



## **Deliverable D3.12**

**Final and public version of the implemented web site with full functionality that hosts all relevant information on the Climate Atlas of the Carpathian Region, including a public download functionality within the web site for all gridded datasets of the climatology**

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## **1. Introduction**

The aim of this deliverable is to describe the final implementation of the CARPATCLIM Web site with a special view on the Climate Atlas of the Carpathian Region, with the framework that provides the basic functionality and content of the site and the design of the Atlas interface.

The CARPATCLIM Web site constitutes the project's official dissemination channel, as well as the basic mean for distributing the project's results and activities to users interested in climate data and climatological studies for the Carpathian Region.

## **2. General information**

### ***2.1 The aim of the website***

The aim of the CARPATCLIM project Web site is to:

- provide constant online presentation and dissemination of the project progress and results including information about the project and its goals, the consortium members, and the public deliverables of the project;
- offer accessibility to datasets used to improve the basis of climate data in the Carpathian Region;
- provide access to derived climatological datasets and regional climatological studies based on the Climate Atlas of the Carpathian Region;
- simplify the discovery of available data through a Metadata Catalogue which is hosted on the Web site;
- offer the possibility of combining spatial data from different sources in a consistent way and share them among divers users and applications.

## 2.2 Implementation

The architecture of CARPATCLIM project Web site is shown on Fig. 1.

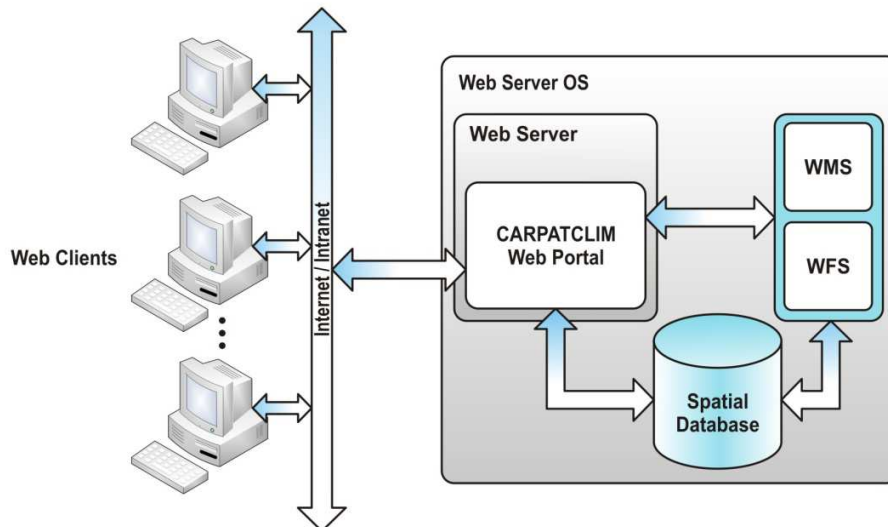


Figure 1. The architecture of the CARPATCLIM Web site

The most important components of the CARPATCLIM Web site are as follows:

### WEB Server OS

- **Microsoft Windows Server 2008** - is a platform server that includes a robust set of features. Whether it is necessary to consolidate servers, build a Microsoft private cloud, or offer Virtual Desktop Infrastructure, the features of Windows Server 2008 R2 with SP1 offer the flexibility to deliver advanced capabilities to your business for increased IT efficiency and agility.

Link:

<http://www.microsoft.com/en-us/server-cloud/windows-server/default.aspx>

### Database server:

- **PostgreSQL**- is an object-relational database management system (ORDBMS) available for many platforms including Linux, FreeBSD, Solaris, Microsoft Windows and Mac OS X. It is released under the PostgreSQL License, which is an MIT-style license, and is thus free and open source software.

Link: <http://www.postgresql.org>

### **Web Server:**

- **IIS7.5** - (Internet Information Services) is a Web server application and set of feature extension modules created by Microsoft for use with Microsoft Windows. IIS 7.5 supports HTTP, HTTPS, FTP, FTPS, SMTP and NNTP. What is most important is that it is an integral part of Windows Server family of products.

**Link:** <http://www.iis.net>

### **OGC Based Services**

- **WMS** - (Web Map Service) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.

**Link:** <http://www.opengeospatial.org/standards/wms>

- **WFS** - (Web Feature Service) provides an interface allowing requests for geographical features across the web using platform-independent calls. The XML-based GML furnishes the default payload-encoding for transporting the geographic features, but other formats like shape files can also serve for transport.

**Link:** <http://www.opengeospatial.org/standards/wfs>

**Server scripting engine:**

**ASP.NET**- is a Web application framework developed and marketed by Microsoft to allow programmers to build dynamic Web sites, Web applications and Web services. ASP.NET is built on the Common Language Runtime (CLR), allowing programmers to write ASP.NET code using any supported .NET language.

Link: <http://www.asp.net/>

**PHP** - is a general-purpose server-side scripting language originally designed for Web development to produce dynamic Web pages. PHP can be deployed on most Web servers and also as a standalone shell on almost every operating system and platform free of charge.

Link: <http://www.php.net/>

**Client scripting engine:**

**JavaScript** is a lightweight, object-oriented language, most known as the scripting language for Web pages, but [used in many non-browser environments](#) as well.

Link: <https://developer.mozilla.org/en/JavaScript>

### 3. Carpatclim Digital Atlas Portal Architecture

The architecture of the CARPATCLIM Digital Web Atlas is shown on Fig.2.

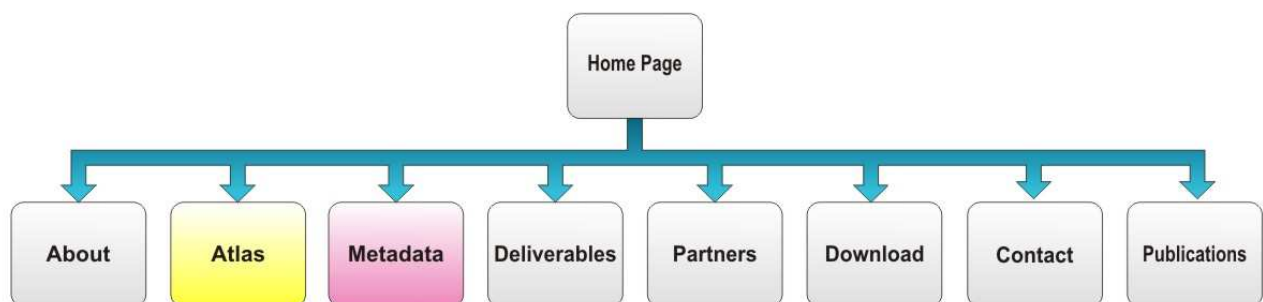


Figure 2. The structure of the CARPATCLIM Web site

### **3.1 Home page**

Description:

The Home page (Fig. 3) is the page which automatically shows when the address of the CARPATCLIM portal is opened. This page is designed in a way that it has a high visual impact and in a practical sense it has quick shortcuts to all main features of the Web site.



Figure 3. Home page

The main components of this page are as follows:

- **Header** – contains the CARPATCLIM logo
- **Menu** – a classic menu allowing user to navigate through the Web site
- **Slideshow** – this component represents a slideshow of promotional images related to the CARPATCLIM project. These images could be atlas screenshots as well photos of collaborating partners etc.
- **Quick About link box** – provides a quick link to the About CARPATCLIM Web page
- **Quick Atlas link box** – provides a quick link to the Atlas WebGIS application page
- **Quick Metatada link box** - provides a quick link to the Metadata search application page
- **Quick Download link box** - provides a quick link to the bulk download application page
- **Quick partner Logo links** – this component presents all the partners which are collaborating on this project as well as offers the possibility to quickly jump to a partner Web site by simply clicking the appropriate partners` logo.



