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The Meteorological Series from Aarau, 1807–1865

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Abstract

Heinricht Zschokke, a politician and reformer, started meteorological measurements in Aarau in 1807. The measurements were continued by his son until the start of the Swiss National network in 1863. In this paper we describe the observations for this period of almost five decades. Together with existing station data after 1864 from Buchs-Aarau, a 210-yr time series can be generated. This paper provides the detailed information accompanying the publication of the inventory of early Swiss series, of the imaged data sheets, and of the digitised and quality-controlled data series.

1. Introduction

Until recently, only few early instrumental series from Switzerland were known and studied (Pfister et al., 2019, see also introductory chapter by Brönnimann et al., 2020, in this book). Searching for series that could help to understand the "Year Without a Summer" climate of 1816 in Switzerland, Brugnara et al. (2015) discovered a previously little-known series from Aarau. Further research brought to light an almost complete series from 1807 to 1863, the start of the Swiss meteorological network. The series was continued by the Natural Sciences Society of Aargau and in fact is still continued, but after 1864 the corresponding MeteoSwiss series Buchs-Aarau provides a better reference for climate applications. Together, the series form Aarau might eventually provide a 210-year long meteorological time series.

In this paper we describe the meteorological series form Aarau from 1807 to 1863. We provide information on the observers, instruments, data processing, and quality control. This paper accompanies the publication the inventory of early Swiss series (Pfister et al., 2019), of

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the imaged data sheets (https://zenodo.org/record/3066836#.XVv-fGRS8-U), and of the digitised data (Brugnara et al., 2019; https://doi.pangaea.de/10.1594/PANGAEA.909141). The data will also be available from the Copernicus Climate Change Service surface data repository (Thorne et al., 2017), MeteoSwiss and EURO-CLIMHIST (Pfister et al., 2017).

The paper is organised as follows. Section 2 gives a summary of the station history. The instruments and data source are described in Section 3. Section 4 discusses the processing and quality assurance of the data. Conclusions are drawn in Section 5.

2. Station history

2.1 Heinrich Zschokke, founder of the meteorological station of Aarau

From published meteorological data, it is known that Heinrich Zschokke maintained a meteorological station in Aarau during the years 1807 to 1816. Moreover, documents in his son's estate (Theodor Zschokke) imply that Heinrich continued his measurements after 1816 until (most likely) his son took over. A detailed bibliography of Heinrich Zschokke's life is given in Ort (2013). The most important dates are summarised in the following paragraphs.

Heinrich Zschokke was born in Magdeburg on 22 March 1771 as son of Gottfried and Dorothee Elisabeth Schocke. During his education Heinrich visited the convent "Unserer Lieben Frauen", the school "Friedrichschule", the high school "Altstädter Gymnasium", and finally the university in Frankfurt an der Oder. There he studied theology and philosophy and became lecturer for philosophy until 1795 after his graduation. In the following two years Heinrich travelled through Germany, France and Switzerland. His travel came to an end in

