Climate of the Carpathian Region. A JRC tender for high resolution gridded database

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Content

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Problems of the climate data availibility

- Atmosphere is the fastest part of the climate system
- WMO and taxpayers' money
- Difference between US and Europe
- Clear tendency of enlargement of freely available data(bases)
- Regional Climate Centres: on Climate Data in De Bilt(NL): eca.knmi.nl/

Solutions (?)

Gridded databases

- ERA databases (40, Interim, Clim, 65), backcasting, model calculations
- EUMETGRID, European-wide
- EEA-ECMWF co-operation

Raw data

- RCC
- Subregional databases
- European Climate Atlas (ECSN)
- Economical troubles (expensive network)

National/international needs

- The problem is larger at smaller countries with complex topography
- Near border problems
- Different instruments
- Different data management tools
- Comparability is requested (harmonisation)

Background of the project

- Hungarian initiative in the Environmental Committee at the European Parliament in 2008
- Accepted by the Economical Committee and the Plenary in 2008
- Preparation of the tender by DG Environment and JRC Ispra in 2009
- Call in June 2010

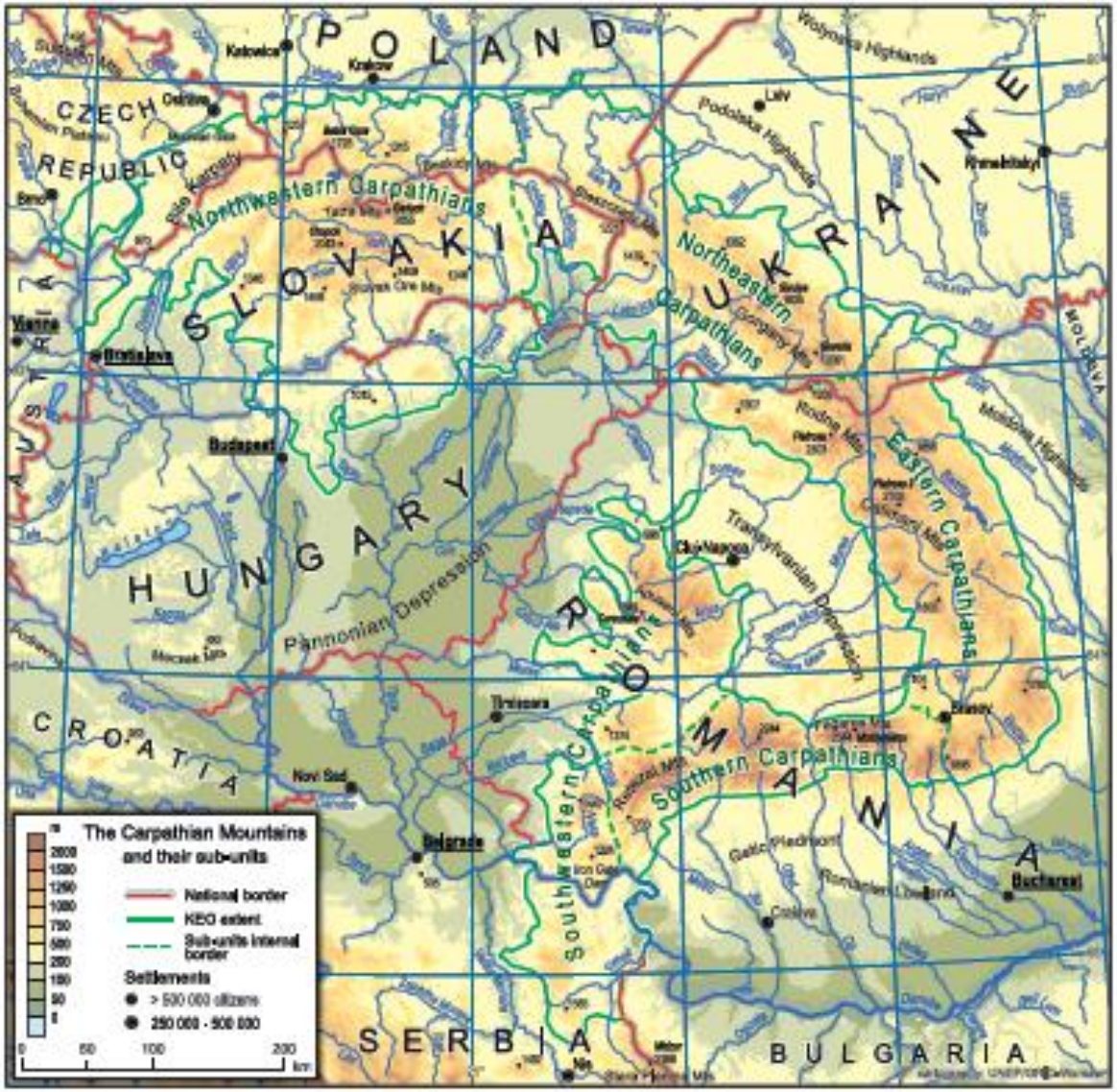
Countries and participants

- Bulgaria, Czech Republic, Croatia, Hungary, Moldova, Poland, Romania, Serbia, Slovakia, and Ukraine
- (Hydro)meteorological institutes and services of Czech Republic, Slovakia, Austria, Poland, Ukraine, Serbia, Hungary, and the National Research and Development Institute of Environmental Protection of Romania and the Szent Istvan University from Hungary. The Croatian Hydrometeorological Service takes part in the project as well. Slovenia supports the initiative

Territory

- For the production of the digital climate atlas, the resulting climatological grids should cover the area between latitudes 50°N and 44°N, and longitudes 17°E and 27°E, approximately.

