

Coping with the challenge

Climate Change and Variability: Impact on Central and Eastern Europe...

The CLAVIER (Climate Change and Variability: Impact on Central and Eastern Europe) project, running from 2006 to 2009, is supported by the European Commission's 6th Framework Programme as a Specific Targeted Research Project under the Thematic Sub-Priority 'Global Change and Ecosystems'. CLAVIER is co-ordinated by Dr Daniela Jacob at the Max-Planck Institute for Meteorology in Hamburg, Germany.

The nations in Central and Eastern Europe (CEE) face triple challenges through the ongoing economic and political transition, continuing vulnerability to environmental hazards, and longer-term impacts of global climate change. In this case, the overall aim of CLAVIER is to make a contribution to successfully cope with these challenges.

The project addresses the following scientific goals:

- Investigation of ongoing and future climate changes and their associated uncertainties in Central and Eastern European Countries (CEEC);
- Analyses of possible impact of climate changes in CEEC on weather pattern and extremes, air pollution, human health, natural ecosystems, forestry, agriculture and infrastructure, as well as water resources;
- Evaluation of the economic impacts of climate changes on CEEC economies, concentrating on four economic sectors: agriculture, tourism, energy supply and the public sector.

Three representative CEE countries are studied in detail: Hungary, Romania and Bulgaria.

Researchers from six countries and different disciplines investigate the

links between climate change, and its impact on weather patterns, air pollution, extreme events, and on water resources. Furthermore, an evaluation of the economic impact on agriculture, tourism, energy supply and the public sector is conducted.

To fulfil the need of local and regional impact assessment, ongoing and future climate changes are analysed with very high detail based on existing data and on climate projections. The experiments performed within CLAVIER consist of an ensemble of model simulations, covering the period from 1951 to 2050, and are conducted at the Institute Pierre Simon Laplace (IPSL) in Paris, the Max Planck Institute of Meteorology (MPI-M) in Hamburg and the

Hungarian Meteorological Service in Budapest. This ensemble is a cross-product of two greenhouse gas emission scenarios (A1B and B1 from the International Panel on Climate Change), two global ocean atmosphere coupled models (MPI-M and IPSL), and two regionally oriented climate models (REMO from MPI-M and LMDZ from IPSL). Such an exhaustive combination is designed to evaluate the uncertainties existing in the different stages of regional climate change information. Fig. 1 shows the preliminary results of the model simulations performed in MPI-M by the regional climate model REMO.

A crucial part of the project is the establishment of an effective interface between the project participants,

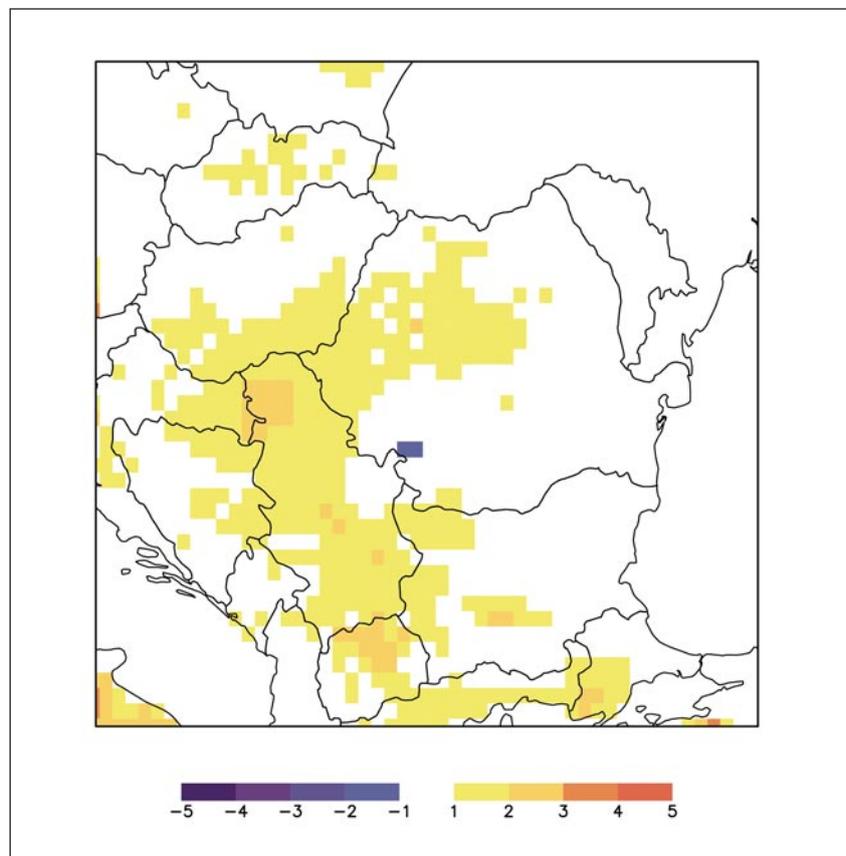


Fig. 1: Mean temperature deviation between regional climate model REMO and ECA observational data for the period from 1961 to 1980

