

USER GUIDE

on

Digitised atmospheric electricity yearbooks of Stanisław Kalinowski Geophysical Observatory in Świder, Poland, 1957-2005

<https://dataportal.igf.edu.pl/dataset/digitised-atmospheric-electricity-yearbooks-swider-observatory-1957-2005>

The data set contains digitised yearbooks with atmospheric electricity and meteorological data sets from the Stanisław Kalinowski Geophysical Observatory in Świder, Poland, 1957-2005, as published in the paper observatory yearbooks. The yearbooks are provided in PDF format, and contain tabulated data sets, descriptions of measurements, research papers and obituaries. Digital data sets are provided as CSV files. PDF files for yearbooks are provided in the main directory, and CSV data files are organized in two directories: ELECTRIC and METEO. Description of the folders and auxiliary information are given in this user guide. The guide explains the content and notation used in the digital files in reference to the tabulated data published in the yearbooks. More details on measurement and instruments including the instrument types or model, altitude of measurements, times of measurements and time zones for reporting, details for measurements and reported averages can be found in the yearbooks' introductory notes.

MAIN DIRECTORY - YEARBOOKS

This part of the dataset contains PDF scans of all available paper yearbooks 1957-2005 published till 2021. Citations for each yearbook are provided in the file description. Yearbook have been scanned in black and white which allows comparison of numerical data sets with the original data tabulated in these yearbooks. Blank pages without numbering were skipped. Photographs are illegible but pure text is available to read, including the data, descriptions, legends of symbols used, short introduction with details on measurements, legends as well as research and occasional papers. The languages of yearbooks are French or English, and Polish. References to all yearbooks are listed in the appendix. References to individual yearbooks are given in Appendix A, and list of staff involved in the observations is given in Appendix B.

DIRECTORY ELECTRIC

The dataset contains digitised series of 1957-2005 atmospheric electrical data of ground-level atmospheric electric field (or the potential gradient, PG), air electric conductivity (positive, PC, and negative, NC, only in 1957-1964, with the total conductivity, TC, and the conductivities' ratio CRATIO) and concentrations of condensation nuclei, CN (Table 1, Table 2). The potential gradient mean values were calculated for each hour. The atmospheric electricity sign convention is used, meaning the sign of the electric field strength is the same as the sign of physical electric potential gradient. Number concentration of condensation nuclei is given as measured three times a day, around 06 UTC, 12 UTC and 18 UTC (see details in Table 5). In 1957-1964 both polarities of the conductivity were measured and the average values given at the three terms as CN. Since 1965 positive conductivity was reported in yearbooks only, with the mean values given at hourly intervals. The sets also contains information on fair weather conditions, FW, encoded by 1 or 0 from PG or PC data tables where all values outside periods of fair weather are underlined. In 1957-1954 electrically quiet day conditions, EQ, were applied instead, and over years 1965-1970 both criteria were used (in yearbooks electrically quiet hours not withstanding new criteria are underlined with a dashed line). Series D include also diurnal averages.

Monthly average values are given in a separate M series. All timestamps are in Coordinated Universal Time (UTC). For more details on the contents and data see Tables 5-7.

DIRECTORY METEO

This dataset contains digitised series of 1957-2005 meteorological data (Table, 3, Table 4). The data include: air temperature, TA, atmospheric pressure, PA, water vapour pressure, VP, relative humidity, RH, wind speed, WS, and wind direction, WD, cloudiness N, and cloud types CT (in 1957-1964 including genera and varieties), sum of precipitation, PREC, and snow cover, SNOW. Year 2005 contains also tabulated data for wet-bulb temperature, TWB, water vapour saturation deficit, VPD and sunshine, SUN. In years 1957-1964 soil temperature, TS, was recorded at four depths: -5 cm, -10 cm, -20 cm, and -50 cm. These parameters are given in three to four meteorological times about 06 UTC, 12 UTC and 18 UTC (air temperature and relative humidity also at 00 UTC in 1971-1996). Series D include also diurnal averages. Monthly average values are given in separate M series. Another series lists meteorological phenomena, i.e., non-cloud meteors. All timestamps are in Coordinated Universal Time. Meteorological observations and their reporting follow international and national meteorological service standards. For more details on observation times see Table 5. For more details on the contents and data see Tables 6-7 and Tables 8-12.