### 3.2 About

The About page (Fig. 4) contains information about the CARPATCLIM project challenges, objectives and goals.

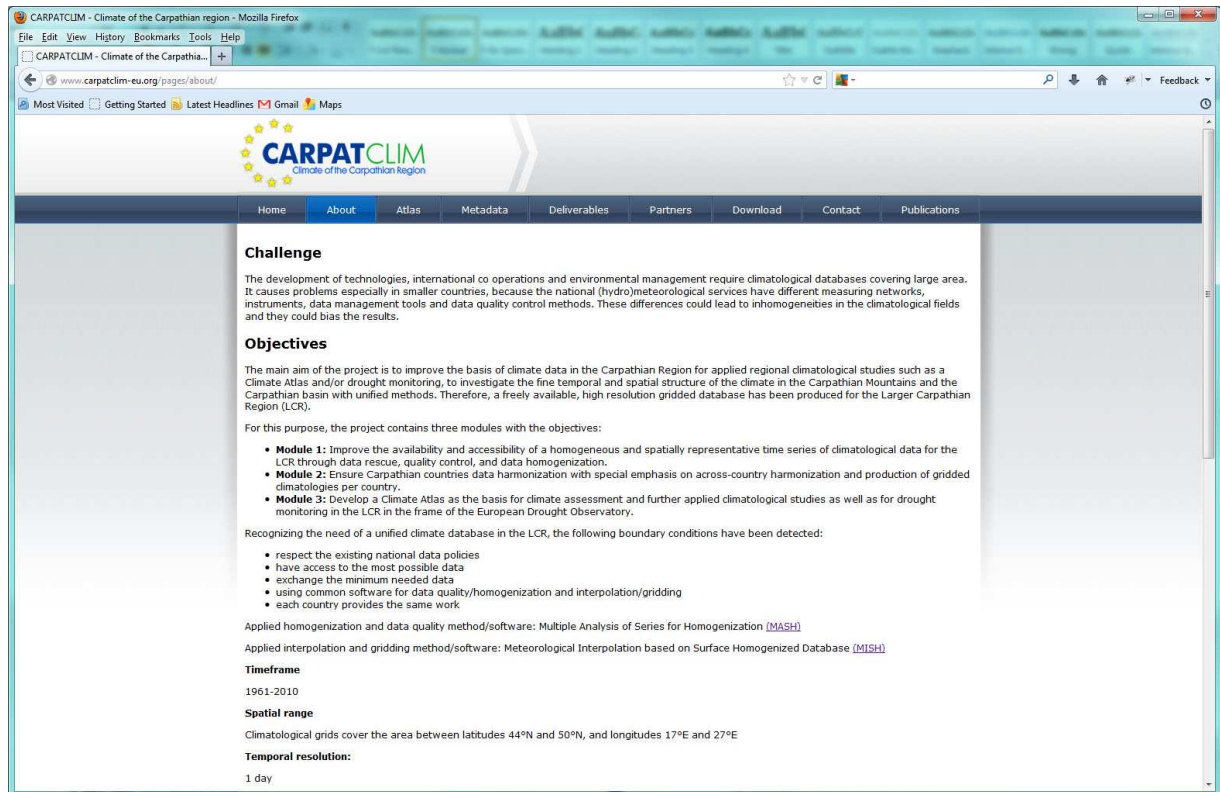


Figure 4. About page

### 3.3 Atlas

The Atlas WebGIS application uses the latest Web Standards HTML5 (AJAX/CSS3/SVG) meaning that it supports rich user interface and graphical features without the need for downloading additional plugins.

Main components of the page containing the Atlas WebGIS application (Fig. 5) page are as follows:

1. Options Panel (Described in 3.3.1)
2. Map View (Described in 3.3.2)
3. Toolbar (Described in 3.3.3)
4. Title (Described in 3.3.4)
5. Color Map (Described in 3.3.5)
6. Data Information (Described in 3.3.6)

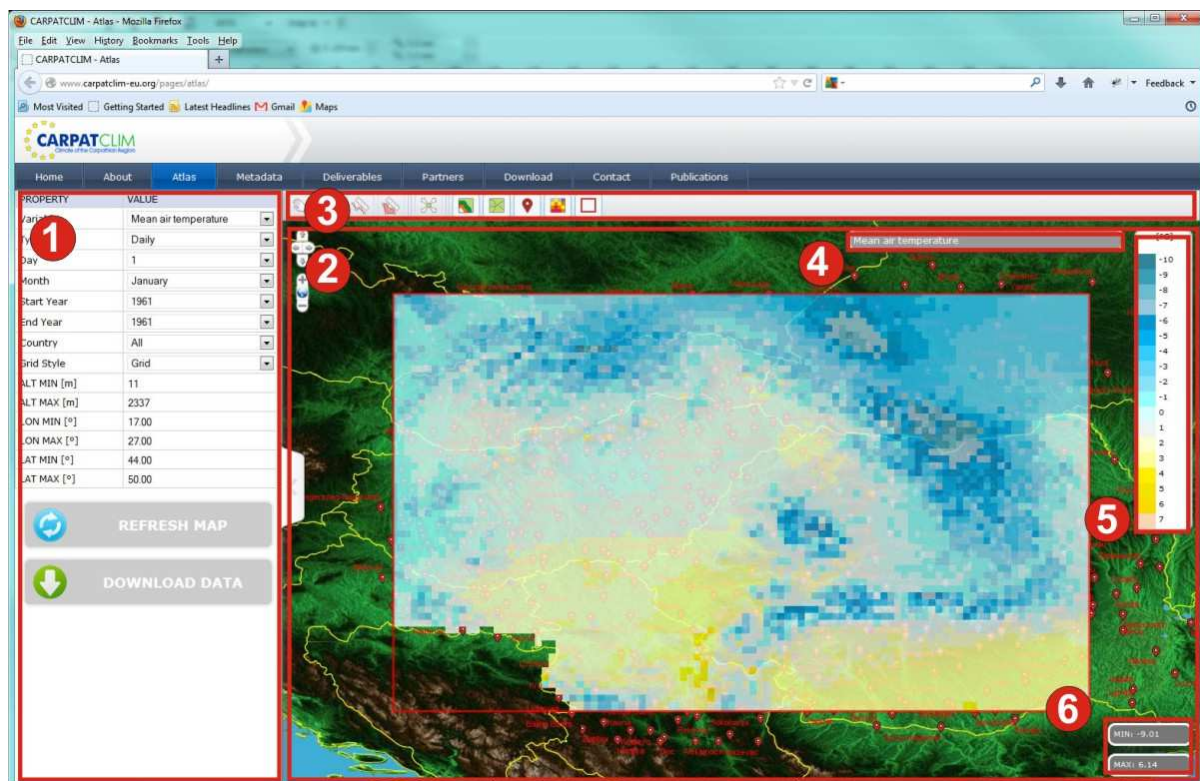


Figure 5. Atlas page

### 3.3.1 Options Panel

The options panel (Fig. 6) contains various properties which can be edited in order to visualize the selected climatology variable or indicator. The options panel contains the following properties:

