Deliverable D1.10

Final report on the documentation of the data rescue and digitization exercise, per country

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Content

1. Introduction

According to the service contract and the proposed deliverables D1.6 (on data inventory) and D1.9 (on preliminary results of the data rescue and digitization exercise) a summary was made in order to evaluate the efficiency and success of the activities for filling data gaps in the individual country data sets for obtaining complete daily data series of variables for further processing.

2. Summary of digitized and rescued data

Deliverable D1.9 gives the overall review on the number of data to be edited or digitized to fulfil the expectances of CARPATCLIM regarding the completeness of daily data of all variables. Deliverable D1.10 summarises the results of the data rescue and digitization activities per country. The main aims of D1.10 are to get information on:

a. differences between the promised values in D1.9 and the real work that has been done,
b. ratio of the data digitized in the frame of the project to the all data used in the project per individual country,
c. if rescued/digitized data are in the database,
d. if rescued/digitized data are after quality control and
e. other important issues with respect to data rescue and digitization.

Tab. 1. Reported number of edited or digitized data per country according to D1.9

Country	**Nb. of stations for data rescue**		**Nb. of records to be digitized**	**Status of digitalization**	**Notice**
	Climatological	**Precipitation**			
Croatia	0	0	0	Finished	All necessary data already digitized
Czech Republic	0	0	0	Finished	All necessary data already digitized
Hungary	6/21	0	1 303050	Finished	14 variables from 6 stations, 1 variable from 21 stations
Poland	12	3	389455	Finished	
Romania	10	20	1525700	Finished	
Serbia	0	12	30660	Finished	
Slovakia	5	15	394200	Finished	Full station sheets digitized (more than 12 variables)
Ukraine	39	91	11 625750 (9964500 +1660750)	Finished	14 variables from 39 stations, 1 variable from 91 stations

Austria participates in the near border data exchange only and Croatia and Czech Republic have all necessary data already digitized.

Tab. 2. Summary of digitized data per country with percentage (%) of data digitized in the frame of the project with respect to the all data used in the project per country

Country	Climatological stations		Precipitation stations		Database (Y/N)	QC (Y/N)
	Number of digit. data	%	Number of digit. data	%		
Hungary	1 522 780	20,0	0	0	Y	Y
Poland	65 700	2,9	281 780	29,7	Y	Y
Romania	1 323 490	6,0	203 670	8,0	Y	Y
Serbia	9 560	0,19	21 900	2,26	Y	Y
Slovakia	255 500	4,5	219 000	9,5	Y	Y
Ukraine	9 396 176	94.2	1 531 520	92.2	Y	Y

All the countries from Tab. 2 digitized data for completing variables for the project purpose.

5. References

D1.7 Proposal for quality control tests to be performed for all observational time series, Submitted to JRC.

D1.8 Proposal for homogenization methods to be applied to all observational time series, Submitted to JRC.

D1.9 Report on preliminary results of the data rescue and digitization exercise, per country, Submitted to JRC.

Annex 1 **D1.10 Hungary**

D1.10 Final report on the documentation of the data rescue and digitization exercise, per country

prepared by Monika Lakatos and Zita Bihari
Hungarian Meteorological Service

According to the recommendations on the spatial density of stations as agreed on the 1st meeting of Consortium (April 2011, Budapest), 37 climatological and 139 precipitation stations were selected in the territory of Hungary to produce the tender service in the area of interest.

1. The differences between the promised values in D1.9 and the real work that has been done

The sunshine duration measurements digitalization for 21 stations listed in the Table 1 was finished according to the plan in the preliminary report D1.9. The period of 1961-1970 had to be digitized.

Table 1. Digitization practice of the sunshine duration

No.	Station name	Periods has to be digitized or checked	Percentage of the checked and digitized data
1	Gödöllő	1961.01-1965.12, 1966.05.,1969.07-10.,1996.01-2000.03	100%
2	Békéscsaba	1961.01-05,	100%
3	Győr	1967.04-07,12;	100%
4	Iregszemcse	1961.01-1970.12., 1971.04.1988.08-09,1992.06.,1993.08,1997.12, 1998.01-11.	100%
5	Jósvafő	1961.01-1970.12, 1995.09-12	100%
6	Kalocsa	1961.01.-1980.07, 1988.12-1989.02,1991.12-1992.03, 2010.06-2010.12	100%
7	Kaposvár	1961.01-1988.07	100%
8	Kecskemét	1961.01-1965.12,1970,	100%
9	Kékestető	1965.04-1966.12,1995.07-12	100%
10	Kompolt	1961.01-1971.12,	100%
11	Miskolc	1981.07-1985.02	100%
12	Nagykanizsa	1961.01-1970.12, 2007.03-	100%
13	Nyíregyháza Napkor	2003.02-	100%
14	Orosháza	1961.01-1972.12, 1980.08-1981.02, 1981.06-1982.04, 1982.09-11, 1986.04-1995.05, 1995.07-08, 1998.04, 2000.04-	100%
15	Pápa Nyárád	1961.01-1972.12, 1994.12-1995.12, 2000.03.06-04.25, 2000.08.05-	100%
16	Mezőhegyes	1961.01-1971.12, 1989.05-	100%

17	Sárospatak	1961.01-1971.12, 1990.02, 1994.06-07, 1995.06, 1995.07.16-08.31, 1996.04, 1996.06.16-31, 1996.12-1997.01, 2000.04-	100%
18	Szarvas Bikazug	1961.01-1970.12, 1998.06-2004.12, 2005.01-	100%
19	Szolnok Alcsisziget	1962.11-1965.12, 1967.04-12	100%
20	Túrkeve	1961.01-1965.12, 1966.09, 1969.03, 1969.11, 1970, 2001.01-	100%
21	Zalaegerszeg Repülőtér	1961.01-1980.06, 1993.10-	100%

Majority of the climatological information exists in paper format and electronic format as well, but 6 stations had to be digitized for project purposes, namely: Jósvafő, Sárospatak, Kompolt, Szarvas, Pitvaros, Pápa. The digitizing of these stations was done.