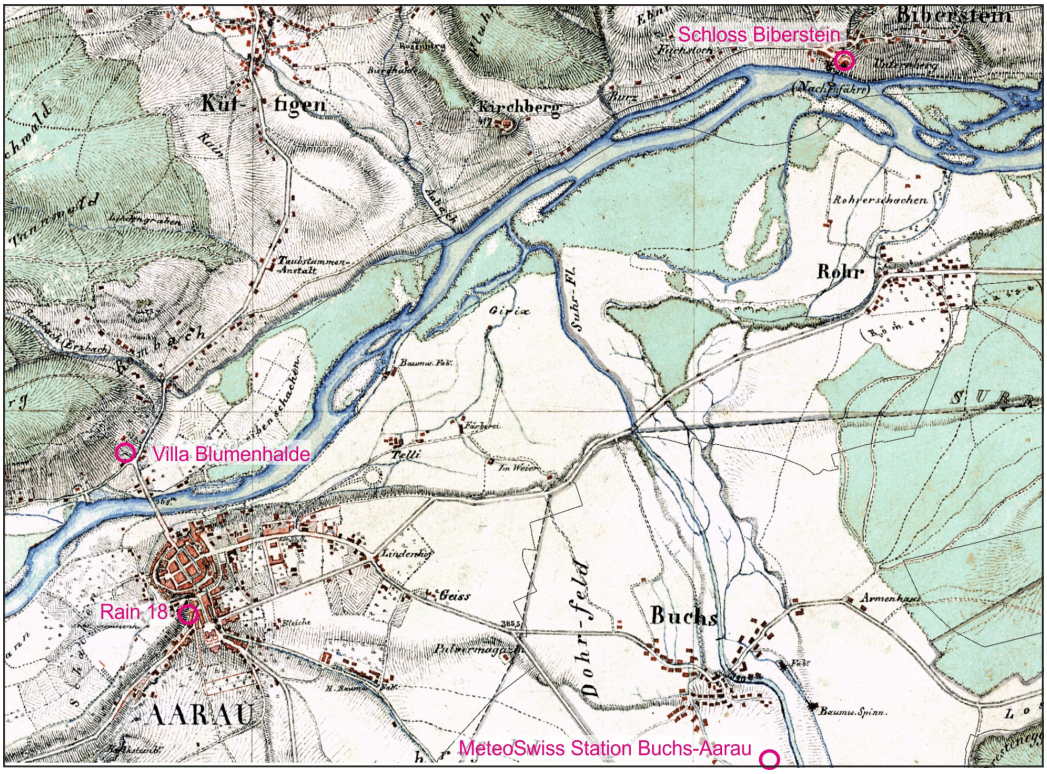

Figure 1. Map of the location of historical meteorological measurements in Aarau, 1807–1866, as well as the current station of MeteoSwiss (excerpt of the topographic map of the Canton of Aargau 1:25000, 1837–1843, by Ernst Heinrich Michaelis, data: Canton of Aargau).

Table 1. Summary of the station history of Aarau until 1865

Period	Coordinates	Alt. (m asl)	Observer	Adress / Location
Jan 1807 – Jun 1807	47.41, 8.08	377.6	Heinrich Zschokke	Schloss, 5023 Biberstein
Jun 1807 – Dec 1816	47.39, 8.04	383.7	Heinrich Zschokke	Rain 18, 5000 Aarau
1817-1865	not known	not known	Heinrich Zschokke Theodor Zschokke	probably Villa Blumenhalde
1826-1836	not known	not known	Franz Xaver Bronner	not known

1796 when he accepted the head teacher position at the "Seminar Reichenau" in the canton Graubünden. Following the French occupation of Switzerland and due to his political activities, he had to flee to Aarau in 1798. In 1803 he moved to the castle Biberstein (see Fig. 1) near the city Aarau to take up a post as supreme forestry and mining advisor ("Oberforst- und Bergrat"). During this period, Heinrich Zschokke started his activities in meteorology by taking measurements (Ort, 2013).

In 1804 Heinrich married the preacher's daughter Anna Nüsperli. Two years later their first son Theodor was born. In 1807 the family moved into a house in Aarau at Rain 18 (Fig. 1). In the garden of this house, Heinrich built a meteorological station according to the current knowledge of that time. During the period of 1807 to 1816, Zschokke carried out meteorological measurements and published them in different journals. In 1818 the family moved to Villa Blumenhalde (Fig. 1).