- **Variable** – Option for selecting a climatology variable or indicator (i.e. Mean air temperature, Maximum temperature, Minimum temperature, Precipitation etc.)
- **Type** – Option for selecting a Time period type (It can be Daily, Monthly or Yearly)
- **Day** – Option for selecting a desired day (Available only if the Type Option equals “Daily”)
- **Month** – Option for selecting a desired month (Available only if the Type Option equals “Daily” or “Monthly”)
- **Start Year** – Option for selecting a desired start year used for yearly averaging (Available only if the Type Option equals “Daily” or “Monthly” or “Yearly”)
- **End Year** – Option for selecting a desired end year used for yearly averaging (Available only if the Type Option equals “Daily” or “Monthly” or “Yearly”)
- **Country** – Option for performing Grid filtering by country (i.e. If the user selects Hungary the Atlas will display data only in the national territory of Hungary)
- **Grid Style** – Option for determining the quality of Grid data rendering (It can be Grid, Filled Contours or Filled Contours + Edges)
- **ALT MIN** – Option for performing Grid filtering by minimum altitude (All grid points that are below ALT MIN will not be displayed)
- **ALT MAX**– Option for performing Grid filtering by maximum altitude (All grid points that are above ALT MAX will not be displayed)
- **LON MIN**– Option for performing Grid filtering by minimum longitude (All grid points that are below LON MIN will not be displayed)
- **LON MAX**– Option for performing Grid filtering by maximum longitude (All grid points that are above LON MAX will not be displayed)
- **LAT MIN** – Option for performing Grid filtering by minimum latitude (All grid points that are below LAT MIN will not be displayed)
- **LAT MAX**– Option for performing Grid filtering by maximum latitude (All grid points that are above LAT MAX will not be displayed)

PROPERTY	VALUE
Variable	Mean air temperature
Type	Daily
Day	1
Month	January
Start Year	1961
End Year	1961
Country	All
Grid Style	Grid
ALT MIN [m]	11
ALT MAX [m]	2337
LON MIN [°]	17.00
LON MAX [°]	27.00
LAT MIN [°]	44.00
LAT MAX [°]	50.00



Figure 6. Options panel

### 3.3.2 Map View

The Map view component (Fig. 7) takes the most space on the Digital Atlas and it is used for displaying the Climatology and daily Grid data. This component also provides various standard GIS functionalities like panning and zooming.

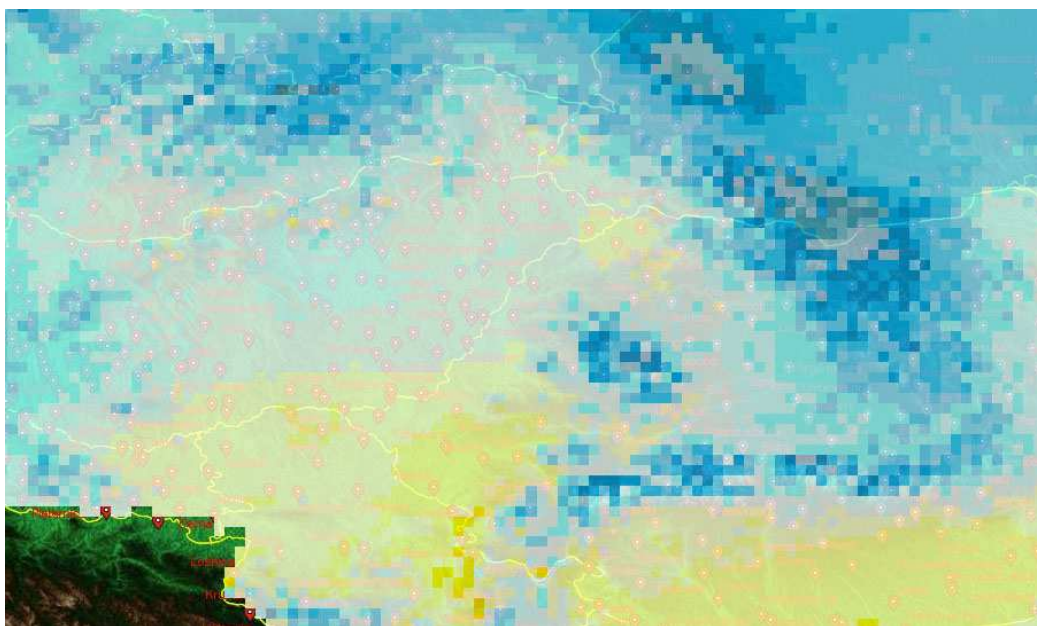


Figure 7. Map View

### 3.3.3 Toolbar

The main toolbar (Fig. 8) contains buttons which enable various GIS functionalities:

- **PAN** – This button enables the Map pan mode (In this mode the user can interactively move the map view by using the mouse cursor)
- **SELECT ZOOM** – This button enables the Select zoom mode which enables the user to zoom on a preselected rectangular area of the map.
- **DISTANCE/AZIMUTH MEASURE TOOL** – This button activates the tool which can be used for interactive measurement of distance and azimuth directly on the map.
- **AREA /CIRCUMFERENCE MEASURE TOOL** – This button activates the tool which can be used for interactive measurement of area and circumference directly on the map.
- **ZOOM EXTENT** – This button automatically pans and zooms the map so the full grid can be visible.
- **OROGRAPHY LAYER DISPLAY** – This button is used to switch ON/OFF the layer containing Orography.
- **COUNTRIES LAYER DISPLAY** - This button is used to switch ON/OFF the layer containing Countries.
- **STATIONS LAYER DISPLAY** - This button is used to switch ON/OFF the layer containing stations.
- **GRID LAYER DISPLAY** - This button is used to switch ON/OFF the layer containing the climatological/daily grid.



Figure 8. Main toolbar

### 3.3.4 Title

This component (Fig. 9) displays the title of the currently selected variable/indicator. Also this component shows variable/indicator details (Fig.10) when the mouse cursor hovers over the title panel.

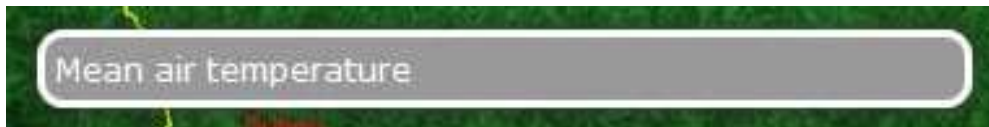


Figure 9. Title panel

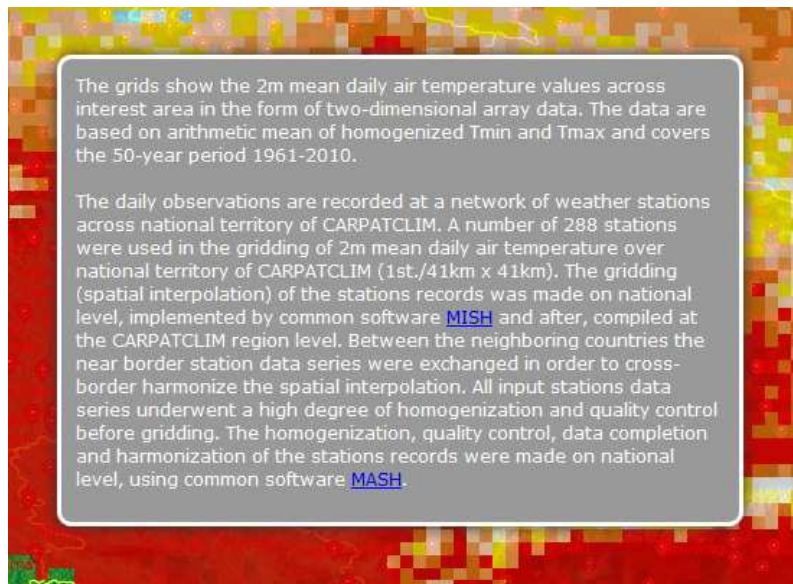


Figure 10. Extended variable/indicator information panel

### 3.3.5 Color Map

The Color Map (Fig. 11) component displays the color scale for the currently selected climatological variable or indicator. Note that this component automatically trims the color scale so it contains values from the min – max span of the selected grid.

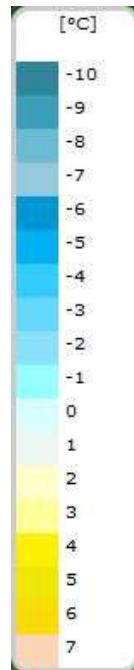


Figure 11. Color Map

### 3.3.6 Data information

This component (Fig. 12) displays the minimal and maximal values on the selected grid.