The most problematic period of the measurements is the decade of 1961-1970. Additional stations and years, months above the planned in the D1.9 was entered to the database:

Table 2. Additional stations and years, months above the planned amount in the D1.9

Station name	**Missing period**
Nyíregyháza	1961.01.-1971.12
Pátyod	1970.01-1971.12.
Orosháza	1965.01.-1972.12.
Győr-Likócs	1967.04-06., 12.
Kékestető	1965.04-1966.12
Aszód / Gödöllő	1970-71.
Homokszentgyörgy	1970-72.
Iklódbördőce / Lenti	1970-72.
Iregszemcse	1970.
Kalocsa	1970-71.
Kecskemét	1970.
Pécs Árpádtető / Misinatető	1961-70.
Penc / Vác	1970-72.
Sopronhorpács	1970-72.
Szarvas	1961-70.
Szolnok	1962.11-1965.12.
Tata / Tatabánya	1970.
Túrkeve	1970.
Zalaegerszeg	1963.09-12.

The digitization procedure was completely finished by the final deadline of the bordering data exchange.

The total number of records that were converted into electronic format can be expressed as following: 14 variables (11 variables + 3 values of wind direction) × 6 stations × 40 years × 365 days = **1 226 400** records. With the sunshine duration measurement for 21 stations and 10 years, we have got the number of **1 303 050** records approximately + additional records approximately 43 years x 365 days x 14 variables = **219 730** records

The total amount of the rescued records: **1 522 780.**

2. The ratio of digitized records to the total amount of data used in the frame of the project for Hungary can be expressed as follows:

a. Climatological stations:

- digitized **1 522 780 records**
- all data used in the project: 14 variables (11 variables + 3 values of wind direction) × 37 stations × 50 years × 365 days = **9 453 500 records** approximately
- ratio: **1 522 780/ 9 453 500= 0.16, 16%** approximately

b. Precipitation stations:

- digitized records: **0**
- all data used in the project: 2 variables × 139 stations × 50 years × 365 days = **5 073 500** approximately.
- ratio: 0%

3. All the rescued/digitized data are in the database of the Hungarian Meteorological Service

4. The digitized data are after quality control

Annex 2 **D1.10 Poland**

D1.10 Final report on the documentation of the data rescue and digitization exercise, per country

Prepared by Elżbieta Cebulak, Danuta Limanówka, Robert Pyrc, Piotr Kilar

In the CARPATCLIM project according to the Technical Specification the spatial density was established and minimum number of stations for Poland is 8 climatological and 24 precipitation stations. Optimum numbers are 9 climatological and 26 precipitation. Poland selected 22 climatological stations and 32 precipitation stations (together with climatological stations measuring precipitation the total number of stations for precipitation was 54). Some of stations are exceeding 50 degrees North for further interpolation outside the border of Project area.

1. The differences between the promised values in D1.9 and the real work that has been done

The sunshine duration, mean vapour pressure, mean surface air pressure and snow water equivalent measurements digitalization for 9 stations listed in the Table 1 (pos.1-9) was finished according to the plan in the preliminary report D1.9. For 6 (table1. pos. 10-15) stations missed precipitation was digitized.

Table 1. Digitization practice of the four missed elements on climatological stations.

No.	Station name	Periods has to be digitized or checked	Percentage of the checked and digitalized data
1	RACIBÓRZ	1961.01-1965.12	100%
2	KRAKÓW-BALICE	1961.01-1965.12	100%
3	TARNÓW	1961.01-1965.12	100%
4	RZESZÓW	1961.01-1965.12	100%
5	BIELSKO BIAŁA	1961.01-1965.12	100%
6	ZAKOPANE	1961.01-1965.12	100%
7	KASPROWY WIERCH	1961.01-1965.12	100%
8	NOWY SĄCZ	1961.01-1965.12	100%
9	LESKO	1961.01-1965.12	100%
10	HALA GĄSIENICOWA (P)	1961.01-1980.12	100%
11	IGOŁOMIA (P)	1961.01-1990.12	100%
12	CIESZYN (P)	1961.01-1986.12	100%
13	DOBCZYCE (P)	1961.01-1986.12	100%
14	ROZDZIELE (P)	1961.01-1980.12	100%
15	GORLICE (P)	1961.01-1980.12	100%

Snow depth was only available for climatological stations data, and their number wasn't big enough for further interpolation. We decided to digitize snow depth data available on archival paper lists for precipitation stations. The number of stations and digitized period is summarized in table 2.

Table 2. Additional stations and years completing the snow depth data, above the planned amount in the D1.9.

Station name	**Missing period**	**Records**
Istebna – Stecówka	1961 – 2010	18250
Węglówka	1961 – 2010	18250
Rozdziele	1961 – 2010	18250
Lutowiska	1961 – 2010	18250
Pilzno	1961 – 2010	18250
Gorlice	1961 – 2010	18250
Szaflary	1961 – 2010	18250
Istebna - Kubalonka	1961 – 2010	18250
Szczyrk	1961 - 2010	18250
Wadowice	1981 – 2010	10950
Półrzeczki	1961 – 2010	18250
Korbielów	1961 – 2010	18250
Koszarawa	1961 – 2010	18250

The digitization procedure was completely finished by the final deadline of the bordering data exchange.

The total number of records was converted into electronic format and can be expressed as follows:

- 4 variables (sunshine duration, mean vapour pressure, mean surface air pressure and snow water equivalent) × 9 stations × 5 years × 365 days = **65 700** records.
- Precipitation measurement for 6 stations different periods (tab 1) = **51 830** records.
- Records for snow depth = **229 950** records

The total amount of the rescued records: **65 700 + 51 830 + 229 950 = 347 480**

2. The ratio of digitized records to the total amount of data used in the frame of the project for Poland can be expressed as following:

a. Climatological stations:

- digitalized **65 700** records
- all used in the project data: 14 variables (11 variables + 3 values of wind direction) × 9 stations × 50 years × 365 days **= 2 299 500** records approximately
- approximately ratio: **65 700 / 2 299 500 * 100% = 2,9%**

b. Precipitation stations:

- digitalized records: **51 830 + 229 950 = 281 781**
- all used in the project data: 2 variables × 26 stations × 50 years × 365 days = **949 900 records** approximately.
- approximately ratio: **281 780 / 949 900 * 100% =** 29,7**%**

3. All the rescued/digitized data are in the database of the Institute of Meteorology and Water Management –National Research Institute

4. The digitized data are after quality control

Annex 3 **D1.10 Romania**

D1.10 Final report on the documentation of the data rescue and digitization exercise, per country

Prepared by Sorin Cheval and Monica Matei
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In the accordance with the Minutes of the 2nd meeting of CARPATCLIM project (Bratislava, 18-19 July, 2011) for the Romanian territory, in the area of interest, the minimum number of stations was assumed as 74 climatological and 221 precipitation stations, while the optimal number of stations was 81 climatological and 243 precipitation stations respectively (together 324 stations). Regarding the stations density in the Carpathian region, for the Romanian territory, there are 91 climatological stations covering the entire area. Concerning the precipitation stations, we have been provided with information for 67 stations, regularly distributed.