FLAGS and SUBSCRIPTS

Special characters have been used for indicating an uncertain value or other limitation on the average value obtained. In the digital files these characters have been replaced by numbers – numerical flags. The meaning of all flags and their encoding in the files are shown in Table 6. The flags are printed out in the files as a separate set of numbers following any related variable or its characteristic feature. All flags are marked by the variable symbol followed by “_FLAG”.

In addition, there are description footnotes or subscripts used, which indicate certain statistics or location features of the measurements. These are given in Table 7.

ERRORS and CORRECTIONS

The datasets have been digitised and formed to be a close reproduction of data published in the yearbooks. However, some corrections have been introduced to calculation errors, print errors or illegible signs, and changes are given in an auxiliary file in the main directory. If you notice any further errors or discrepancies please contact us, so a revision can be made in any further dataset versions.

HOW TO CITE

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When using data from this dataset please also include references to individual yearbooks provided online in each yearbook file description or listed in this manual in Appendix A.

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Table 1. File content of directory ELECTRIC.

Filename	Years	Var	Time regime
DIGITISED_SWI_1D_1957-2025_PG_SERIES.CSV	1957-2005	PG	24 HOURLY and DAILY averages of FW, EQ and all values
DIGITISED_SWI_1M_1957-2025_PG_SERIES.CSV	1957-2005	PG	MONTHLY average, 24 MONTHLY HOURLY averages
DIGITISED_SWI_1D_1965-2025_PC_SERIES.CSV	1965-2005	PC	24 HOURLY and DAILY averages of FW, EQ and all values
DIGITISED_SWI_1M_1965-2025_PC_SERIES.CSV	1965-2005	PC	MONTHLY average, 24 MONTHLY HOURLY averages
DIGITISED_SWI_1D_1957-1964_PC_NC_SERIES.CSV	1957-1964	PC, NC, TC, CRATIO	3 TERMS* and DAILY** averages
DIGITISED_SWI_1M_1957-1964_PC_NC_SERIES.CSV	1957-1964	PC, NC, TC, CRATIO	3 TERMS MONTHLY averages, MONTHLY average
DIGITISED_SWI_1D_1957-2025_CN_SERIES.CSV	1957-2005	CN	3 TERMS and DAILY averages
DIGITISED_SWI_1M_1957-2025_CN_SERIES.CSV	1957-2005	CN	3 TERMS MONTHLY averages, MONTHLY average
DIGITISED_SWI_1D_1957-2025_FW_SERIES.CSV	1957-2005	FW, EQ	24 HOURLY VALUES EQ criterion used from 1957 to 1970 FW criterion used from 1965 to 2005

*See Table 7.

** Average of three values (at the three terms).

Table 2. List of atmospheric electric and related variables.

Notation in files	Physical description in year book	Unit	Instrument (general) for measurements or marked as calculated	Remarks
PG	Atmospheric electric potential gradient	V/m	Radioactive collector connected with an electrometer	
	Atmospheric electric field strength			
PC	Positive electrical conductivity of the air	10^{-16} S/m	Gerdien tube apparatus connected to an electrometer	Units in yearbooks tables vary from 10^{-16} to 10^{-14} S/m
NC	Negative electrical conductivity of the air	10^{-16} S/m	Gerdien tube apparatus connected to an electrometer	Units in yearbooks tables are 10^{-14} S/m Only 1957-1964
TC	Total electrical conductivity of the air	10^{-16} S/m	Calculated	Only 1957-1964
CRATIO	Ratio of positive to negative conductivity		Calculated	Only 1957-1964
CN	Condensation nuclei number concentration	per cm^3	Small Scholtz counter, observatory-made CN counter	CN counter from 1981
EQ	Electrically quiet conditions	1 or 0	Observations supported by meteorological records	1 – electrically quiet* 0 – not electrically quiet*. Conditions evaluated till 1970
FW	Fair weather conditions (according to WMO)	1 or 0	Observations supported by meteorological records	1 – fair weather criteria fulfilled**, 0 – fair weather criteria not fulfilled. Conditions evaluated since 1965.

