

A high resolution gridded database of the Carpathian Region, including a set of drought indices as a contribution to the European Drought Observatory

Sandor Szalai¹, Jürgen Vogt²

¹ Szent Istvan University (Hungary), szalai.sandor@mkk.szie.hu ² European Commission, Joint Research Centre (Ispra), juergen.vogt@jrc.ec.europa.eu

Background

The development of gridded climatological databases made considerable progress over the last decades. While global scale gridded databases have been created earlier, their spatial resolution is not appropriate for the regional and even less for the sub-regional scale. In Europe, EUMETGRID is the biggest attempt to create a European gridded database (Tveito, 2010). It has been developed under the umbrella of EUMETNET, the co-operation of the European Meteorological Services.

Recognising the need for more detailed climatological information, the European Parliament in 2008 accepted a Hungarian initiative to support an international co-operation on the climate of Carpathian Region. The practical work started in December 2010 and will finish in December 2012.

Objectives

The aim of the project is to improve the basis of climate data in the Carpathian Region for applied regional climatological studies, including the development of a Climate Atlas and of indicators for drought monitoring. It will investigate the fine temporal and spatial structure of the climate in the Carpathian Mountains and the Carpathian Basin with unified and comparable methods.

Project Structure

Module 1: Improve the availability and accessibility of a homogeneous and spatially representative time series of climatological data for the Carpathian Region through data rescue, quality control, and data homogenization. (Lead: Slovak Hydrometeorological Service)

Module 2: Ensure data harmonization with special emphasis on harmonization across country borders and production of gridded climatologies per country. (Lead: Hungarian Meteorological Service)

Module 3: Develop a Climate Atlas as a basis for climate assessment and further applied climatological studies as well as for drought monitoring in the Carpathian Region (Lead: The Hydrometeorological Service of the Republic of Serbia). As a contribution to the European Drought Observatory, the following indicators will be developed: Palfai Drought Index, 3-months Standardized Precipitation Index, Reconnaissance Drought Index, Palmer Drought Severity Index, Percentage of days without defrost (ice days), Percentage of extremely hot days, Percentage of severe cold days, Percentage of wet days, Percentage of wet days above 20 mm/d, Greatest 1-day total rainfall, Greatest 5-day total rainfall, Aridity index, Moisture index, and Ellenberg index.

Consortium Members

- Hungarian Meteorological Service,
- Slovak Hydrometeorological Institute,
- Hydrometeorological Service of the Republic of Serbia,
- Czech Hydrometeorological Institute,
- Institute of Meteorology and Water Management (Poland),
- Ukrainian Hydrometeorological Institute,
- Ministry for Environment, National Research and Development Institute for Environmental Protection (Romania),
- Central Institute for Meteorology and Geodynamics (Austria),
- Meteorological and Hydrological Service of Croatia
- Szent Istvan University (Hungary)

European Drought Observatory (EDO) - <http://edo.jrc.ec.europa.eu>

Due to the increased need for consistent and timely information on droughts on the European scale, the Joint Research Centre is developing a European Drought Observatory for drought monitoring, assessment and forecasting. Information currently available on the EDO Map Server, includes the Standardized Precipitation Index for different aggregation periods, Soil Moisture Anomalies, and Vegetation Response (NDWI and fAPAR anomalies), all of them covering the entire European continent. Additional indicators are available at sub-continental level.