1. The differences between the promised values in D1.9 and the real work that has been done

The digitalization process for the climatological and precipitation stations was finished according to the plan in the preliminary report D1.9. The completeness of data in the database for the period 1961-2010 from Romanian part of Carpathian region is 100 %.

There were some missing data in the archive that were completed by means of homogenization procedure, using MASH software. The parameters with periods of missing values and for which this procedure was performed are: minimum air temperature, maximum air temperature, precipitation, wind speed, sunshine duration, cloud cover, relative humidity, and surface air pressure. The parameter surface vapor is not measured at the climatological stations in the Romanian territory.

Table 1 show the periods with missing values for the climatological stations where this procedure was performed. The list of precipitation stations where digitization was made for precipitation and snow cover parameters is presented in table 2.

Table 1. Digitization practice of the missed elements for climatological stations

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
1	Sighetul Marmaţiei	01/2003-05/2003; 01/2004-03/2004; 12/2004-02/2005; 01/2002-12/2010	100%

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
2	Rădăuţi	01/1961-07/1961; 07/2004-12/2010	100%
3	Baia Mare	12/1962; 11/1963-03/1964; 11/2010-12/2010	100%
4	Ocna Şugatag	06/1999-10/1999; 01/1961-11/1970; 01/1971; 03/1961-04/1961; 06/1999	100%
5	Botoşani	11/1992-12/1992	100%
6	Suceava	02/1963-07/1963; 01/1961-06/1963; 08/1964; 01/1961-06/1963; 02/1963-07/1963; 08/1964	100%
7	Iezer	11/2008-02/2009; 11/2009-12/2009; 07/2010-09/2010; 12/1961-01/1962; 12/1962-01/1963; 12/1963; 12/1964-01/1965; 11/1965-12/1965; 12/1966; 12/1967; 12/1968; 12/1969; 12/1970; 12/1971; 12/1972; 12/1973; 12/1974; 12/1975; 12/1976; 12/1978; 12/1979; 12/1980-01/1981; 12/1981; 12/1982; 12/1983; 12/1984; 12/1985; 12/1986; 12/1987; 12/1988; 12/1989; 12/1990; 12/1991; 12/1992; 12/1993; 12/1994; 12/1995; 12/1996; 12/1997; 12/1998; 12/1999; 12/2000; 12/2001; 12/2002; 12/2003; 12/2004; 12/2005; 12/2006; 11/2008-02/2009; 11/2009-12/2009; 07/2010-09/2010	100%
8	Săcuieni	03/2002; 11/2003-12/2010; 03/2002-07/2002; 11/2003-2/2010; 04/2002	100%
9	Zalău	01/1961-02/1963; 01/2010-11/2010; 02/1963	100%
10	Poiana Stampei	07/2005; 05/1999-12/2010	100%
11	Târgu Neamţ	04/2002-07/2005; 06/2006-10/2006; 04/2002-12/2010 04/2002-05/2002; 10/2000	100%
12	Dej	09/2009-11/2009; 06/2010-11/2010; 06/2010-11/2010	100%
13	Bistriţa	01/1961-05/1961	100%
14	Topliţa	02/2002-07/2002; 02/2002-12/2010; 02/2002-05/2002	100%
15	Piatra Neamţ	01/1961-05/1962	100%

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
16	Roman	08/2005-11/2005; 09/2004-12/2010	100%
17	Vlădeasa 1800	05/1961;11/2008-10/2009; 01/1961-01/1966; 12/2008-12/2010; 01/1961-03/1961	100%
18	Bacău	08/2010-12/2010	100%
19	Stei	03/2002-06/2002; 08/2004-09/2004; 03/2002-07/2002; 11/2003-12/2010; 04/2002; 04/2002	100%
20	Băişoara	10/2009-11/2009; 07/2010-08/2010; 10/2009-11/2009; 07/2010-08/2010	100%
21	Odorheiu Secuiesc	02/2002-06/2005; 12/2009-01/2010; 10/2010-11/2010 01/1961-02/1966; 09/2010-12/2010; 02/2002-12/2010 02/2002-05/2002; 02/2002-05/2002	100%
22	Miercurea Ciuc	06/2010-12/2010	100%
23	Dumbrăveni	01/1961-02/1964; 01/1963	100%
24	Târgu Ocna	08/2005-01/2006; 09/2007-11/2007; 12/2007-01/2008; 08/1964; 07/2005-12/2010	100%
25	Sânnicolaul Mare	08/2009-05/2010; 10/2010-02/2011; 08/2009-12/2010	100%
26	Varadia de Mureş	07/1963-05/1964; 05/1961; 03/1962; 03/2002-06/2010; 03/2002-12/2010; 04/2002/-05/2002; 04/2002-05/2002; 01/1961-11/1961	100%
27	Blaj	12/2006-11/2010; 12/2006-12/2010;	100%
28	Baraolt	03/2003-12/2010; 01/1961; 01/2001-02/2001; 03/2003-12/2010;	100%
29	Deva	11/1962-12/1962; 04/1961; 06/1961;	100%
30	Sebeş Alba	01/1961-06/1963; 01/2009-11/2010	100%
31	Făgăraş	08/1961; 09/2006-05/2009; 09/2006-07/2009	100%
32	Păltiniş Sibiu	01/1961-12/1962; 06/2009-05/2010; 10/2008-01/2009;	100%
33	Întorsura Buzăului	01/1961-07/1971	100%