Figure 12. Data Information

### 3.4 Metadata

The Metadata page shows the Web interface for Metadata search (Fig. 13). It is important to emphasize that the CARPATCLIM Web portal is closely integrated with Geonetwork server meaning that this Web interface is actually part of Geonetwork but never the less the communication between the CARPATCLIM Web portal and the Geonetwork server is transparent for the common user. All additional information about this integration and the Metadata catalog can be found in deliverable D3.16.

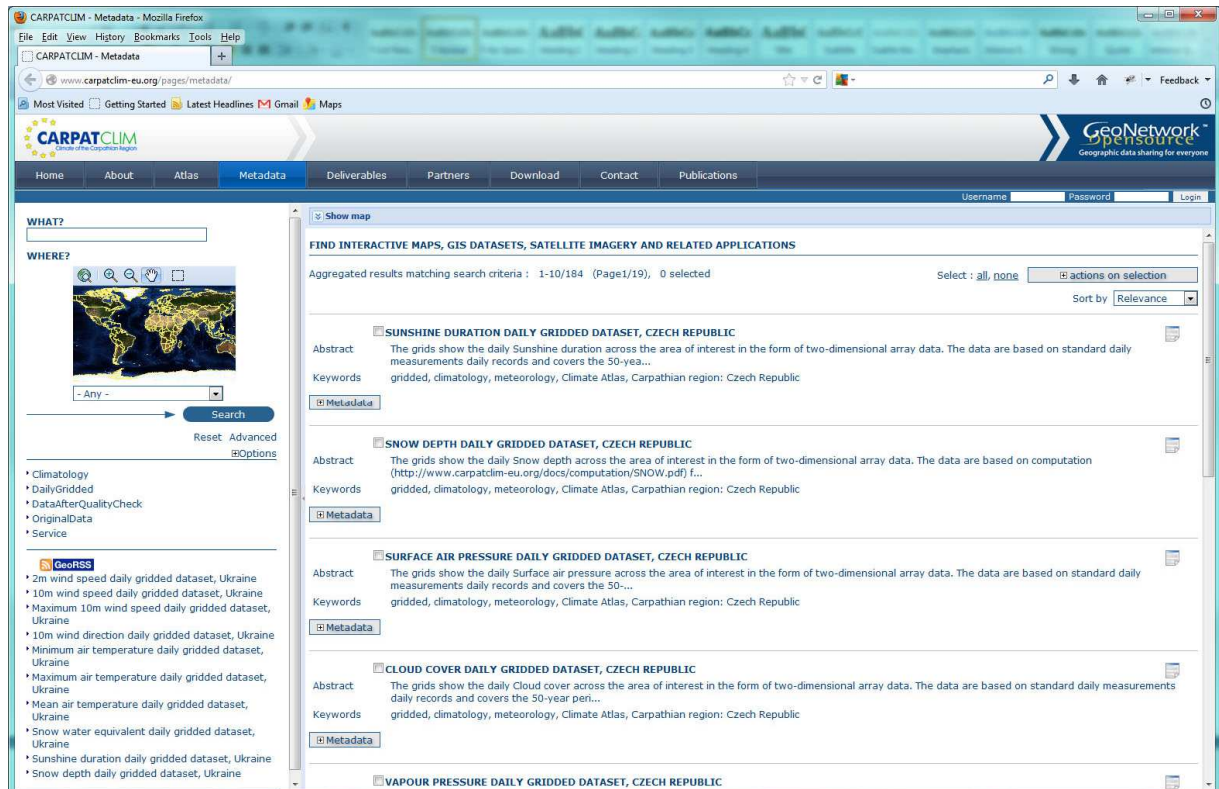


Figure 13. Metadata page



### 3.5 Deliverables

The deliverables page (Fig.14) is designed as a list of deliverable documents which can be downloaded.

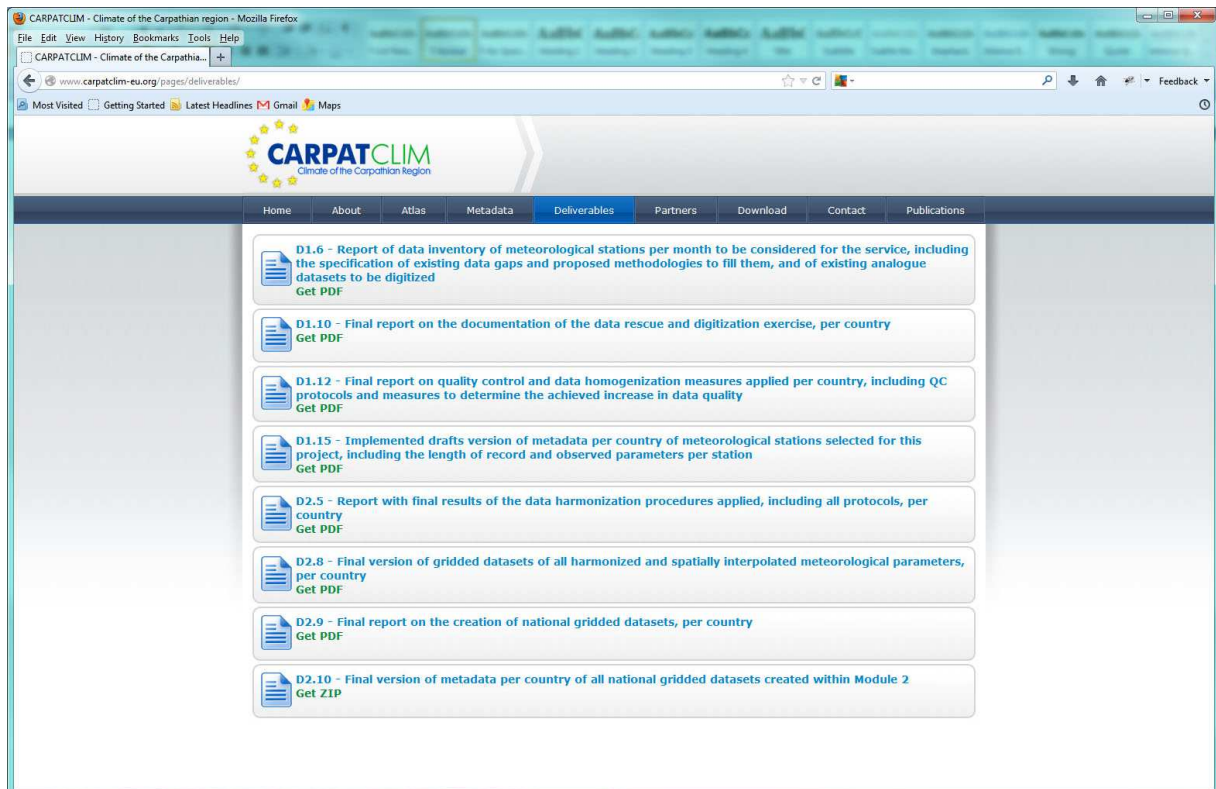


Figure 14. Deliverables page

### 3.6 Partners

The Partners page (Fig. 15) is designed as a list of all project partners with adequate logos, full organization names and links to their Web sites. Although it is not included in the draft screenshot an additional short description of every partner organization could be added.