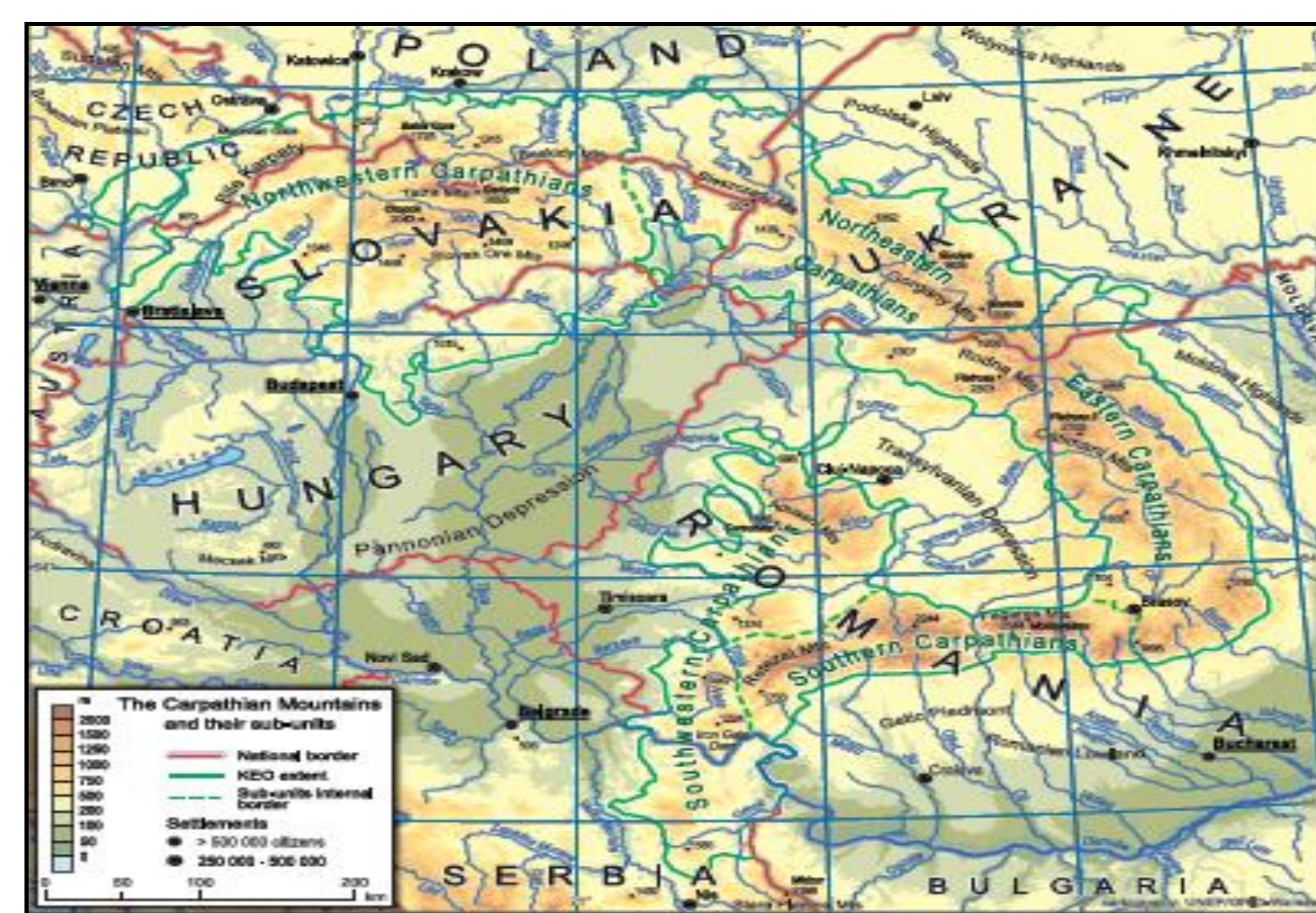
Status of the project

The stations appropriate to the project's requirements were identified and a metadata catalogue is under construction. Data harmonization will be assured by near border data exchange, which is ongoing presently. Common homogenization and interpolation methods have been chosen: MASH and MISH methods will be used (Szentimrey, 1999). The common use of these two software tools will ensure the necessary quality control and the production of the gridded database (Szentimrey *et al.*, 2010)

References:

