-1990 using 9, 18, and 27 weather pattern types. The resulting circulation pattern types from 1961-1990 classifications of the mean sea level pressure fields are applied to the classification of the 2071-2100 period for both A2 and B2 scenarios. Frequency distribution changes of circulation pattern types are analyzed in the selected domain by 2071-2100 period for both A2 and B2 scenarios relative to the 1961-1990 reference period. Furthermore, temperature anomaly and precipitation pattern changes are evaluated in the Carpathian basin (covering 45-49°N, 14-27°E) for each circulation pattern types using all the selected classification techniques.