Besides operating his personal weather station Heinrich Zschokke founded the "Aargauische Naturforschende Gesellschaft" (Natural Sciences Society of Aargau) in the year 1811. Shortly after its foundation, the Society designed a project that envisaged Aarau as the hub of a European meteorological observation network. Stations were planned along a North-South and a West-East transect, including Florence, Gr. St. Bernhard, Andermatt, Thun, Paris, Torino, Naples, Weimar, London, Frankfurt, Prague, Lemberg and Charkow. However, numerous difficulties arose. Instruments arrived broken or not at all at some of the destinations, at others no observers could be motivated. Experienced observers, in turn, refused to change their observation scheme as was requested by the Society. The project, which had begun with high expectations, was abandoned as early as 1818. Several stations (*e.g.,* Pisa, Naples, Torino, Gr. St. Bernhard) sent their data from 1814 to ca. 1817 to Zschokke, who however never published them but sent the material to London (Zschokke, 1823; Custer, 1869). In the 1850s, the Society made another attempt to launch an observation network, this time limited to the Canton, where measurements were carried out at 22 stations (Custer, 1869). Most stations operated for less than 3 years, and the data were never published (see Pfister et al., 2019).

As to the series for Aarau, Table 1 gives an overview of the station history. A map of the locations mentioned in the text is given in Figure 1.

2.2. The meteorological station Aarau after 1818

After ten years of continuous observations, in 1818, the family Zschokke moved out of the city to the Villa Blumenhalde (Fig. 1). There Heinrich Zschokke died on 27 June 1848 at the age of 77 years. Today his estate can be found in the public records of the canton Aargau.

Measurements continued from 1818 to 1866. The data could be found in Theodor Zschokke's estate in the public record of Aargau (Kanton Aargau 2016a, 2016b), which contains unpublished data ("Meteorologische Tabellen (1817-1838)" and "Meteorologische Tabellen (1839–1859)"). These tables contain measurements of pressure, temperature, precipitation, wind and other variables three times per day for the period 1817 to 1859. This indicates that Heinrich Zschokke continued his measurements after the family moved to Villa Blumenhalde. It seems likely that Theodor Zschokke resumed Heinrich Zschokke's work at some point, as Theodor Zschokke is mentioned to be the observer of the station Aarau when it was integrated into the network of the "Eidgenössiche Meteorologische Commission" in 1863 (Aargauische Naturforschende Gesellschaft, 1878), and his entry in the "German Biography" indicates that he made meteorological observations for 30 years (Zschokke, 1900).

According to the Natural Sciences Society of Aargau, Theodor Zschokke maintained the station until his death in December 1866. Professor Gouzy became Theodor's successor in spring 1867, carrying out measurements until summer 1872. When Professor Gouzy took over the station the instruments were replaced with new ones from the Meteorological Commission (the predecessor of MeteoSwiss). During that time the observations were published in the "Aarauer Blatt" on a daily basis, furthermore they were sent to the Meteorological Commission each month (Aargauische Naturforschende Gesellschaft, 1878). After a short gap, Professor Dr. Krippendorf resumed the meteorological measurements in 1873 at Telli near Aarau. Those measurements can be found in the volumes of the "Schweizerische Meteorologische Beobachtungen" published by the "Meteorologische Centralanstalt der schweizerischen naturforschende Gesellschaft". In this paper we only consider data up to 1865.

In addition to the data from Zschokke, we also analyse a short series from Franz Xaver Bronner, covering the late 1820s. Franz Xaver Bronner (1758–1850) was a priest, poet, and scientist who came to live in Aarau in the early 19th century. Here he worked as a teacher until 1827 and from 1829 onward as state archivist. He took measurements from 1826 to 1836, although only the data from 1826 to 1830 could be found (Pfister et al., 2019). The years overlap with three times daily measurements from Zschokke. However, during these years, the latter data have no time stamps, which therefore makes analysis (particularly for temperature) difficult. The Bronner data thus could eventually substitute the Zschokke data for these years.

3. Instruments and data source

The following description of observation times and instruments for different variables refer to the observations made by Heinrich Zschokke from January 1807 to December 1816. Only very limited information about the instruments could be found. An example of the data source for that period is shown in Figure 2.