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
34	Lăcăuţi	07/1961-09/1961	100%
35	Lugoj	01/1961-06/1966	100%
36	Boiţa	12/2003-03/2004; 07/2005-03/2009; 01/1961-08/1963; 12/2003-03/2004; 07/2005-03/2009; 06/1964	100%
37	Vârfu Omu	07/1964-09/1965; 06/1980-07/1980;	100%
38	Banloc	10/2008-01/2009; 11/2009-12/2009; 05/2010; 12/1961; 10/2008-01/2009; 11/2009-12/2009; 05/2010;	100%
39	Petroşani	11/1963-01/1964; 11/1984-04/1989; 06/1989-10/1989	100%
40	Fundata	01/1961-11/1963	100%
41	Predeal	09/1981-05/1982	100%
42	Semenic	06/2008; 07/2009; 12/2010; 05/2006-08/2006; 07/2007-10/2007; 06/2008-07/2008;	100%
43	Cuntu	04/2002-06/2002; 06/2003-12/2010;	100%
44	Voineasa	02/2010-12/2010; 06/2002-09/2002; 09/2008-12/2010; 01/1961-05/1967; 05/1967-05/1972; 10/1972; 12/1972-03/1973; 11/1978-01/1979; 12/1979-01/1980; 12/1980; 12/1981; 12/1982; 12/1983; 12/1985; 12/1986; 12/1987; 12/1988; 12/1989; 12/1990; 12/1991; 12/1992; 11/1993-01/1994; 12/1994-01/1995; 12/1995-01/1996; 12/1996; 12/1997-01/1998; 12/1998-01/1999; 12/1999-01/2000; 12/2000; 12/2001; 12/2002-01/2003; 12/2003; 12/2004; 12/2005; 12/2006-01/2007; 12/2007-01/2008; 12/2009; 01/02/2010-12/2010;05/1991-05/1991;06/2002-09/2002	100%
45	Parâng	01/1961-01/1972; 05/2010-07/2010;	100%
46	Câmpulung Muscel	01/1961-10/1962	100%
47	Sinaia 1500	01/1961-12/1987	100%
48	Pătârlagele	1961-1970	100%
49	Oraviţa	03/1964; 05/1966; 03/1962-07/1962; 04/1963;	100%

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
		07/1963; 10/1963; 06/1964	
50	Apa Neagră	04/1964-05/1964; 10/1961-11/1961; 1961-05/1972; 03/1984;	100%
51	Polovragi	04/2003-05/2003; 07/2008-01/2010; 07/2008-01/2010;	100%
52	Morăreşti	09/1961-10/1961; 11/1963; 11/2005-12/2005; 1961-07/1965; 01/1961-02/1961;	100%
53	Râmnicu Vâlcea	06/1964; 11/1984; 05/1961;	100%
54	Curtea de Argeş	09/1998; 01/1962; 09/1961;	100%
55	Câmpina	01/2002-07/2004; 11/2005-01/2008; 10/2008-12/2010; 01/1961-09/1967; 09/1962-10/1962; 01/2002-07/2004; 11/2005-12/2010; 02/2002-04/2002;	100%
56	Buzău	05/1961-01/1962; 11/1964-12/1964; 03/1965-06/1965; 09/1965-12/1965;	100%
57	Târgu Logreşti	10/1961-04/1963; 08/1962	100%
58	Piteşti	03/1967-04/1967; 11/2006;	100%
59	Târgovişte	10/1964; 04/1973-10/1973; 12/1973; 11/1982-04/1983; 07/1984; 10/1991	100%
60	Ploieşti	05/1981	100%
61	Drăgăşani	09/2000	100%
62	Urziceni	04/2006-05/2007; 01/2010-08/2010; 10/2010; 12/2010; 12/1973;	100%
63	Drobeta Turnu Severin	03/1961	100%
64	Bicleş	05/2001; 03/1962-05/1962;	100%
65	Stolnici	03/2005-08/2005; 11/2005-12/2005; 04/2006; 06/2006-08/2006; 01/2007; 05/2007-07/2007; 10/2007; 1961-1962;	100%
66	Bucureşti Băneasa	2001	100%
67	Bucureşti Filaret	03/2009-05/2009; 09/2009-12/2009; 08/1969-	100%

No	Station name	Periods in which digitized and checking procedures were performed	Percentage of the checked and digitized data
		12/1969; 03/1977-12/2010; 03/2009-12/2009	
68	Craiova	02/1971; 05/1971-07/1971; 10/1971; 09/1972; 12/1972; 12/1973; 01/1996;	100%
69	Videle	03/2003-12/2003; 01/2004-03/2004; 02/2005-06/2005; 11/2005/12/2005; 01/2006; 04/2006-11/2006; 01/1961-06/1962;	100%
70	Băileşti	02/1961	100%
71	Calafat	01/1961; 11/1961; 07/1983-09/1983;	100%
72	Giurgiu	1961-1963	100%
73	Bechet	04/1962-05/1962	100%
74	Cotnari	04/1961; 04/1962	100%

Table 2. List of the precipitation stations in Romania where precipitation and snow cover parameters were digitized

No	Station name	Periods in which digitized and checking procedures were performed		Percentage of the checked and digitized data
		Precipitation	Snow Cover	
1	Amărăştii de Jos	1991-1995;1997	01/1961-12/1985; 03/2006-01/2010	100%
2	Cetate	1992-1995;1997	01/1961-12/1985; 03/2006-01/2010	100%
3	Drăgăneşti Olt	1990-1993; 1998; 2003	01/1961-12/1985; 03/2006-01/2010	100%
4	Mănăstirea	1991; 1993-1995; 1998; 2001; 2003	01/1961-12/1985; 12/2005-/01/2009	100%
5	Ceptura de Jos	1961; 1991; 1995; 2001; 2003;	01/1961-12/1985; 12/2005-01/2010	100%
6	Vălenii de Munte	1991; 1995; 2001; 2003	01/1961-12/1985; 12/2005-01/2010	100%
7	Muntele Roşu	2000-2003	01/1961-12/1986; 01/2006-01/2010	100%
8	Cehu-Silvanei	1991; 1998; 2003	01/1961-12/1985; 12/2006-01/2010	100%
9	Fălticeni	1991-1994; 2003	01/1961-12/1998; 03/2006-01/2010	100%

The majority of the climatological and precipitation information exists in paper format and electronic format as well.