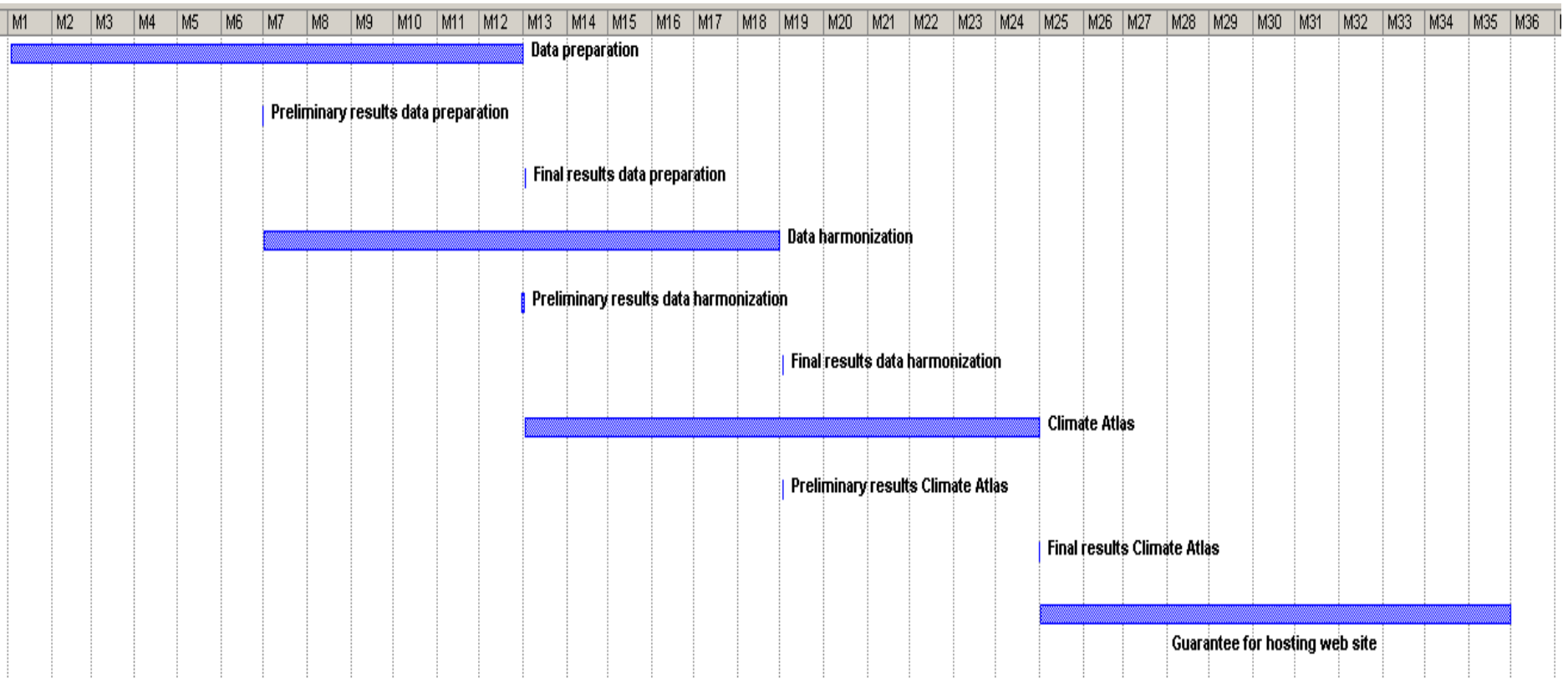
Map


POLAND
CZECH REPUBLIC
SLOVAKIA
UKRAINE
HUNGARY
ROMANIA
SERBIA
BULGARIA
CROATIA
AUSTRIA
Northwestern Carpathians
Northeastern Carpathians
Eastern Carpathians
Southwestern Carpathians
Southern Carpathians
Pannonian Depression
Transylvanian Depression
Podolska Highlands
Wolynska Highlands
Moldova Highlands
Katowice
Krakow
Lviv
Ostrava
Brno
Vienna
Bratislava
Budapest
Debrecen
Cluj-Napoca
Timisoara
Novi Sad
Belgrade
Bucharest
The Carpathian Mountains and their sub-units
National border
KEO extent
Sub-units internal border
Settlements
> 500 000 citizens
250 000 - 500 000

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 homogenisation.
- Module 2: Ensure Carpathian countries data harmonisation with special emphasis on across-country harmonisation and production of gridded climatologies per country.
- Module 3: Develop a Climate Atlas as a basis for climate assessment and further applied climatological studies, create publicly accessible dedicated web site of the Climate Atlas, including a web map server and data download/access infrastructure, freely available gridded climatological datasets and searchable metadata catalogue for the Climate Atlas.