3.1. Pressure ("Barometer")

Pressure was measured twice a day, in the morning and in the afternoon. Starting in the year 1809, observation times are more precisely stated, namely at sunrise and at sunset. The barometer was a "Heberbarometer", which belongs to the class of siphon barometers. It was installed 28 feet ("Schuh") above ground (Zschokke, 1810) and kept at a constant temperature

of 15 °R (Zschokke, 1816a). The observed pressure was written down in three columns with the units "Zoll" (equal to 27.07 mm), "Ligne" (equal to 2.2558 mm), and a tenth of a "Ligne" (equal to 0.22558 mm) (see Brugnara et al., 2015, 2019, 2020).

3.2. Temperature ("Thermometer")

Similar to pressure, temperature was noted in the morning, at noon and in the afternoon. Those measurement times were specified in 1809 as sunrise, 2 pm and sunset (Zschokke, 1816a). The instrument used was a Deluc thermometer, probably referring to Jean André Deluc, a swiss scientist who – besides many other interests – developed meteorological instruments (Hübner, 2010). This information tells us that the thermometer was filled with mercury. The thermometer was placed suspended freely in the shade and 28 feet above ground (Zschokke, 1810). The temperature was measured and written down in degrees Réaumur (°R).

3.3. Precipitation ("Schnee oder Regen")

Precipitation was observed in the morning, in the afternoon and during the night. The observer did not give any information about the amount of precipitation that fell, but it is specified whether the precipitation was snow ("Schnee", "Schn."), rain ("Regen", "Reg.") or hail („Hag."). Furthermore, a number next to the precipitation denotes the time at which it set in. In May 1810, Zschokke started to use of a fourth term, called "Stbreg." or "Str." ("Staub-, Schwefelregen") (Zschokke, 1810, p. 184). It represents rain containing dust and pollen, possibly coloring the floor yellowish (Zschokke, 1812).

3.4 Wind ("Winde")

The direction of the wind was observed in the morning and in the afternoon. Besides the direction of the wind, a qualitative description of its strength is given. One star represents very strong winds, while two stars describe a wind storm or winds that are able to cause tree uprooting and the destruction of rooftops (Zschokke, 1816a).

3.5. Other observations

Other observations were also noted once per day, including dew ("Thau") or frost ("Frost"). Similarly, the observer noted the presence or not of fog as well as its duration: morning, afternoon, or whole day (denoted "Vorm.", "Nachm.", and "G.T." or "ganz.T"; Zschokke, 1816a). Finally, three terms were used to describe cloud cover ("Himmelsbeschaffenheit"). The first one, "bewölkt", describes a period of continuous cloud cover. The second term, "halbheiter", represents a period in which the sunlight reached the Earth's surface undimmed several times. The third, "heiter" stands for a period with only few clouds, with sunlight continuously reaching the Earth's surface undimmed (Zschokke, 1816a).

Zschokke also measured humidity using a hygrometer, but the instrument remains unknown. In May 1812 Heinrich Zschokke extended his observations by noting the phase of the moon. The four phases are signed with "Letzt V." (last quarter), "Neumd." (new moon), "Erst. V." (first quarter), and "Vollm." (full moon).

3.6. Data source

Heinrich Zschokke's first publication of meteorological observations is a report on the winter 1805/1806 in the third volume of the journal "Isis. Eine Monatschrift von Deutschen und Schweizerischen Gelehrten". This publication contains only few instrumental measurements, therefore it was not part of this study. The focus of the document is on a wind storm in Switzerland that reached its full strength on 10 and 11 January 1806 (Isis, 1806).