The estimation of the total number of records to be converted into electronic format was expressed as follows:

For climatological stations:

- 14 variables (11 variables+ 3 values of wind direction) × 74 stations × 3.5 years× 365 days =**1 323 490** records

For precipitation stations:

- 2 variables × 9 stations × 31 years × 365 days =**203 670** records

The total amount of the rescued records: **1 527 160**

2. The ratio of digitized records to the total amount of data used in the frame of the project for Romania can be expressed as following:

a. Climatological stations:

- Digitalized: **1 323 490**
- All used in the project data: 14 variables (11 variables + 3 values of wind direction) × 91 stations × 50 years × 365 days = **23 250 500 records** approximately
- Ratio: **1 323 490 /23 250 500 = 0.06; 6%** approximately

b. Precipitation stations:

- Digitalized records: **203 670**
- All used in the project data: 2 variables × 67 stations × 50 years × 365 days = **2 445 500 records** approximately.
- Ratio: **203 670 /2 445 500=0.08; 8%** approximately

3. All the rescued/digitized data are stored in the database of the National Meteorological Administration, Bucharest, Romania.

4. The digitized data are stored after the performance of quality control operation.

Annex 4 **D1.10 Serbia**

D1.10 Final report on the documentation of the data rescue and digitization exercise, per country

Prepared by Jasna Kolaček, Dragan Mihić

1. The differences between the promised values in D1.9 and the real work that has been done

According to the Technical Specification of the CARPATCLIM project the spatial density was established and for Serbian part of the project area it meant selecting a minimum of 18 climatological and 54 precipitation stations. As mentioned and presented in the reports D1.6 and D1.9 most of the necessary data were already available in digitized form. Still, some digitalization and data rescue from paper forms and old archiving digital format on magnetic tape (mainly 1961-1964 periods) has been done. Also, quality control tests, both logical and critical, were performed in order to have the best possible original data sets. During that process some changes to the lists of stations to be used in the project were made. Namely, Šabac was removed from the climatological stations list and replaced by Surčin. Also, a couple of precipitation stations (Martonoš, Šajkaš, Ravni Topolovac, Bački Petrovac and Surčin) were removed and several were added to its list (Table 1). Finally, 20 climatological and 53 precipitation stations were selected for the project.

Table 1. Final list of precipitation stations (1961-2010)

No.	Nat. ID	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
1	30	Subotica	46.0999	19.7113	110	31 months in 1981-1996 and 1999	95%
2	70	Horgoš	46.1666	19.9778	95	12 months in 1965-1969, 1999	98%
3	130	Bački Monoštor	45.7999	18.9280	85	58 months in 1979, 1981, 1993-1997, 1998-2001, 2006, 2009	90%
4	140	Bezdan	45.8499	18.9280	90	1977, 5 months in 1981, 1998	97%
5	160	Gakovo	45.8999	19.0614	90	47 months in 1980, 1981, 1985, 1991-1998, 2005	92%
6	310	Bajmok	45.9666	19.4279	115	10 months in 1961, 1963, 1964, 1997, 1999, 2001, 2003	98%
7	380	Bačka Topola	45.8166	19.6446	100	28 months in 1966, 1989, 1996, 1997, 1999, 2001, 2002, 2010	95%
8	440	Gunaroš	45.7666	19.8279	100	32 months in 1969-1973, 1975, 1976, 1980, 1981, 1993, 1996, 1998,	94%

No.	Nat. ID	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
						1999, 2001, 2010	
9	490	Tornjoš	45.8832	19.8279	110	15 months in 1973, 1976, 1977, 1987, 1993, 1998-2000, 2010	97%
10	510	Bačko Gradište	45.5333	20.0279	85	9 months in 1976-1977, 1992-1993, 1996, 1998, 2006-2007	99%
11	520	Bečej	45.6333	20.0279	78	11 months in 1961, 1962, 1964, 1971, 1972	98%
12	521	Bačko Petrovo Selo	45.7166	20.0778	80	18 months in 1979, 1985, 1987, 1994-1997, 1999-2000, 2010	97%
13	550	Ada	45.7999	20.1278	80	6 months in 1992, 1996, 1999, 2006, Aug 2009 - Dec 2010	96%
14	560	Novi Bečej	45.5999	20.1446	80	2 months in 1979, 1995	99%
15	620	Sajan	45.8499	20.2778	80	19 months in 1974, 1977, 1982, 1989, 1991, 1995-1997	97%
16	640	Melenci	45.5167	20.3112	80	3 months in 1995, 1997, 2002, Jun 2009 - Dec 2010	97%
17	660	Mokrin	45.8999	20.4112	85	14 months in 1977, 1986, 1992, 1996-1998	97%
18	670	Bašaid	45.6333	20.4112	80	31 months in 1987, 1989, 1991-1998	95%
19	690	Torda	45.7199	20.4612	85	5 months in 1961, 1977, 1992, 1996, 1998	99%
20	710	Toba	45.6833	20.5612	80	34 months in 1962-1964, 1974, 1980, 1991-1997	94%
21	720	Rusko Selo	45.7499	20.5778	80	3 months in 1969, 1995	99%
22	760	Srpska Crnja	45.7300	20.6945	80	9 months in 1961, 1976, 1979, 1985, 1994-1995, 1998-1999	99%
23	810	Vajska	45.4332	19.1114	85	3 months in 1994, 1998	99%
24	890	Bač	45.3999	19.2447	85	24 months in 1965, 1971, 1973-1978, 1980, 1985-1987, 1992-1993	96%
25	950	Bačka Palanka	45.2499	19.3780	80	29 months in 1972, 1986-1988, 1991-1998, 2005-	95%