*Electrically quiet conditions criteria: no precipitation, fog, haze, or storm (Warzecha, 1968).

**Fair weather conditions criteria: no precipitation, fog, haze, or storm, low-level cloud cover no higher than 3/10, no negative electric field values or high field values exceeding 1000 V/m (Warzecha, 1968), wind speed not exceeding 6 m/s (Warzecha, 1971).

Table 3. File content of directory METEO.

Filename	Years	Var	Time regime
DIGITISED_SWI_1D_1957-2005_PT_SERIES.csv	1957-1964	PA,TA,TMIN, TWB,VP,RH,V PD,WS,WD	3 TERMS* and DAILY** averages
DIGITISED_SWI_1D_1957-2005_CL_SERIES.csv	1957-2005	N,NMAX,CT, PREC, SNOW, SUN	3 TERMS and DAILY averages
DIGITISED_SWI_1D_1957-1964_TS_SERIES.csv	1957-2005	TS	3 TERMS and DAILY averages
DIGITISED_SWI_1D_1957-2005_WT.csv	1957-2005	WT	List of daily reports of weather type – see Table 11
DIGITISED_SWI_1M_1957-2005_PT_SERIES.csv	1957-1964	PA,TA,TMIN, TWB,VP,RH,V PD,WS	3 TERMS MONTHLY averages, MONTHLY average
DIGITISED_SWI_1M_1957-2005_CL_SERIES.csv	1957-2005	N,NMAX, PREC, SNOW, SUN	3 TERMS MONTHLY averages, MONTHLY average
DIGITISED_SWI_1M_1957-1964_TS_SERIES.csv	1957-2005	TS	3 TERMS MONTHLY averages, MONTHLY average
DIGITISED_SWI_1957-2005_MT_SERIES.csv	1957-2005	MT	List of phenomena
DIGITISED_SWI_1957-2005_TH_SERIES.csv	1957-2005	MT	List of thunderstorms and lightning including directions

*See Table 5.

**Check yearbooks for details of calculating the daily average value for meteorological variables.

Table 4. List of meteorological variables.

Symbol in files	Physical name	Unit	Instrument	Remarks
PA	Pressure of the air	hPa	Barometer	Reduced to 0°C and g at 45° latitude
TA	Temperature of the air (dry-bulb)	degree C	Thermometer	
TMIN_5cm	Minimal temperature at 5 cm above ground level	degree C	Minimal thermometer	
TWB	Wet-bulb temperature	degree C	Calculated	
VP	Vapour pressure	hPa	Psychrometer/calculated	
RH	Relative humidity	%	Psychrometer/calculated	
VPD	Water vapour saturation deficit	hPa	Calculated	
WS	Wind speed	m/s	Anemometer	
WD	Wind direction	degree	Anemometer	International symbols replaced by degrees - see Table 12
N, NMAX	Cloudiness, Cloudiness scale base	In octa or tenths scale	Visual observations	Octa scale applied from 1980, scale type indicated by NMAX
C	Cloud genera, species and varieties		Visual observations	International symbols replaced by codes - see Table 10 Species and varieties in 1957-1964 only
PREC	Precipitation	mm	Precipitation gauge/sum calculated	
SNOW	Snow cover	cm	Snow gauge	
SUN	Sunshine	h	Heliograph	Only 2005
TS	Soil temperature	degree C	Soil thermometer	Only 1957-1964
WT	Weather type			Denoted by letter codes – see Table 11
MT	Non-cloud meteor			Symbols replaced by codes – see Table 9

Table 5. Time of measurements for electrical and meteorological data

Year	Time for electric observations	Times of measurements of CN (also TC in 1957-1964)	Time for meteo observations	Terms for meteorological variables
1957	LT	7:15-7:45, 12:25-13:55; 20:25-21:55	LT	7, 13, 21
1958	LT	7:15-7:45, 12:25-13:55; 20:25-21:55	LT	7, 13, 21
1959	LT	7:15-7:45, 12:25-13:55; 20:25-21:55	LT	7, 13, 21
1960	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1961	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1962	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1963	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1964	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1965	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1966	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1967	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1968	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1969	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1970	GMT	5:50-6:20; 11:00-11:30; 19:00-19:30	LT	7, 13, 21
1971	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1972	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1973	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1974	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1975	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1976	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1977	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1978	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1979	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1980	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1981	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1982	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1983	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1984	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1985	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1986	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1987	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1988	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1989	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1990	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1991	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1992	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1993	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1994	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1995	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1996	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	0,6,12,18
1997	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
1998	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
1999	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
2000	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18