The data analysed in this study were digitised from scans of the original publications (Fig. 2). All documents are available online (Pfister et al., 2019). During Heinrich Zschokke's observation period, all variables were written down regularly, resulting in a continuous time series that shows no gaps from January 1807 to December 1816. The data were published in the two journals "Miscellen für die neueste Weltkunde", vols. 1 to 7, and "Archiv der Medizin Chirurgie und Pharmazie", vols. 1 to 3. In those journals the subdaily measurements of the variables described in Section 2.2 are published in monthly tables followed by a short remark of the author. Some information about the instruments can be found in the fourth volume of "Miscellen für die neueste Weltkunde" (Zschokke, 1810) and in the first volume of "Archiv der Medizin Chriurgie und Pharmazie" (Zschokke, 1816a). Beginning in 1809 the meteorological measurements were accompanied by epidemiological remarks of Dr. Johann

Meteorologiſche Beobachtungen im Aargau. Mai 1812.

Monatstage.	Mondzeichen.	Barometer. Bei Sonnenaufgang.	Barometer. Bei Sonnenunterg.	Thermometer. Bei Sonnenaufgang.	Thermometer. Nachmitt. 2 Uhr.	Thermometer. Bei Sonnenunterg.	Schnee oder Regen. Nachts.	Schnee oder Regen. Vormitt.	Schnee oder Regen. Nachm.	Thau oder Reif.	Winde. Vormitt.	Winde. Nachm.	Nebel.	Himmelsbeſchaffenheit. Vormitt.	Himmelsbeſchaffenheit. Nachm.
1		27. 0 3	27. 0 5	+ 4	+ 19	+ 17	—	—	—	Thau	N.W.	S. O.	Vorm.	heiter	heiter
2		27. 0 2	26. 9 3	+ 5	+ 20	+ 17	—	—	—	Thau	S. O.	O.	—	heiter	heiter
3		26. 8 8	26. 7 1	+ 5	+ 19	+ 16	—	—	—	Thau	O.	O.	—	heiter	heiter
4	Letz. V.	26. 7 3	26. 7 8	+ 9	+ 17	+ 15	—	—	—	—	O.	W.	—	heiter	bewölkt
5		26. 8 8	26. 8 9	+ 10	+ 20	+ 17	—	—	—	Thau	N.	N.	—	heiter	heiter
6		27. 0 3	27. 0 8	+ 9	+ 19	+ 17	—	—	—	Thau	N.	O.	—	heiter	heiter
7		27. 0 9	27. 0 4	+ 8	+ 18	+ 15	—	—	—	Thau	N.	O.	—	heiter	heiter
8		27. 0 5	27. 0 2	+ 9	+ 18	+ 16	—	—	—	Thau	O.	O.	—	heiter	heiter
9		27. 0 3	27. 0 6	+ 8	+ 19	+ 17	—	—	Regen	Thau	O.	W.	—	heiter	bewölkt
10		27. 0 9	27. 1 8	+ 11	+ 16	+ 14	Regen	Stbreg.	Regen	—	W.	W.	—	bewölkt	bewölkt
11	Neumd.	27. 1 9	26. 9 9	+ 8	+ 17	+ 16	—	—	—	—	W.	W.	Vorm.	heiter	heiter
12		26. 9 1	26. 9 2	+ 10	+ 12	+ 11	—	Regen	Regen	—	W.	W.	—	bewölkt	bewölkt
13		26. 9 1	26. 8 5	+ 9	+ 11	+ 10	Regen	Regen	Regen	—	W.	S.W.	—	bewölkt	bewölkt
14		26. 8 3	26. 7 5	+ 7	+ 14	+ 10	Regen	—	—	—	S.W.	O.	—	bewölkt	heiter
15		26. 7 6	26. 8 1	+ 9	+ 12	+ 10	—	—	—	—	S.W.	W.	—	bewölkt	bewölkt
16		26. 8 1	26. 9 5	+ 7	+ 11	+ 10	Regen	Regen	Regen	—	W.	S.W.	—	bewölkt	bewölkt
17		26. 9 1	27. 0 4	+ 8	+ 15	+ 15	—	—	—	—	S.W.	S.W.	—	heiter	heiter
18	Erſt. V.	27. 0 4	27. 0 0	+ 7	+ 20	+ 16	—	—	—	Thau	O.	O.	Vorm.	heiter	heiter
19		26. 9 6	26. 9 1	+ 9	+ 20	+ 16	—	—	—	Thau	S.W.	S.W.	Vorm.	heiter	bewölkt
20		26. 9 2	27. 0 1	+ 11	+ 21	+ 14	—	—	Regen 3	Thau	O.	S.W.	—	heiter	bewölkt
21		27. 0 4	26. 9 8	+ 11	+ 15	+ 14	Regen	Regen	—	—	W.	N.W.	—	bewölkt	bewölkt
22		27. 0 8	27. 0 8	+ 9	+ 13	+ 10	—	Regen 7	Regen	—	W.	W.	—	bewölkt	bewölkt
23		27. 0 8	27. 1 6	+ 8	+ 11	+ 9	—	—	—	—	W.*	N. W.*	—	bewölkt	bewölkt
24		27. 2 8	27. 3 0	+ 8	+ 11	+ 9	—	Reg. 11	—	—	O. | W.	O.	—	bewölkt	heiter
25		27. 3 0	27. 2 6	+ 5	+ 16	+ 10	—	—	—	—	O.	N. O.	—	heiter	heiter
26	Vollm.	27. 1 4	27. 0 3	+ 5	+ 16	+ 13	—	—	—	Thau	N.W.	N.W.	—	heiter	heiter
27		26. 9 6	26. 8 4	+ 8	+ 21	+ 17	—	—	—	Thau	N.W.	W.	Vorm.	heiter	heiter
28		26. 9 3	26. 8 6	+ 11	+ 22	+ 19	—	—	—	Thau	N.	N. W.	—	heiter	heiter
29		26. 9 6	26. 9 4	+ 14	+ 24	+ 14	—	—	Regen 4	Thau	N.W.	W. | NO	—	heiter	heiter
30		27. 0 2	27. 0 1	+ 12	+ 12	+ 14	—	Regen	—	—	N.W.	N.W.	—	bewölkt	bewölkt
31		27. 0 8	27. 1 1	+ 10	+ 17	+ 15	—	—	—	Thau	W.	N.W.	Vorm.	heiter	heiter