Timetable


M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 M17 M18 M19 M20 M21 M22 M23 M24 M25 M26 M27 M28 M29 M30 M31 M32 M33 M34 M35 M36
Data preparation
Preliminary results data preparation
Final results data preparation
Data harmonization
Preliminary results data harmonization
Final results data harmonization
Climate Atlas
Preliminary results Climate Atlas
Final results Climate Atlas
Guarantee for hosting web site

Set of meteorological variables in daily temporal resolution to be provided (1)

Variable	Description	Units
Ta	2 m mean daily air temperature	°K
Tmin	Minimum air temperature from 18:00 to 06:00	°K
Tmax	Maximum air temperature from 06:00 to 18:00	°K
p	Accumulated total precipitation from 06:00 to 06:00	mm
DD	10 m wind direction	0°-360°
VV	10 m horizontal wind speed	m/s
Sunshine	Sunshine duration	hours
cc	Cloud cover	octas

Set of meteorological variables in daily temporal resolution to be provided (2)

Variable	Description	Units
Rglobal	Global radiation	MJ/m2/day
RH	Relative humidity	%
pvapour	Surface vapour pressure	hPa
pair	Surface air pressure	hPa
Snow depth	Snow depth	mm

Minimum set of variables and indicators to be provided for the Digital Climate Atlas of the Carpathian Region

No	Variable/Indicator	Description	Units	Frequency
1	T	Average air temperature (2 m)	°K	Daily
2	T	Average mean air temperature (2 m)	°K	Monthly, yearly
3	Tmin	Minimum air temperature from 18:00 to 06:00	°K	Daily
4	Tmin	Average minimum air temperature	°K	Monthly, yearly
5	Tmax	Maximum air temperature from 06:00 to 18:00	°K	Daily
6	Tmax	Average maximum air temperature	°K	Monthly, yearly
7	Precipitation	Accumulated total precipitation from 06:00 to 06:00	mm	Daily
8	Precipitation	Accumulated total precipitation	mm	Monthly, yearly
9	u_10m_max	Maximum 10 m horizontal wind speed	m/s	Daily
10	u_10m	Average 10 m horizontal wind speed	m/s	Daily, monthly
11	u_2m	Average 2 m horizontal wind speed	m/s	Daily, monthly
12	Sunshine	Sunshine duration	hours	Daily, monthly, yearly
13	Cloud cover	Average cloud cover	octas	Daily, monthly
14	Radiation	Measured global radiation	MJ m^{-2} day^{-1}	Daily, monthly
15	R.H.	Average relative humidity	%	Daily, monthly
16	p_vap	Mean vapour pressure	hPa	Daily, monthly
17	p_air	Mean surface air pressure	hPa	Daily, monthly
18	Snow depth	Snow depth	mm	Daily, monthly
19	Snow water	Snow water equivalent	mm	Daily, monthly
20	Frost days	Number of frost days	-	Monthly, yearly
21	Summer days	Number of days with Tmax above 25 °C	-	Monthly, yearly
22	Hot days	Number of days with Tmax above 30 °C	-	Monthly, yearly
23	PAI	Palfai Drought Index	-	Yearly
24	SPI -3	Standardized Precipitation Index averaged over a three-months period	-	Monthly

Additional set of indicators

	Indicator	Description	unit	frequency
25	RDI	Reconnaissance Drought Index	-	Monthly
26	PDSI	Palmer Drought Severity Index		Monthly
27	%id	Percentage of days without defrost (ice days)	-	Monthly
28	%ehd	Percentage of extremely hot days	-	Monthly
29	%scd	Percentage of severe cold days	-	Monthly
30	Growing	Growing season length	day	Yearly
31	%wd	Percentage of wet days	-	Monthly
32	%wd20	Percentage of wet days above 20 mm/d	-	Monthly
33	maxr1d	Greatest 1-day total rainfall	mm	Monthly
34	maxr5d	Greatest 5-day total rainfall	mm	Monthly
35	ARI	Aridity index		Monthly
36	MI	Moisture index		Monthly
37	EI	Ellenberg index	C/mm	Yearly

Outcomes

- High-resolution (10 km*10 km) freely available databases
- Data availability on monthly and daily level

Benefits

- Development possibilities in the agriculture, hydrology and forestry
- Modelling possibilities for spatial distribution of species
- Strong development in the applied sciences
- Damage estimation, crop-yield forecast
- Development of early warning systems
- More accurate determination of crop sites

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Thank you for your attention!