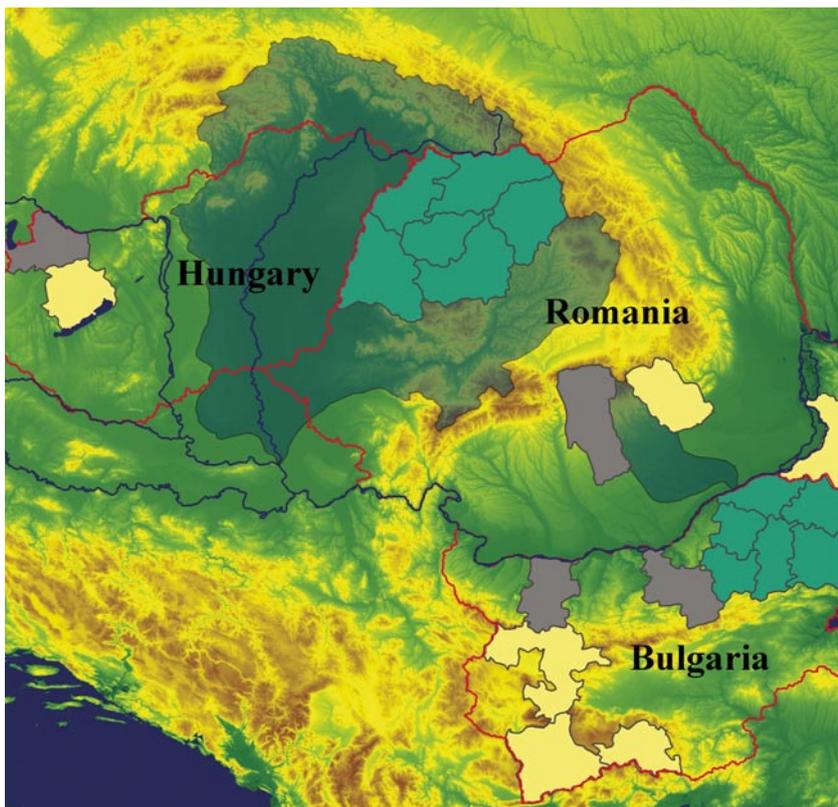


Fig. 2: CLAVIER Target regions: cyan – hydrological/water management; green – agriculture; grey – energy; yellow – tourism

particularly those from the climate modelling and the climate impact assessment communities. Thus, information about the requirements of climate impact studies conducted in the framework of CLAVIER is collected, and the potentials and restrictions of available climate scenario data are communicated.

Furthermore, available methodologies for bridging the ‘scale gap’ between modelling data and the needs of particular impact studies are evaluated in the framework of CLAVIER.

Weather regimes are believed to be a main factor in organising the local weather and climate of Central and Eastern Europe. They are associated with significant anomalies of temperature, precipitation and wind. Therefore, the CLAVIER objective is to make a complete analysis of weather regimes for the selected region, including the study of ongoing and future changes, as well as their implication to air pollution levels.

It is generally expected within the climate research community that

extreme events will increase under climate change conditions. They will occur more often and will become more intense. Such events could be heavy extra-tropical storms, as well as heavy precipitation events. In the framework of CLAVIER, past and future trends of extreme events in the Central and Eastern European region are analysed.

CLAVIER aims at the production of future hydrological and agricultural scenarios based on the output of regional climate models, mentioned above. Analysis of the simulation results received from hydrological models serves as direct or indirect input to water management decision support systems. Within the project, the Upper-Tisza, the Mures/Maros and the Arges catchments are studied in detail.

One of the main objectives of CLAVIER is to evaluate the economic impacts of climate changes in Hungary, Romania and Bulgaria. The CLAVIER target regions for impact studies are shown in Fig. 2.

In order to estimate the economic vulnerability and the impacts on the national economies, representative case studies of selected regions are conducted for each of the four economic sectors of particular interest – agriculture, tourism, energy supply and the public sector. In addition, the risk transfer mechanisms and institutional settings that can deal with economic risks, eg. from flood events or droughts, are analysed.

Based on the findings of the case studies, the influence of climate change scenarios on the national economies is estimated and conclusions on the overall macro-economic relevance of the studied phenomena are drawn.

A substantial part of the project is also in close contact with a wide range of user groups from CEE countries who will benefit from the CLAVIER results. CLAVIER closely co-operates with the EU projects ENSEMBLES and CECILIA.

Please visit the project website to find more information about CLAVIER.



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