Climate of the Carpathian Region

Digital climate atlas of the Region- Summary of the CARPATCLIM project

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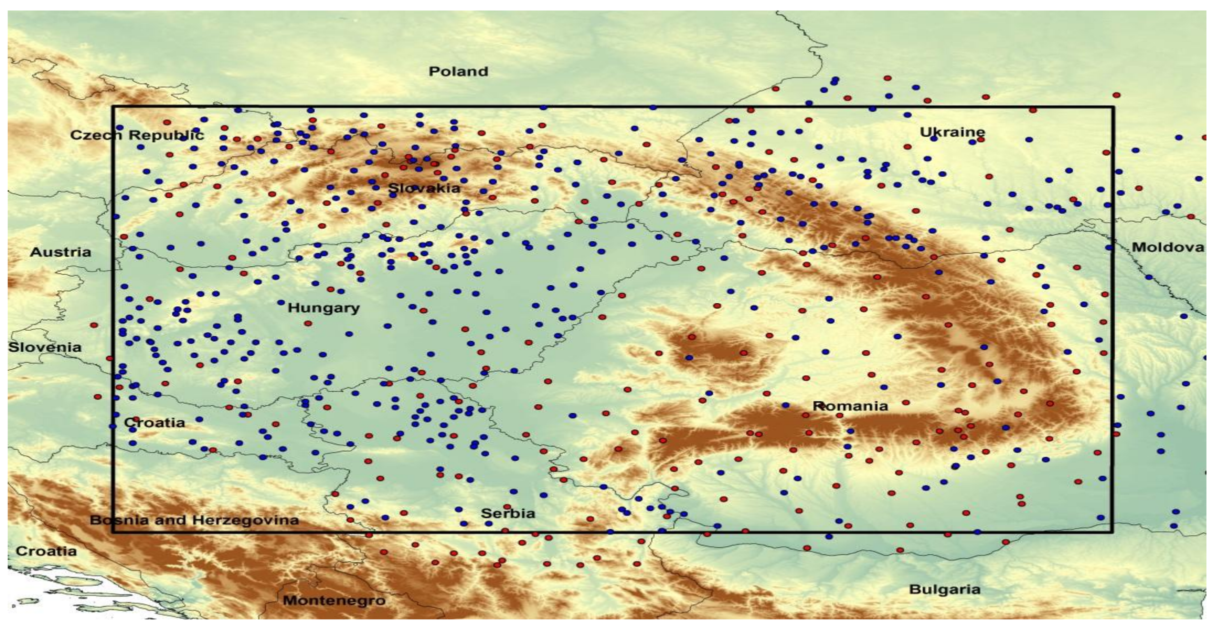
1. Background and objectives: The main aim of CARPATCLIM is to improve the climate data source and data access in the Carpathian Region for applied regional climatological studies such as a Climate Atlas and/or drought monitoring, to investigate the fine temporal and spatial structure of the climate in the Carpathian Mountains and the Carpathian basin with unified methods The JRC (European Commission Joint Research Centre) launched a tender call in 2010 for supplying the data demand of its Desert Action activity (JRC, 2010). The consortium led by the Hungarian Meteorological Service (OMSZ) together with 10 partner organizations from 9 countries in the region was supported by the JRC to create a daily harmonized gridded dataset during the period between 1961 and 2010.