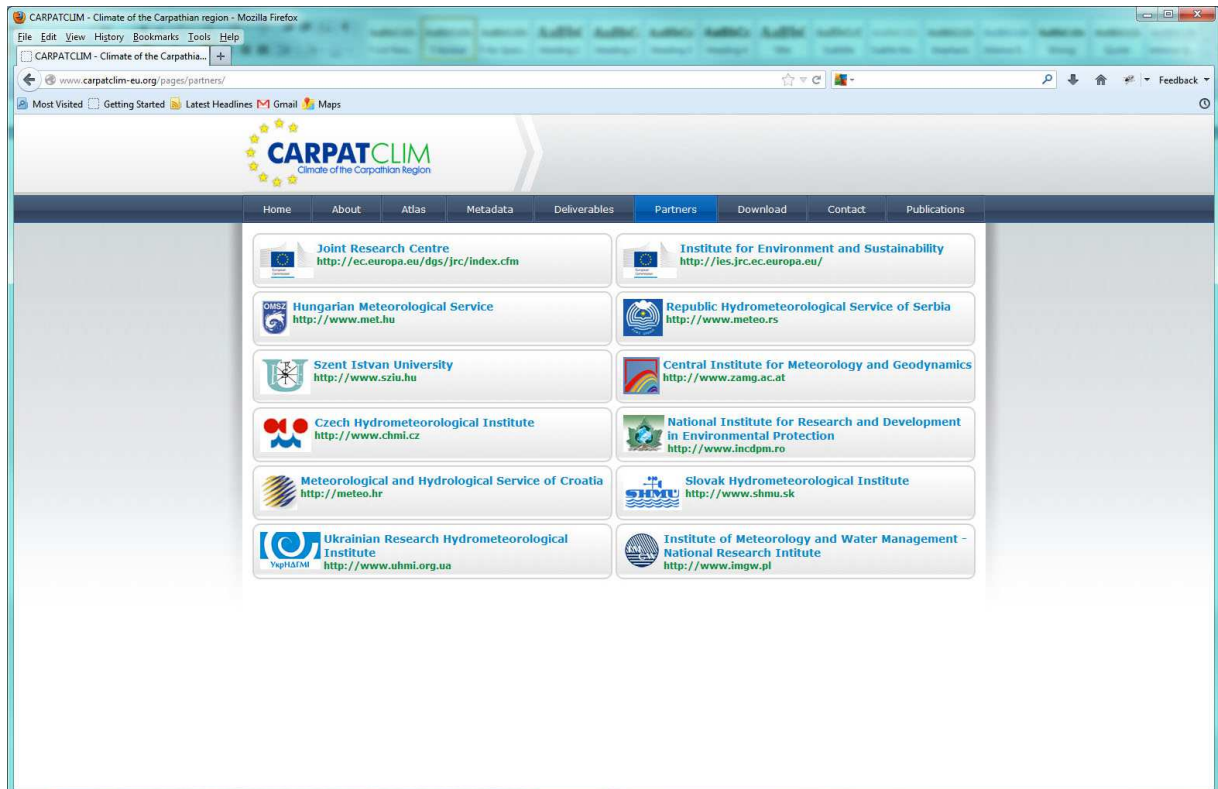


Figure 15. Partners page

### 3.7 Download

Besides downloading grid data through the Atlas page interface it is possible to perform a bulk download of all gridded data series. The bulk download procedure is very simple and it only requires the user to enter his details (First Name, Last Name, Organization and E-mail address) and to accept the terms of the agreement. The Web form is shown on Fig. 16.

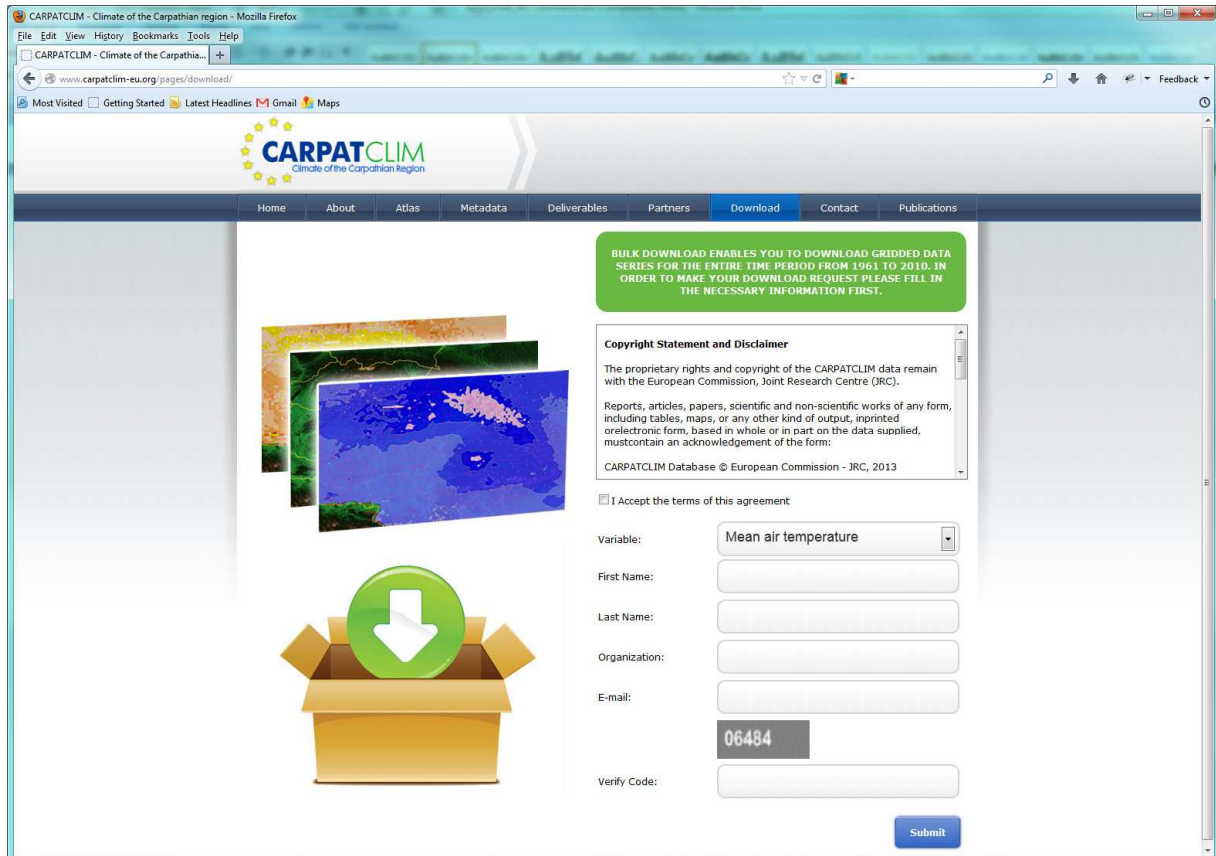


Figure 16. Download page

### 3.8 Contact

The Contact page (Fig. 17) is designed as a list of all project contacts (Names and email addresses) added.