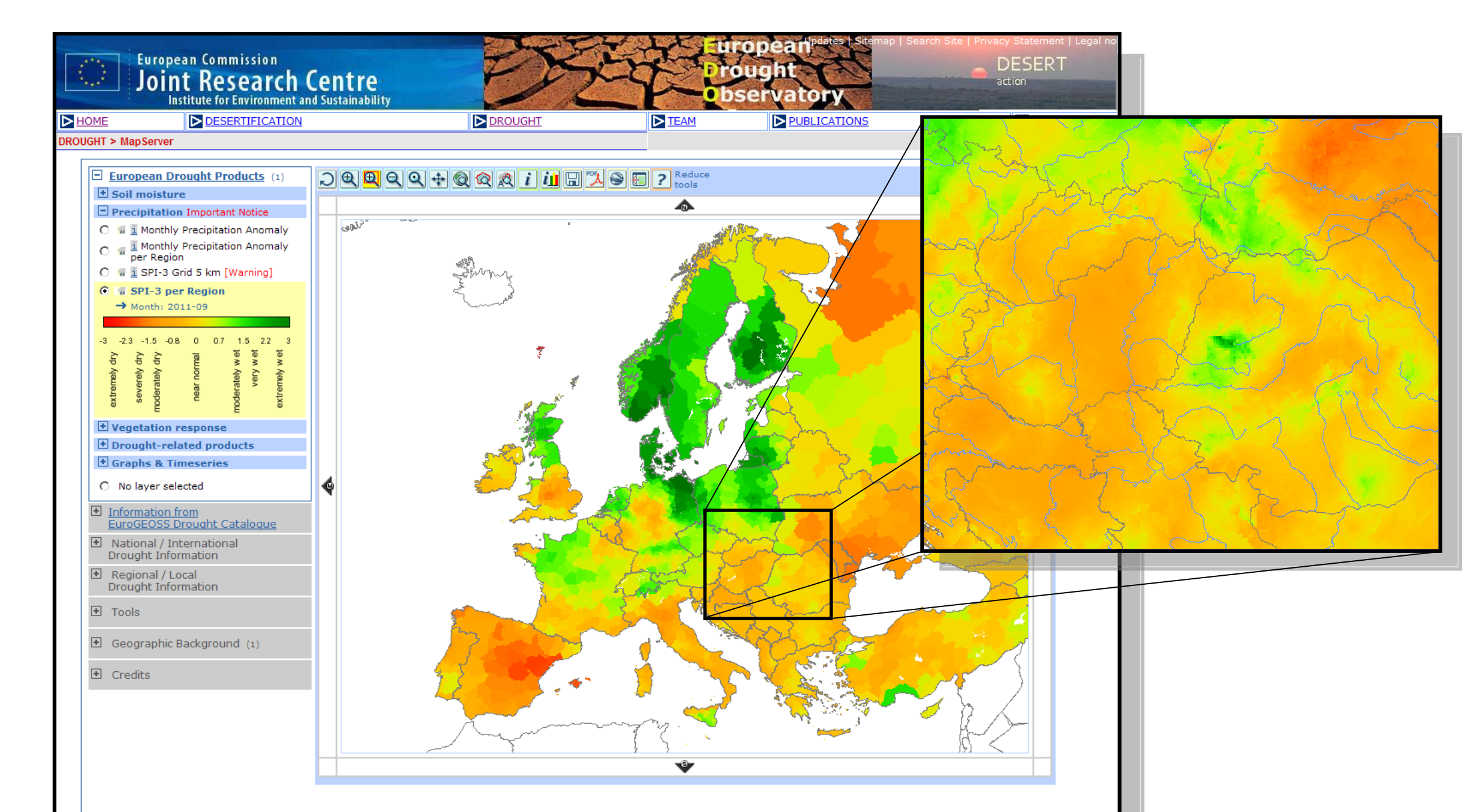
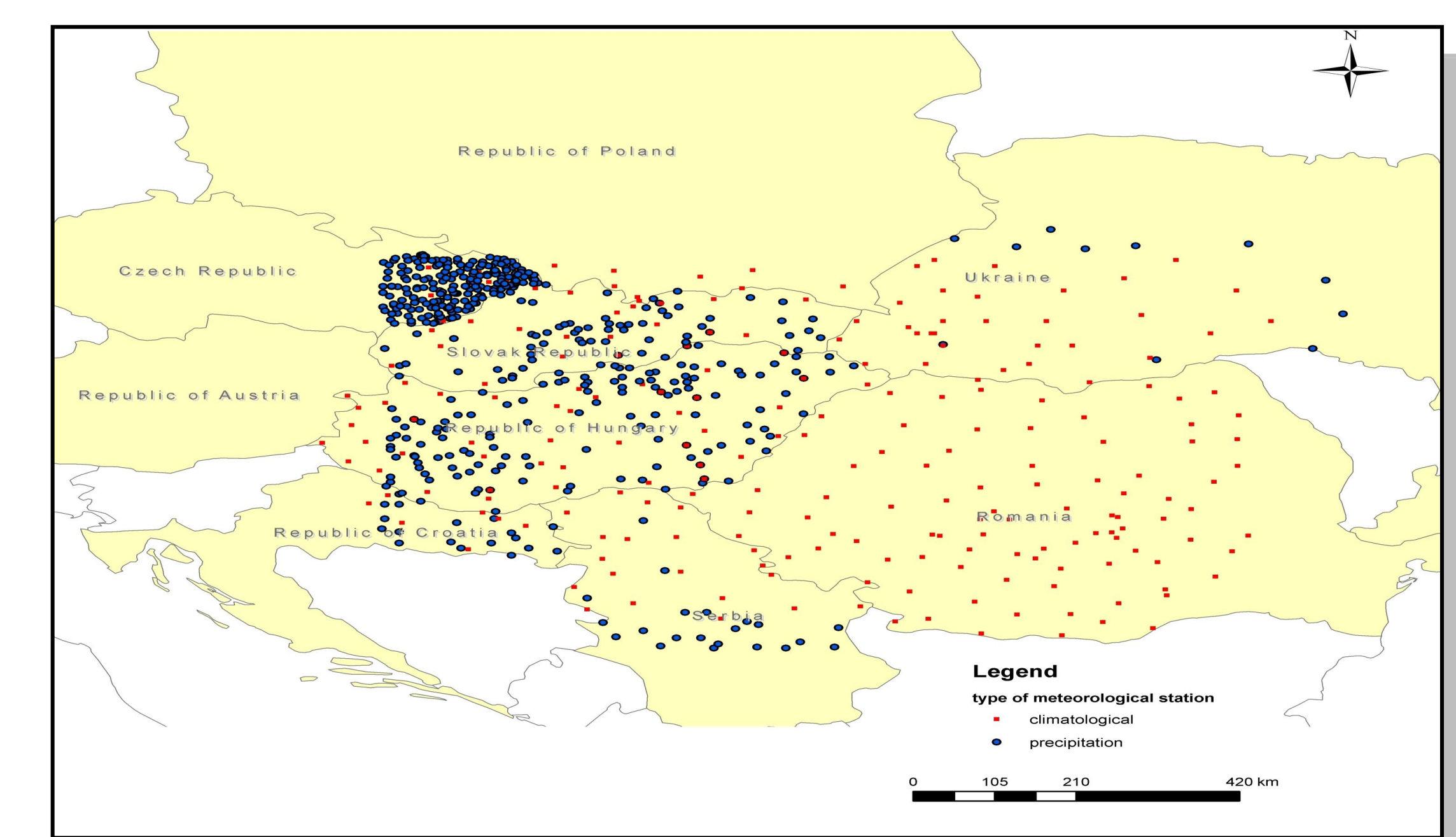
- Szentimrey, T., 1999: Multiple Analysis of Series for Homogenization (MASH). *Proceedings of the Second Seminar for Homogenization of Surface Climatological Data*, Budapest, Hungary; WMO, WCDMP-No. 41, pp. 27-46.
- Szentimrey, T., Bihari, Z., Lakatos, M., 2010: Quality control procedures in MISH-MASH systems. In: *Proceedings of the EMS Annual Meeting & European Conference on Applied Climatology*, 13-17 September 2010, Zürich, Switzerland.
- Tveito, O.E., 2010. EUMETGRID – towards a common European data infrastructure for gridded climate data. In: *Proceedings of the EMS Annual Meeting & European Conference on Applied Climatology*, 13 – 17 September 2010, Zürich, Switzerland. http://www.emetsoc.org/annual_meetings/documents/presentations_2010/MC3_Tveito.pdf

Area of interest



The climatological grids will cover the area between latitudes 50°N and 44°N, and longitudes 17°E and 27°E,

Preliminary Outputs (Module 1)



3-month Standardized Precipitation Index (SPI-3) July to September 2011, aggregated to regional level and full grid-resolution for the project area