No.	Nat. ID	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
						2006	
26	1220	Temerin	45.4000	19.8779	80	8 months in 1970, 1977-1978, 1993, 1995, 1997, 2009-2010	99%
27	1380	Mošorin	45.3000	20.1779	80	11 months in 1973, 1975, 1979-1981, 1987, 1995, 2003	98%
28	1410	Aradac	45.3833	20.2946	80	17 months in 1978, 1982, 1999-2000, 2005, 2010	97%
29	1460	Perlez	45.2167	20.3779	80	17 months in 1961, 1966, 1980, 1983, 2005, 2010	97%
30	1550	Tomaševac	45.2667	20.6278	80	7 months in 1982-1983, 2007, Dec 1992 - Jan 1996, Mar - Dec 1998	91%
31	1560	Uzdin	45.2167	20.6112	80	5 months in 1961, 1980, 1998, 2004 Dec 1984 - Mar 1989	93%
32	1590	Neuzina	45.3500	20.7112	80	35 months in 1970-1972, 1980, 1985, 1987, 1990-1992, 1995-1999, 2002, 2004	94%
33	1610	Padina	45.1167	20.7279	110	26 months in 1970-1974, 1996, 1998	96%
34	1720	Banatski Karlovac	45.0501	21.0278	89	4 months in 1978-1980, 1985	99%
35	2414	Batajnica	44.9000	20.2779	80	57 months in 1969, 1993, 1995-1997, 1999-2008	90%
36	2470	Radmilovac	44.7501	20.5779	130	1 month in 1984, 1993-1995	94%
37	2650	Mala Krsna	44.5834	21.0112	85	59 months in 1961, 1979, 1993-1996, 1999-2004, 2006-2008	90%
38	2780	Batuša	44.5335	21.3112	110	54 months in 1974-1976, 1978, 1987, 1993-1995, 1998-2007	91%
39	2950	Dobra	44.6501	21.9111	70	60 months in 1961, 1969, 1972, 1974-1977, 1993-1995, 1998-2005, 2007	90%
40	3120	Krupanj	44.3667	19.3781	280	35 months in 1961-1966, 1969-1970, 1973, 1981, 1983-1984, 1987, 1992	94%

No.	Nat. ID	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
41	3150	Zavlaka	44.4501	19.5281	300	58 months in 1966-1967, 1973, 1994-1995, 1999-2000, 2002-2007, 2010	90%
42	3290	Poćuta	44.2168	19.7281	450	29 months in 1965, 1992, 1994-1995, 1999-2000, 2003-2007	95%
43	3620	Darosava	44.3334	20.4613	250	50 months in 1962-1963, 1965-1966, 1968-1969, 1971-1975, 1983, 1985, 1994-1995, 2000-2003, 2005-2007	92%
44	3660	Rudnik	44.1334	20.5113	700	17 months in ,1963, 1966-1967, 1970-1971, 1982, 1986 Jan 1961 - Feb 1962	95%
45	3780	Čumić	44.1334	20.7613	366		100%
46	4310	Zlot	44.0169	21.9778	300	21 month in 1992, 1996, 2000, 2003-2004, 2006, 2009-2010	96%
47	4330	Rudna Glava	44.3335	22.0944	185	5 months in 1963, 1988, 1992, 2004, 2008	99%
48	4370	Crnajka	44.2835	22.1444	180	20 months in 1963, 1966, 1972, 1988, 1992-1993, 2004, 2007, 2009	97%
49	4410	Miroč	44.4835	22.2611	480	17 months in 1963, 1979, 1988, 1992, 2004, 2009	97%
50	4460	Jabukovac	44.3502	22.3777	175	50 months in 1963-1971, 1976, 1983, 1992, 2003-2004, 2009	92%
51	4510	Mihajlovac	44.3669	22.4944	85	18 months in 1962-1963, 1975, 1979, 2004, 2009	97%
52	4520	Šipikovo	44.0336	22.4944	280	28 months in 1961-1962, 1965, 1977, 1992, 1996, 1999-2000, 2004-2005, 2009	95%
53	4560	Prahovo	44.3002	22.5777	60	19 months in 1965, 1984, 1990, 1992, 1998, 2004, 2009-2010	97%

Most of the data digitized from paper forms were wet bulb temperatures and some sunshine duration (Table 2). In addition to that, approximately 30 to 35 individual values for

different parameters per station were found missing in database, although they existed in paper records. All of those gaps were filled.
Digitalization of the precipitation station data mainly covered the period between 2008 and 2010. This included data for 15 stations listed in Table 1 under numbers 35-53, with exception of four climatological stations (Radmilovac, Krupanj, Rudnik and Čumić). Due to low quality of observed snow cover data from named stations, only daily precipitation has been digitized.

Table 2. Digitized and rescued data from paper forms

Name Station	Data rescue
Palić	SN: April 1974.
	RH and PV: years 1979-1980 and Jun 1981.
Sombor	SN: March 1975.
	RH and PV: year 1981.
Novi Sad	RH and PV: years 1979-1980. and Jun 1981.
Zrenjanin	RH and PV: years 1979-1980. and Jun 1981.
Kikinda	SN: August 1972. and April 1973.
Vršac	RH and PV: years 1979-1980. and Jun 1981.
Sremska Mitrovica	RH and PV: Jun 1981.
Negotin	SN: January 1978.

2. The ratio of digitized records to the total amount of data used in the frame of the project for Serbia can be expressed as following:

a. Climatological stations:

- Digitalized: **9 560 records**
- All used in the project data: 14 variables (11 variables + 3 values of wind direction) × 20 stations × 50 years × 365 days = **5 110 000 records** approximately
- Ratio: **9 560 /5 110 000 = 0.00187; 0.19%** approximately

b. Precipitation stations:

- Digitalized records: **21 900**
- All used in the project data: 53 stations × 50 years × 365 days = **967 250 records** approximately.
- Ratio: **21 900/967 250= 0.02264; 2.26%** approximately

3. All the rescued/digitized data are in the database of the Republic Hydrometeorological Service of Serbia

4. The digitized data are after quality control

Annex 6 **D1.9 Ukraine**

D1.10 Final report on the documentation of the data rescue and digitization exercise, per country

prepared by Yurii Nabyvanets and Oleg Skrynyk
Ukrainian Hydrometeorological Institute

There are 30 meteorological observation stations within the area of interest (Carpathian Region) on the territory of Ukraine. Detailed information concerning set of Ukrainian meteorological stations has been presented in Deliverable 1.6. Moreover, following recommendations of the 1st meeting of Consortium (April 2011, Budapest) 9 additional meteorological stations were selected locating in 50 km zone close to the area of interest. List of those stations is attached to the Report as well.

According to national regulation all meteorological information is stored in the State Branch Archive at Central Geophysical Observatory of the Ministry of Emergencies of Ukraine. For the time being historical climatological information exists mainly in paper format except air temperature time series. Those data collected on limited number of meteorological stations are in electronic format primarily.

At the beginning of our work we found more than 90% of daily data related to studied area and for time period of interest (1961-2010) existing in paper format only. In Ukraine like in other former Soviet Union republics daily data are published in special tables. For instance, the most of variables (11 items) are published in special Meteorological tables named as TM-1.