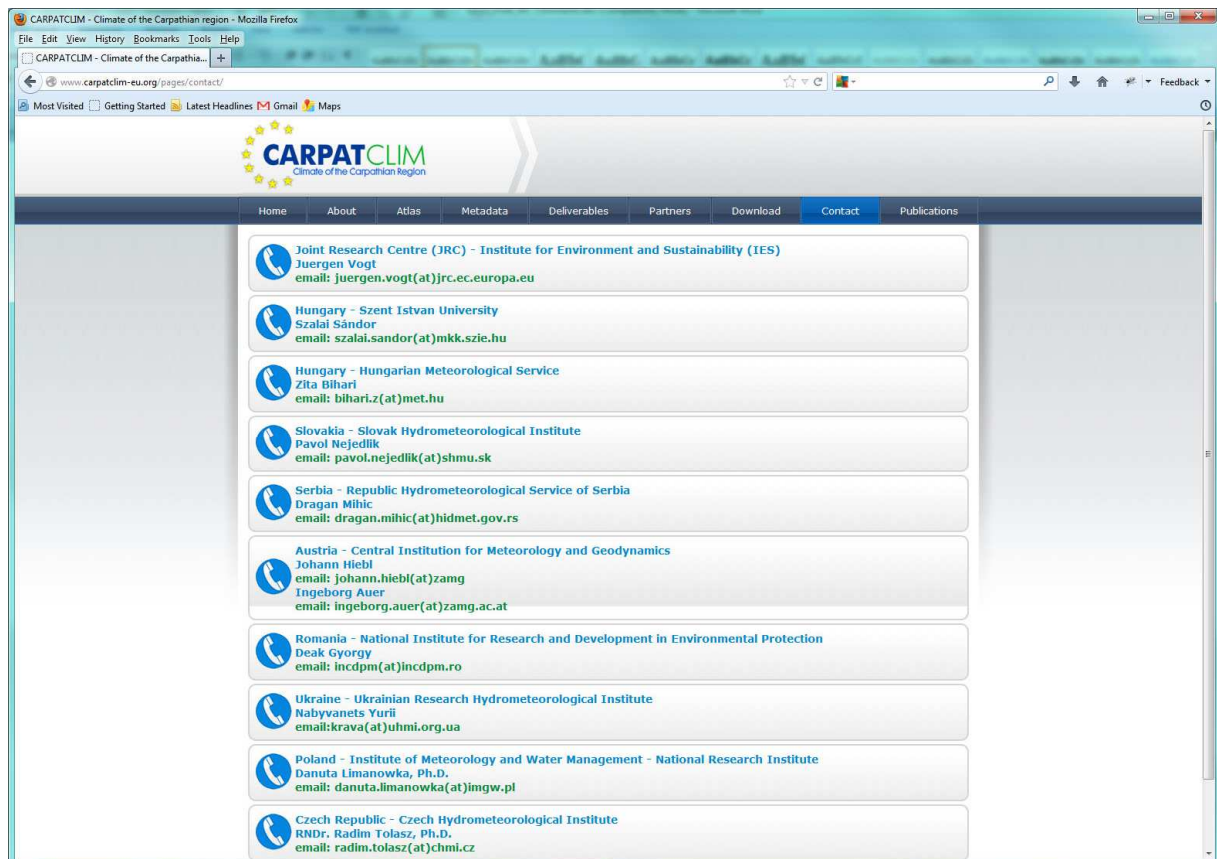


Figure 17. Contact page

### 3.9 Publications

The Publications page (Fig. 18) is designed as a list of all publications that are related to the CARPATCLIM project.

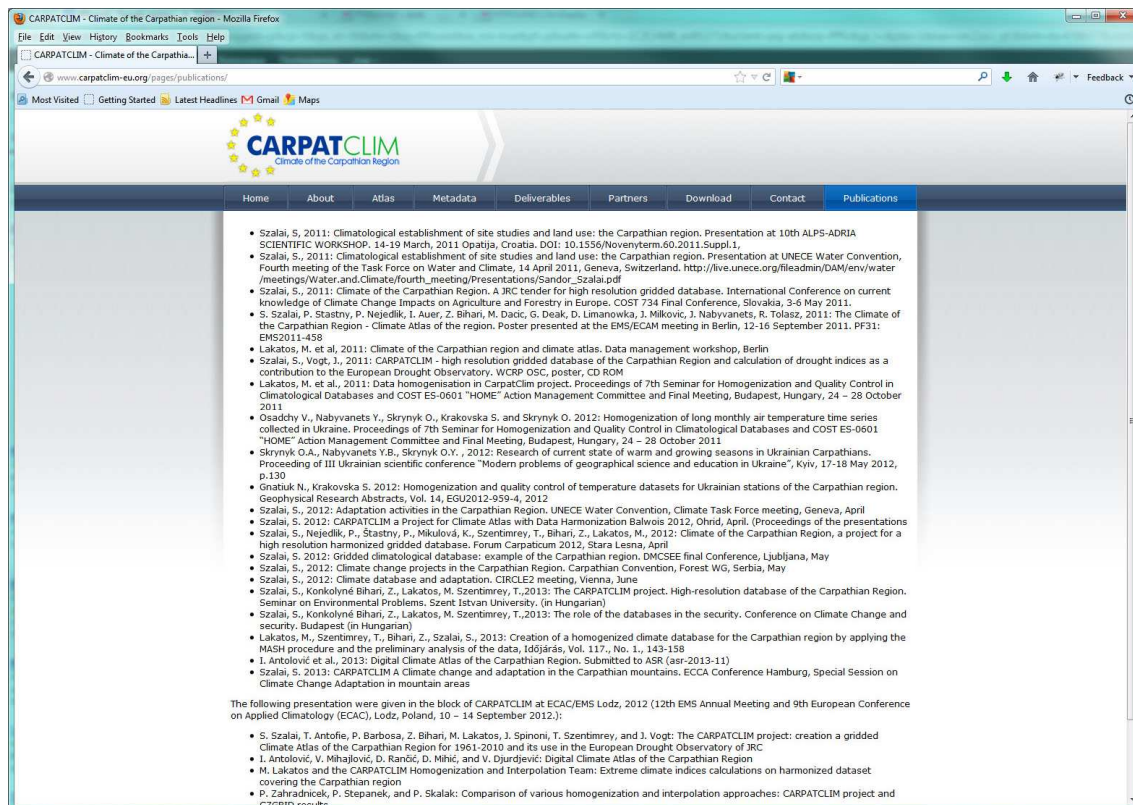


Figure 18. Publications page

## 4. Using the Digital Climate Atlas

In order to visualize and download climatological data the user needs to follow these steps (i.e. the user wants to download data for **Mean air temperature** for May 1st for the 1961-1971 year span):

- The user opens the Atlas page
- The user selects a “Mean air temperature” climatology variable or indicator on the options panel
- The user selects a “Daily” Type of period
- The user sets “May” on the Month property
- The user sets 1 on the Day property
- The user sets “1961” on the Start Year property
- The users sets “1971” on the End Year property
- In order to visualize the user clicks the “Refresh Map” button (Fig. 19)