2001	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
2002	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
2003	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
2004	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18
2005	GMT	6:10-6:30; 11:00-11:30; 18:10-18:30	GMT	6,12,18

Table 6. Flags.

Code in files	Notation in year book	Description
0		Normal value
1	<	Less than
2	>	More than
3	<0>	Values outside minimum and maximum range
4	()	Uncertain value
5	[]	Average calculated from less than 100% of the data but more than 40%
6	(<)	Uncertain value, less than
7	(>)	Uncertain value, more than
8	[<]	Less than average calculated from less than 100% of the data but more than 40%
9	[>]	More than average calculated from less than 100% of the data but more than 40%
10	*	No value (this flag value is not printed in CSV file)
11	([])	Uncertain value of average calculated from less than 100% of the data but more than 40%
12	[()]	Average calculated from less than 100% of uncertain data but more than 40%
13	(<>)	Uncertain value outside minimum and maximum range

Concerns all CSV files.

Table 7. Statistical and description subscripts.

Notation in files	Meaning	Remarks
_MIN	Minimum	Concerns PG, PC
_MAX	Maximum	Concerns PG, PC
_AMP	Amplitude	Concerns PG, PC, calculated from MAX and MIN
_M _DM	Monthly Mean average Daily Mean average	Average calculated from values at electrically quiet (EQ) hours when concerns PG, PC Average calculated from all* values when it concerns CN, PA, TA, VP, RH, VPD, TWB, WS, N, TS
_N _DN	Averages calculated from all* values	Concerns PG, PC only
_A _DA	Averages calculated from values at fair weather (FW) hours	Concerns PG, PC only (since 1965)
MIN_5cm	At 5 cm above ground level	Concerns TMIN_5cm
-5cm, -10 cm, -20 cm, -50 cm	At 5, 10, 20, 50 cm below ground level	Concerns TS
_1, _2, _3	Subscripts indicating a series of elements, features or times	Concerns cloud types, weather types, intensity of cloud meteors
_FLAG	Flag	A non-zero value indicates uncertainty of value – see all flags in Table 6.
_CODE	Code	Code meteorological phenomena (non-cloud meteors)

*i.e. finite values except any value with the flag 4, i.e. in brackets () in yearbooks.

Additional legends for meteorological series:

Table 8. Codes for quality of time of the beginning and ending of a non-cloud meteor. Concerns file: DIGITISED_SWI_1957-2025_MT_SERIES.CSV

Number	Time quality
0	Exact time
1	Approximate time
2	At meteorological terms n, na, a, p, np*
3	At the time of observation at 7, 13 or 21 term (see Table 5)

*See yearbooks for definition.

Table 9. Codes for meteorological phenomena types (non-cloud meteors). Concerns files: DIGITISED_SWI_1957-2025_MT_SERIES.CSV