Estimation of the total number of records to be converted into electronic format was expressed as following: for climatological stations – 14 variables (11 variables+ 3 values of wind direction) × 39 stations × 50 years × 365 days = **9 964 500** records; for precipitation stations – 1 variable × 91 stations × 50 year ×365 days = **1 660 750**; the total number of records is: **9 964 500 + 1 660 750 = 11 625 250.**

Unfortunately, Ukraine Hydrometeorological Service does not perform observations on sunshine at all stations of observation network; also there are no meteorological stations in Ukrainian Carpathian Region providing Global Radiation measurements.

It also should be noted that Cloud Cover variable (cc) is not daily averaged. Above mentioned tables present just timed values.

At present data from all 39 Ukrainian climatological stations and 91 precipitation stations were digitized.

The total number of records from climatological stations converted into electronic format (the total amount of the rescued records) is presented in the table 1.

Tab. 1 The rescued records of Ukrainian climatological stations

No	Station	Number of records	Comments
1	Dubno	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
2	Rava-Ruska	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
3	Shepetivka	255 668	18 262 (number of days) ×14 (number of variables)
4	Kremenets	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
5	Kamyanka-Bugska	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
6	Brody	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
7	Yavoriv	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
8	Yampil	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
9	Lviv	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
10	Mostyska	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
11	Khmilnyk	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
12	Ternopil	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
13	Berezhany	246 325	18 262 (number of days) ×13 (number of variables) + 8 919, Sunshine: only from 01.08.1985
14	Drohobych	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
15	Khmelnytsky	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
16	Stryi	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
17	Turka	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
18	Chortkiv	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
19	Zhmerynka	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
20	Dolyna	255 668	18 262 (number of days) ×14 (number of variables)
21	Velykyi Bereznyi	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
22	Ivano-Frankivsk	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed

No	Station	Number of records	Comments
23	Slavske	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
24	Nova Ushytsia	255 668	18 262 (number of days) ×14 (number of variables)
25	Nyzhni Vorota	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
26	Nyzhnyi Studenyi	218 803	16 831 (number of days) ×13 (number of variables), Station did not work from 1.10.1988 until 31.08.1992, Sunshine is not observed
27	Kamianets-Podilsky	255 668	18 262 (number of days) ×14 (number of variables)
28	Plai	201 812	15 524 (number of days)×13 (number of variables), Station began to work from 1.07.1968, Sunshine is not observed
29	Uzhgorod	255 668	18 262 (number of days) ×14 (number of variables)
30	Kolomyia	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
31	Mizhgirria	255 668	18 262 (number of days) ×14 (number of variables)
32	Yaremcha	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
33	Mogyliv-Podilsky	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
34	Chernivtsi	255 668	18 262 (number of days) ×14 (number of variables)
35	Beregove	255 668	18 262 (number of days) ×14 (number of variables)
36	Khust	255 668	18 262 (number of days) ×14 (number of variables)
37	Pozhyzhevska	255 668	18 262 (number of days) ×14 (number of variables)
38	Rakhiv	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
39	Seliatyn	237 406	18 262 (number of days) ×13 (number of variables), Sunshine is not observed
Total		**9 396 176**	

Table 2. List of precipitation stations for the period 1961-2010

No.	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
1	Chervonograd	50.38333335	24.23333335	191	Jan.1961-Dec.1962 Feb.1977; May.1980	95
2	Mezhyrichchya	50.33333335	24.21666668	192	-	100
3	Shchurovychi	50.26666668	25.03333334	195	Aug. 1982	99
4	Volytsya	50.23333335	24.11666667	205	-	100
5	Triytsya	50.15000001	24.76666671	207	May.1981; Aug.1982	99
6	Nesteriv	50.05000000	23.96666672	227	-	100
7	Busk	49.96666672	24.60000003	220	-	100
8	Sasiv	49.88333338	24.95000005	271	Jan.1978-Dec.1978	98
9	Tvirzha	49.80000004	23.23333335	209	Jul.1993-Aug.1993	99
10	Shchyrets	49.65000003	23.86666671	265	-	100
11	Luky	49.63333337	23.40000002	274	Feb.1991	99
12	Komarne	49.63333337	23.68333337	263	Sep.1976; Jun.1991	99
13	Ozymyna	49.46666669	23.38333335	280	-	100
14	Rozdil	49.43333336	24.06666667	244	Jun.1964	99
15	Strilky	49.33333335	22.98333338	413	-	100
16	Zhuravlyne	49.26666668	24.28333335	244	Jan.1961-Dec.1973 Jun.1979	73
17	Zarichne	49.16666668	24.08333334	282	Nov.1985	99
18	Verkhne Synevydne	49.10000001	23.60000003	381	1961; Sep.1977 Sep.1981; Jul.1984	97
19	Skole	49.03333334	23.51666669	456	-	100
20	Svyatoslav	49.00000000	23.45000002	484	Feb.1973; Apr.1973	99
21	Matkiv	48.91666671	23.10000001	660	-	100
22	Tukhlya	48.90000005	23.46666669	528	Mar.1978; Jan.1995-Dec.1997	93
23	Khyriv	49.53333336	22.86666671	339	Oct.1988-Dec.1995	85
24	Maydan	49.16666668	23.26666668	499	Jan.1961-Dec.1983 Mar.1984	53
25	Rykiv	49.01666667	23.16666668	629	Jan.1961-Dec.1983 Jun.1989	53
26	Sambir	49.51666669	23.2166668	293	Jan.1961-Nov.1988	44
27	Yasenytsya	49.20000001	23.26666668	525	Jan.1961-Dec.1983 Jun.1989	53
28	Stara Synyava	49.56666670	27.66666670	278	Jul.1975; Sep.1975; Mar.1977-Apr.1977	98
29	Volochysk	49.53333336	26.16666668	277	-	100
30	Pyrogivtsi	49.38333335	27.23333335	274	Jan.1963-Dec.1963 Jul.1975; Sep.1975	93
31	Kupyn	49.10000001	26.56666670	277	-	100
32	Zynkiv	49.08333334	27.06666667	214	-	100
33	Kugaivtsi	48.96666672	26.36666669	263	-	100
34	Golozubyntsi	48.83333338	26.88333338	258	Jan.1961-Sep.1970	80
35	Tymkiv	48.78333337	27.08333334	126	Jan.1961-Dec.1973 Sep.1995; Jan.1996;	73