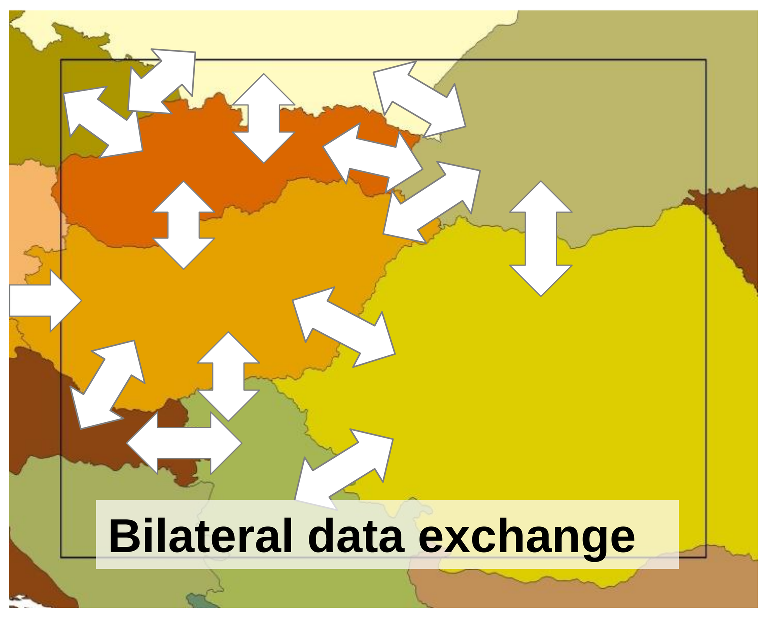


2. The target area of the project partly includes the territory of Czech Republic, Slovakia, Poland, Ukraine, Romania, Serbia, Croatia, Austria and Hungary. 415 climate stations and 904 precipitation stations were used in the project to achieve the objectives.

Variable	Description	units
Ta	mean daily air temperature	ºC
Tmin	minimum air temperature	ºC
Tmax	maximum air temperature	ºC
p	accumulated total precipitation	mm
DD	wind direction, degrees	0-360
VV	horizontal wind speed	m/s
Sunshine	sunshine duration	hours
cc	cloud cover	tenths
Rglobal	global radiation	J/cm^2
RH	relative humidity	%
pvapour	surface vapour pressure	hPa
pair	surface air pressure	hPa
Snow depth	snow depth	cm

3. The final outcome of the CARPATCLIM is a ~10 × 10 km resolution homogenized and gridded dataset on daily scale for basic meteorological variables and several climate indicators, 37 in total, on different time scales from 1961 to 2010.

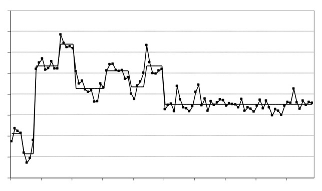
4. Methodology: For ensuring the usage of the largest possible station density, the processing were implemented by the countries themselves using the same methods and software. The commonly used methods were the MASH (Multiple Analysis of Series for Homogenization; Szentimrey, 2011) procedure for homogenization, quality control, and completion of the observed daily data series; and the MISH (Meteorological Interpolation based on Surface Homogenized Data Basis; Szentimrey and Bihari, 2007) for gridding of homogenized daily data series. The harmonization of the datasets was carried out by the exchange of the near border station data of the neighbouring countries before and after homogenization. The snow depth was estimated by ZAMG snow model (D.2.8).



Digitized data in Module 1

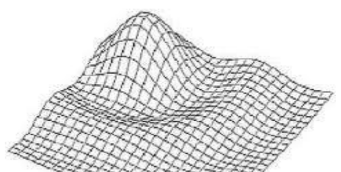
Country	Climatological stations	Precipitation stations
Hungary	1 522 780	0
Poland	65 700	281 780
Romania	1 323 490	203 670
Serbia	9 560	21 900
Slovakia	255 500	219 000
Ukraine	9 396 176	1 531 520

5. Why MASH for homogenization?



The high quality of times series got through the MASH procedure are guaranteed by the excellent monthly benchmark results from the COST HOME Action (Venema et al, 2012) and the promising outcomes of the daily tests. Moreover, MASH is an automatically working software. Application of manual homogenization methods would be exceptionally labour intensive due to handling huge data series.
In addition, the test results of the homogenization and quality control (e.g., detected errors, degree of inhomogenity of the series system, number of break points, estimated corrections, and certain verification results) are documented in automatically generated tables during the homogenization process.

6. Why MISH for gridding?



The MISH method is developed for interpolation of meteorological data, and an adequate mathematical background was developed for the purpose of efficient use of all the valuable meteorological and auxiliary model information. Main advantages of MISH are that the modeling part and the gridding could be run by countries in the project. The gridded daily time series were generated automatically in one step for the 50 years long period.