Code	Meteor
1	Rain
2	Snow
3	Drizzle
4	Granular snow = Snow grains
5	Sleet
6	Drizzle and rain
7	Freezing rain
8	Freezing drizzle
9	Freezing drizzle and snow
10	Rain shower
11	Rain int
12	Snow int
13	Drizzle int
14	Granular snow int
15	Sleet int
16	Drizzle and rain int
17	Freezing rain int
18	Freezing drizzle int
19	Freezing drizzle and snow int
20	Snow shower
21	Hail
22	Soft hail
23	Small hail = ice pellets
24	Grains of ice = snow pellets
25	Ice needless = diamond dust
26	Hail int
27	Soft hail int
28	Small hail int
29	Grains of ice int
30	Ice needless int
31	Fog
32	Ground fog
33	Mist
34	Ground mist
35	Ice fog
36	Cloud fog
37	Hoar frost
38	Soft rime
39	Glazed frost
40	Glazed frost on the ground
41	Dew
42	White dew
43	Advection dew
44	Deposit of fog droplets
45	Haze
46	Dust haze
47	Smoke
48	Duststorm or Sandstorm
49	Drifting or blowing dust or sand at the ground
50	Drifting or blowing dust or sand high up
51	Dust or sand whirl = dust devil
52	Water dust = spray
53	Snow devil
54	Steam devil
55	Drifting snow near the ground
56	Drifting snow high up
57	Snowstorm
58	Thunderstorm
59	Distant thunderstorm = thunder
60	Lightning
61	St Elmo fire
62	
63	Wind gusts
64	Tornado
65	Waterspout
66	Landspout
67	Cold air funnel
68	Solar corona
69	Lunar corona
70	Rainbow
71	Fog bow
72	Solar halo
73	Lunar halo
74	Iridescence
75	Glory
76	Aurora
77	Bishop ring
78	Mirage
79	

Table 10. Codes for cloud genera, species and varieties. Concerns files: DIGITISED_SWI_1957-2025_CL_SERIES.CSV

Cloud genus*	Cloud symbol* Symbol in yearbook	Code**
Cirrus	Ci	1
Cirrocumulus	Cc	2
Cirrostratus	Cs	3
Alto cumulus	Ac	4
Altostratus	As	5
Cumulus	Cu	6
Stratocumulus	Sc	7
Cumulonimbus	Cb	8
Stratus	St	9
Nimbostratus	Ns	10
Fog of intensity 0, 1, 2***		20, 21, 22
Species and varieties		
fib	also Fil	1
unc		2
spi	also Dens	3
flo		5
len		8
fra		10
hum		11
con		13
tr		26
op		28

*According to WMO, see <https://cloudatlas.wmo.int/en/home.html>

** When genus or variety is indicated, total cloud code equals 100*cloud genus code + species/variety code, eg. *Ci* obtains code 1, *Ci spi* obtains code 100*1 + 3 = 103

*** Intensity of meteorological phenomena according to 3-element scale: 0,1,2

Table 11. Weather type symbols.

Letter symbol	Weather type
b	Clear sky
o	Moderately cloudy sky
c	Overcast
r	Rain
p	Passing showers
s	Snow
d	Drizzle
g	Granular snow
h	Hail
t	Thunderstorm over the station
l	Lightning, distant thunderstorm
f	Fog
m	Mist
z	Haze
hf	Hoar frost
w	Snowstorm
ws	Snowstorm with snowfall
wind	Wind velocity > 6 m/s

Table 12. Wind direction (degrees).

Wind direction	Value
C (no wind)	Denoted by 0*
NNE	22.5
NE	45.0
ENE	67.5
E	90.0
ESE	112.5
SE	135.0
SSE	157.5
S	180.0
SSW	202.5
SW	225.0
WSW	247.5
W	270.0
WNW	292.5
NW	315.0
NNW	337.5
N	360.0

* No value is given only when the wind direction is not determined.

APPENDIX A

References of the Świder atmospheric electricity yearbooks 1957-2005:

Warzecha, S. (Ed.): Rocznik elektryczności atmosferycznej i meteorologii, Annuaire météorologique et de l'électricité atmosphérique 1957, Prace Obserwatorium Geofizycznego im. St. Kalinowskiego w Świdrze, Travaux de l'Observatoire Géophysique de St. Kalinowski à Świder, 16, 1960.

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APPENDIX B

List of Świder Observatory staff engaged in routine electrical and meteorological observations from 1957 to 2005 (according to year of employment or engagement in the work as indicated in the yearbooks):

S. Warzecha

Z. Haberka (Haberko)

J. Grasiwicz

M. Jedynak

J. Kołacz

B. Ołdak

P. Łęgowski

M. Stemler

A. Ługowski

W. Kozłowski

A. Jezierska

K. Kasperski

K. Kostrzewa

E. Morawska

A. Gajowniczek

T. Zalewski

T. Czerniewska

D. Jasinkiewicz

S. Bania

E. Chmurzyńska

G. Szubska

M. Kubicki

G. Gawrysiak

Yearbooks: S. Warzecha, M. Kubicki

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