No.	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
					Mar.1996; Apr.1997	
36	Mala Slobidka	48.63333337	26.65000003	154	-	100
37	Zavallya	48.60000003	26.36666669	141	Jan.1961-Dec.1971	78
38	Lastivtsi	48.58333336	26.45000002	143	Jan.1975-Dec.1975	98
39	Zhvanets	48.53333336	26.50000003	158	Sep.1985-Dec.1985	99
40	Kaplyntsi	49.55000003	25.21666668	329	Feb.1963-Mar.1963	99
41	Velyka Berezovytsya	49.50000003	25.60000003	298	Jan.1988	99
42	Pidgaytsi	49.26666668	25.15000001	346	-	100
43	Zadariv	49.06666667	25.03333334	219	Oct.1996	99
44	Koropets	48.93333338	25.18333334	205	Oct.1976	99
45	Strilkivtsi	48.76666671	26.00000000	216	Jan.1982-Dec.1982	98
46	Zalishchyky	48.63333337	25.75000004	149	Jan.1974	99
47	Buchach	49.05000000	25.30000002	271	Jan.1961-Dec.1980	59
48	Lityn	49.33333335	28.10000001	263	Dec.1980	99
49	Kudiivtsi	48.98333338	27.86666671	271	Aug.1985; Jun.1991	99
50	Zherebylivka	48.60000003	27.65000003	135	Jan.1961-Jun.1963 Oct.1995; Apr.1997	94
51	Kozlov	48.51666669	27.53333336	76	Jan.1961-Mar.1989 Feb.1991-Mar.1991	43
52	Bukachivtsi	49.25000001	24.50000003	229	-	100
53	Bilshivtsi	49.18333334	24.73333337	222	Oct.1980; Oct.1983	99
54	Galych	49.11666667	24.71666670	217	May.1975; Nov.1977	99
55	Perevozets	49.08333334	24.55000003	245	-	100
56	Tysiv	49.05000000	23.80000004	423	-	100
57	Goshiv	49.01666667	23.88333338	217	-	100
58	Bodnariv	49.01666667	24.55000003	290	-	100
59	Nyzhniy	48.96666672	25.10000001	198	-	100
60	Tysmenytsya	48.90000005	24.85000004	247	-	100
61	Spas	48.88333338	24.06666667	424	-	100
62	Myslivka	48.78333337	23.76666671	690	-	100
63	Osmoloda	48.63333337	24.01666667	713	Jun.1996	99
64	Guta	48.63333337	24.21666668	647	Dec.1965; Jun.1977	99
65	Pasichna	48.56666670	24.45000002	539	Jun.1977; May.1985	99
66	Dora	48.46666669	24.58333336	489	-	100
67	Buyarsky	48.45000002	24.55000003	478	Jan.1961-Dec.1967 Dec.1990	87
68	Kremintsi (Tatariv)	48.36666669	24.55000003	650	Jul.1976; Dec.1990	99
69	Kuty	48.25000001	25.20000001	336	Jan.1961-Dec.1973	74
70	Yaseniv	48.16666668	24.96666672	604	Jan.1961-Dec.1966 Feb.1979; Aug.1979 Jun.1985; Dec.1990	87
71	Iltsi	48.15000001	24.76666671	718	Jan.1961-Dec.1970	80
72	Verkhovyna	48.15000001	24.83333338	602	Jun.1991	99
73	Usteriky	48.11666667	25.01666667	488	Jun.1991	99
74	Yablunytsya	48.03333334	24.93333338	601	Jan.1961-Dec.1965; Nov.1985; Feb.1986	89
75	Zhornava	48.98333338	22.63333337	346	Dec.1983	99

No.	Stat. name	Lat.	Lon.	Alt.	Missing period	Percentage of checked and digitized data
76	Zaricheve	48.76666671	22.50000003	168	Aug.1983	99
77	Pidpolozzya	48.75000004	23.01666667	363	-	100
78	Svalyava	48.55000003	22.98333338	194	-	100
79	Znyatseve	48.48333336	22.51666669	110	Jun.1991	99
80	Kolochava	48.41666669	23.68333337	525	Jan.1961-Dec.1966; Feb.1972; Nov.1977	87
81	Dovge	48.36666669	23.28333335	175	Feb.1972	99
82	Vylok	48.10000001	22.83333338	120	Nov.1983	99
83	Neresnytsya	48.11666667	23.76666671	312	-	100
84	Lugy	48.06666667	24.43333336	601	-	100
85	Kosivska Polyana	48.01666667	24.11666667	419	Jan.1961-Dec.1973 Sep.1983; Dec.1990	73
86	Velyky Bychkiv	47.96666672	24.00000000	299	-	100
87	Ruska Mokra	48.35000002	23.90000005	549	Jan.1961-Dec.1985 Aug.1991	49
88	Rukhotyn	48.56666670	26.16666668	130	Jan.1961-Dec.1986	48
89	Storozhynets	48.15000001	25.73333337	355	Nov.1985	99
90	Putyla	48.00000000	25.08333334	619	Nov.1985; Apr.1988; Aug.1991; Apr.1994	99
91	Grushevtsi	48.61666670	26.95000005	275	Jan.1961-Dec.1985 Jun.1996; Feb.1997	49

Total number of missing data for precipitation stations is **130 322**. Therefore total number of rescued data for precipitation stations is **1 531 520**.

1. According to the plan in D1.9 all the variables from promised stations were digitized.

2. The ratio of digitized data to the total amount of data used in the frame of the project for Ukraine can be expressed as following:

a. Climatological stations:

- Digitized: **9 396 176 records**
- All used in the project data: 14 variables* (11 variables + 3 values of wind direction) × 39* stations × 50 years × 365 days = **9 964 500 records** approximately
- Ratio: **9 396 176 / 9 964 500 = 0.942; 94.2%** approximately

** sunshine duration measurement is missing or is incomplete from 27 stations*

b. Precipitation stations:

- Digitalized records: **1 531 520**
- All used in the project data: 1 variable* × 91 stations × 50 years × 365 days = **1 666 750 records** approximately.
- Ratio: **1 531 520 / 1 660 750 = 0.922; 92.2%** approximately

**No snow depth.*

3. All the rescued/digitized data are in the database of the State Branch Archive at Central Geophysical Observatory of the Ministry of Emergencies of Ukraine.

4. The digitized data passed quality control.