7. Structure

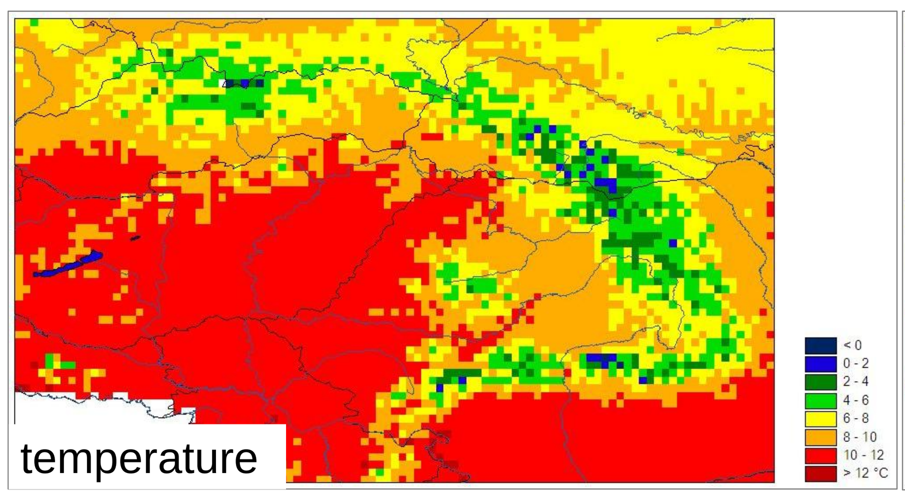
Module 1 leader: SHMU
Meta data collection, data rescue, near border data exchange, homogenization

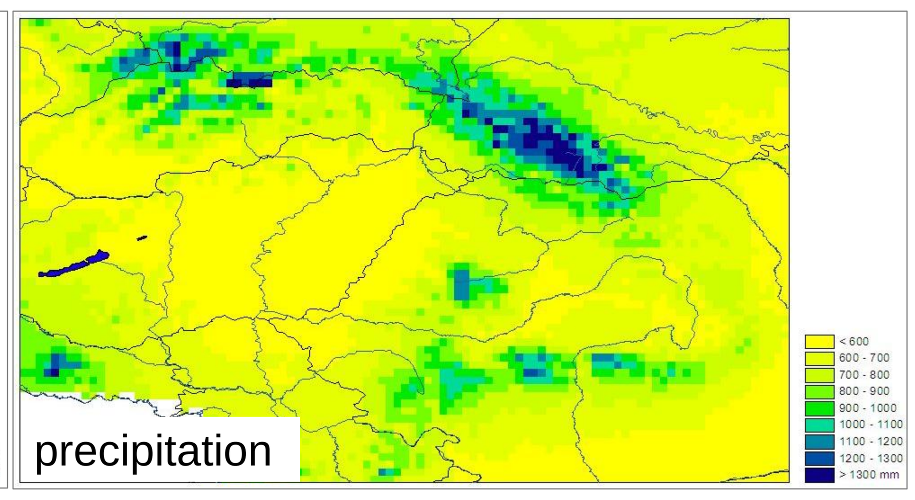
Module 2 leader: OMSZ
Data harmonization, creation of the gridded data

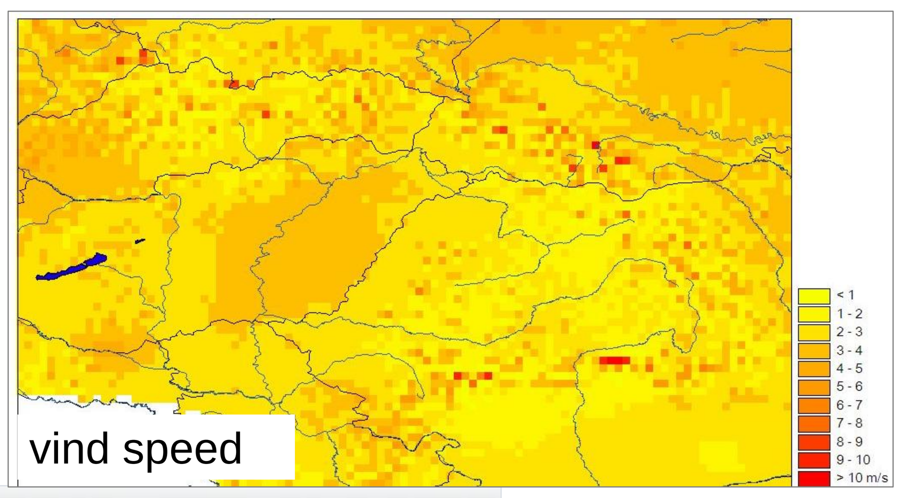
Module 3 leader: RHSS
Digital climate atlas,data download, metadata catalogue