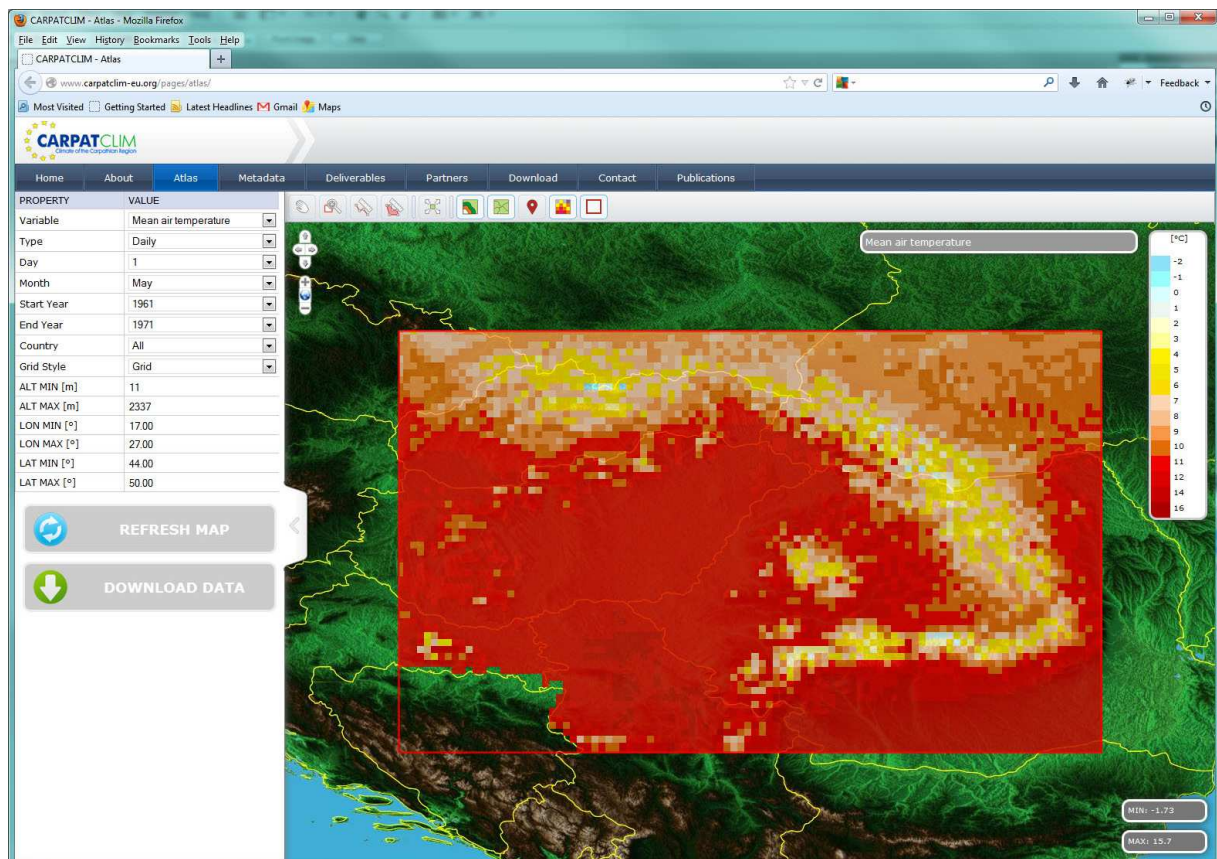


Figure 19. Visualization of the 1961-1971 average Mean air temperature for May 1st

- In order to download the data the user clicks the “Download Data” button
- The user accepts the terms of the agreement (Fig. 20) and clicks on “Start Download” which triggers the download of a zip archive named CARPATGRID\_TA\_D\_1\_MAJ\_1961\_1971.zip which contains several files:
  - Grid data for the selected time period in ESRI GRID format (Fig. 21)
  - Rendered grid data in .jpg format suitable for presentations or Web site upload (Fig. 22)
  - Interpretation sheet containing detailed description for the selected data (Fig. 23)

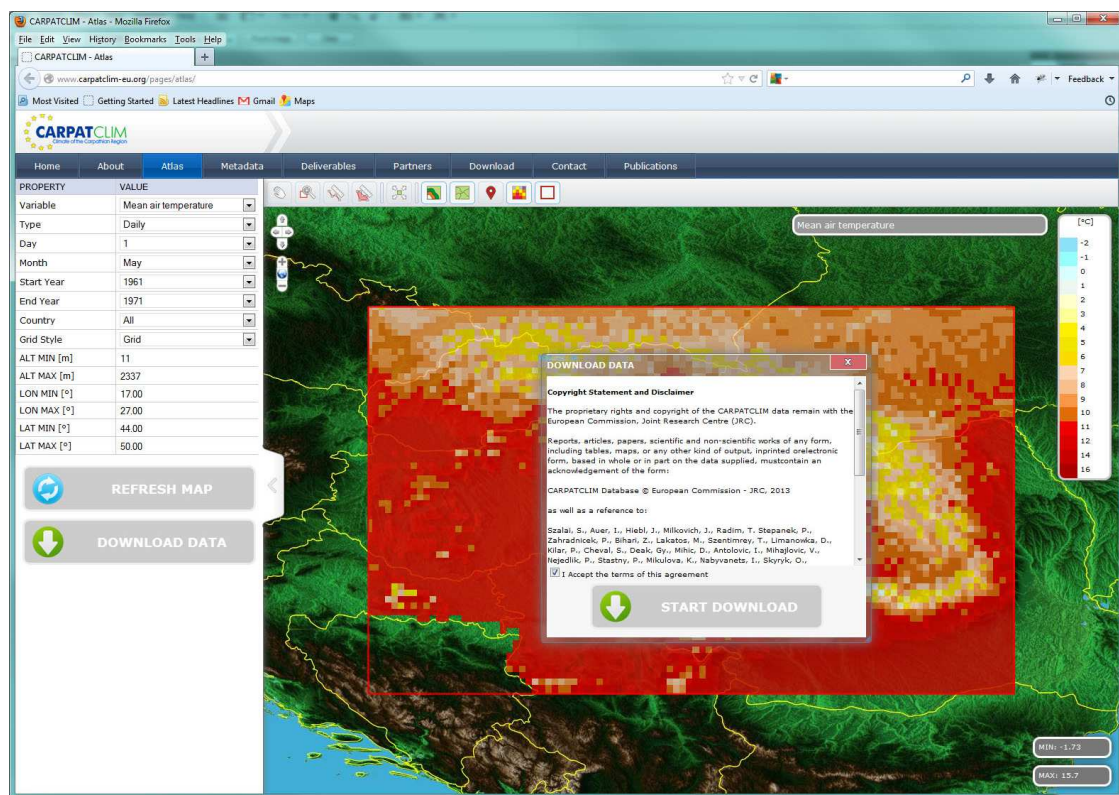


Figure 20. Accepting the terms of agreement

The screenshot shows a Notepad++ window with the following content:

```

1 ncooie 101
2 nrowe 61
3 xllcorner 17.00
4 yllcorner 44.00
5 cellsize 0.1
6 MODATA_value -9999
7 8.57 7.94 5.9 7.25 7.24 7.28 7.5 8.18 8.64 9.09 9.05 9.22
8 9.91 9.01 7.84 8.28 7.94 7.58 7.18 7.61 8.33 8.53 8.68 8.84
9 9.07 9.94 9.69 8.13 8.4 7.4 7.7 7.65 7.67 7.83 8.52 9.35
10 9.06 9.43 10.38 9.66 8.23 8.96 8.09 7.77 8.46 9.28 9.55 9.34
11 7.84 9.59 10.08 10.57 9.75 8.19 8.5 9.44 9.33 9.43 9.34 9.22
12 9.88 9.09 9.82 10.32 10.21 10.66 10.2 9.61 9.43 8.73 8.16 7.7
13 8.92 10.04 10.09 10.21 10.16 10 10.04 9.27 8.74 9.09 7.94 7.94
14 9.83 10.09 9.66 9.5 10.11 9.98 10.02 9.46 9.05 8.5 9.33 8.6
15 10.02 9.12 9.19 9.45 9.27 10.48 10.29 10 10.58 9.32 8.33 8.7
16 10.29 10.81 9.69 9.95 10.71 10.61 10.61 10 9.28 9.79 9.01 7.78
17 10.86 11.04 10.8 10.79 10.97 10.28 10.34 9.69 8.9 8.6 8.55 9.15
18 11.26 11.11 11.11 11.05 10.78 9.68 8.8 9.66 9.08 8.01 10.55 10.3
19 11.23 11.25 11.23 9.88 9.64 9.44 9.38 10.21 10.39 10.86 10.42 10.1
20 11.52 11.28 11.15 11.01 10.88 10.01 9.58 10.78 11.07 10.52 8.71 10.4
21 11.55 11.25 10.92 11.18 11.21 10.43 10.94 11.17 11.52 10.78 10.31 10.5
22 11.88 11.35 11.49 11.02 10.17 11.49 11.62 11.89 11.72 11.11 11.48 11.3
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27 12.28 12.37 12.27 12.19 12.2 12.18 12.15 12.15 12.12 12.11 12.14 12.1
28 11.9 12.12 12.07 12.09 12.12 12.17 12.15 12.15 12.16 12.15 12.15 12.1
29 12.16 12.18 12.13 12.14 12.08 12.08 12 12.09 12.1 12.31 12.35 12.3
30 12.15 12.14 12.12 12.1 11.97 12.13 12 12.15 12.23 12.29 12.3
31 12.17 12.13 12.04 12.05 12.03 12.12 12.01 12.34 12.31 12.29 12.34 12.1
32 12.03 11.97 11.87 11.9 11.96 12.43 11.95 10.17 11.8 11.92 11.97 12.1
33 11.75 11.75 11.99 12.17 12.34 12.42 12.54 12.03 11.88 12.23 11.67 11.5
34 11.73 11.97 12.09 12.01 12.37 12.24 11.69 11.79 10.8 10.56 10.86 10.6
35 11.84 11.83 12.27 12.15 12.27 12.07 11.62 10.83 10.55 9.93 10.96 10.7
36 11.45 11.83 12.42 12.37 12.77 12.13 11.19 11.31 10.5 11.57 12.13 12.2
37 11.64 12.09 12 11.18 12.16 12.47 11.76 10.68 9.51 10.7 11.89 12.1
38 11.08 12.36 10 10.59 12.73 11.79 10.99 11.24 12.04 11.88 12.93 12.5
39 11.45 12.44 12.13 10.62 12.52 11.13 12.54 12.28 12.47 12.56 11.73 12.4
40 11.45 12.52 12.54 12.01 12.69 12.62 12.26 11.13 11.22 11.22 11.04 11.6
41 10.66 12.15 12.35 11.73 12.28 12.46 12.4 11.44 11.71 12.42 12.44 12.0
42 10.56 11.56 11.56 11.56 11.56 11.56 11.56 11.56 11.56 11.56 11.56 11.56