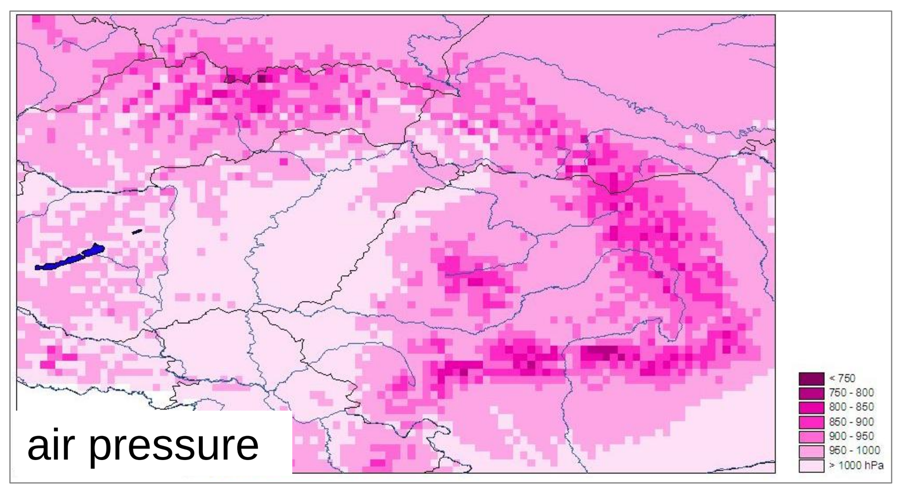
Freely available, high resolution, gridded database

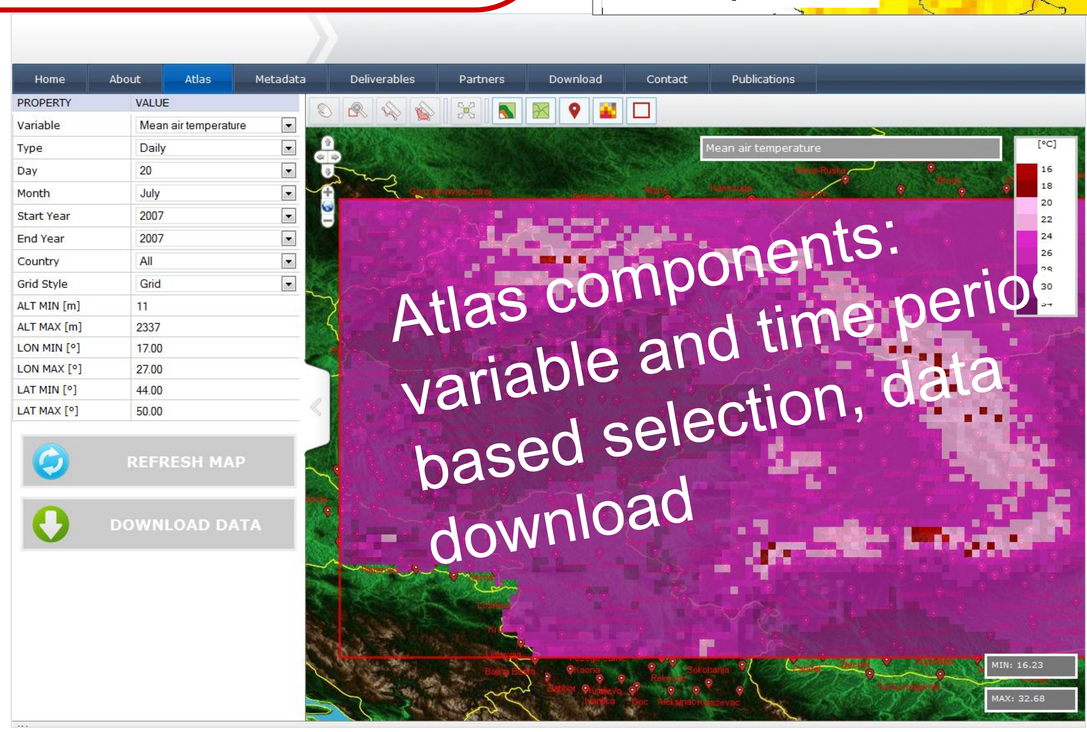
Averages for the 1961-2010 period











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D2.8 project deliverable: Final version of gridded datasets of all harmonized and spatially interpolated meteorological parameters, per country, http://www.carpatclim-eu.org/pages/deliverables/

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CARPATCLIM Official site
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