```

Figure 21. Gridded data in ESRI GRID format

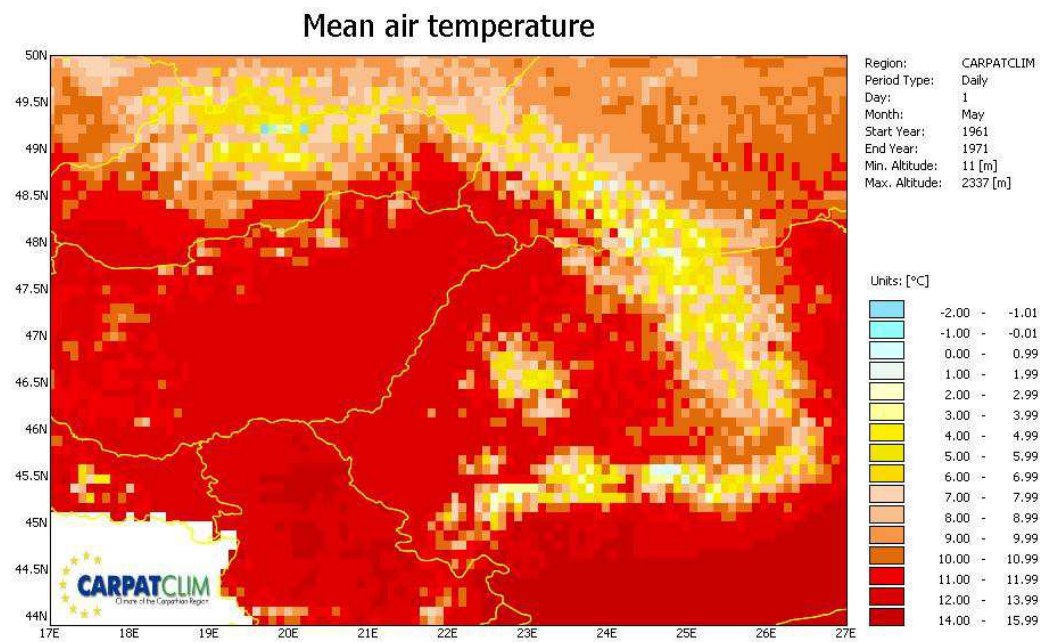


Figure 22. Gridded data rendered as a .jpg image



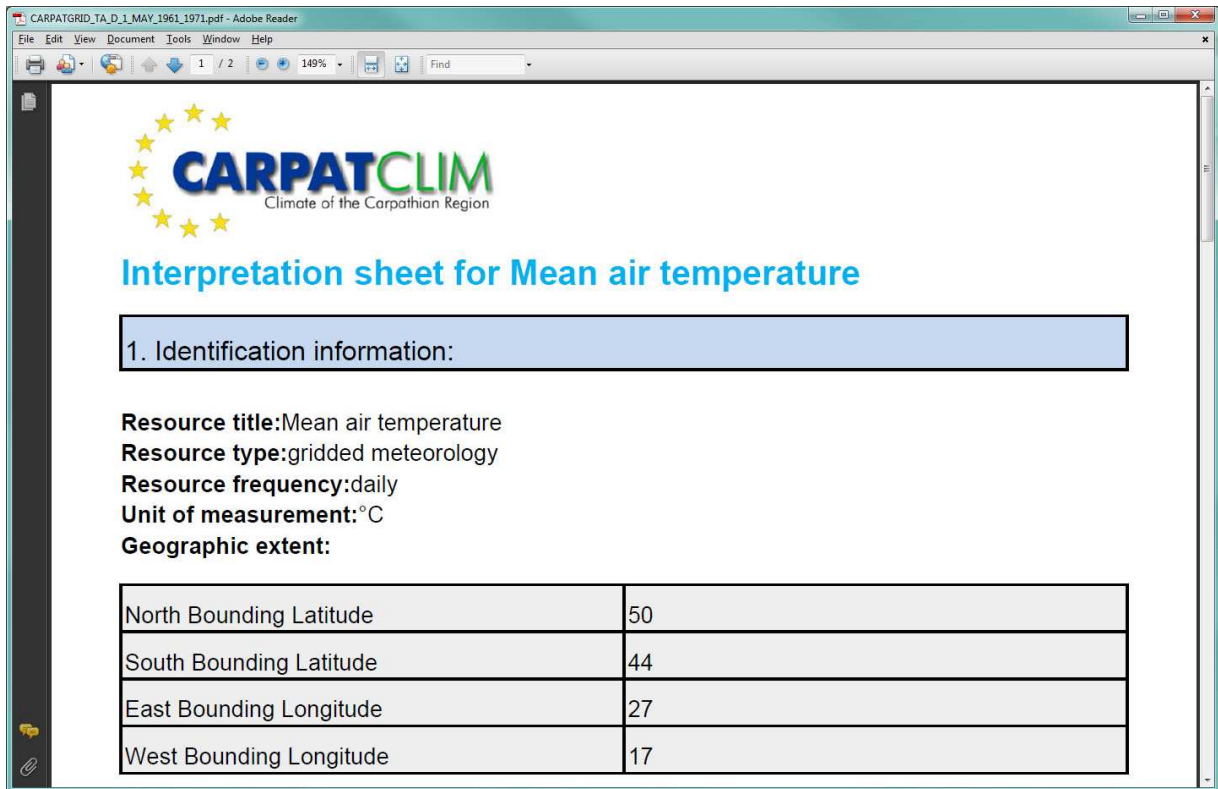


Figure 23. Interpretation sheet for the downloaded grid data

## 5. REFERENCES

**D3.10** Outline of the structure of the Web site of the Carpathian Atlas, foreseeing all requested functionality

**D3.16** Final version of the fully implemented and publically accessible metadata catalogue of the Carpathian Atlas, containing all metadata generated during all three modules of the project

<http://www.geonetwork-opensource.org> – Online resource for the Geonetwork server

<http://www.microsoft.com/en-us/server-cloud/windows-server/default.aspx> - Online resource for Microsoft Windows Server 2008

<http://www.postgresql.org> – Online resource for PostgreSQL database

<http://www.iis.net> – Online resource for IIS Web server

<http://www.opengeospatial.org/standards/wms> - Online resource for the WMS OGC standard

<http://www.opengeospatial.org/standards/wfs> - Online resource for the WFS OGC standard

<http://www.asp.net/> - Online resource for the ASP.NET programming language

<http://www.php.net/> - Online resource for the PHP programming language

<https://developer.mozilla.org/en/JavaScript> - Online resource for the JavaScript scripting language