Anmerkungen.

Der Mai brachte uns den verſpäteten Frühling in aller Pracht. Alles blühte zugleich; Kirſchen, Pflaumen, Pfirſich, neben Aepfeln u. ſ. w. Die Witterung war lieblich fruchtbar, zuweilen von Gewittern abgekühlt; darunter eins nahe, nämlich am 29 Mai um vier Uhr Nachmittags; fünf in der Ferne, nämlich den 4 um 1 Uhr Mittags, den 5 um 10 Uhr Nachts, den 9 Abends um 8 Uhr, den 11 Nachts um 10 Uhr, den 20 Abends um 4 Uhr.

Am 10 war der vormittägige Regen ein ſogenannter Schwefelregen, der vorzeiten Aufſehn gemacht hätte, jetzt kaum bemerkt ward, ungeachtet er in weiten Strecken den Boden gelb bedeckte.

Figure 2. Original publication of the meteorological observations from May 1812 (Zschokke, 1812, p. 188)

Heinrich Schmutziger who reported on predominant diseases during the time of observation. A list of the sources used is given at the end of this paper.

4. Processing and quality assurance

Quality control (QC) was performed as described in Brugnara et al. (2020). Note that several years of data (1807–1808; 1817–1854; 1860–1865) from Zschokke did not have observation times. The quality control of the pressure data of the Zschokke series revealed 493 values flagged as potentially wrong (out of 45,862, thus 1.1%). Conversely, the temperature series exhibits 305 flagged values (out of 64,151). This corresponds to 0.5% of all values.

We analysed the correlations between the measurements at different times of day. For this purpose we subdivided the series into the period June 1807 to Dec 1816 (ignoring the

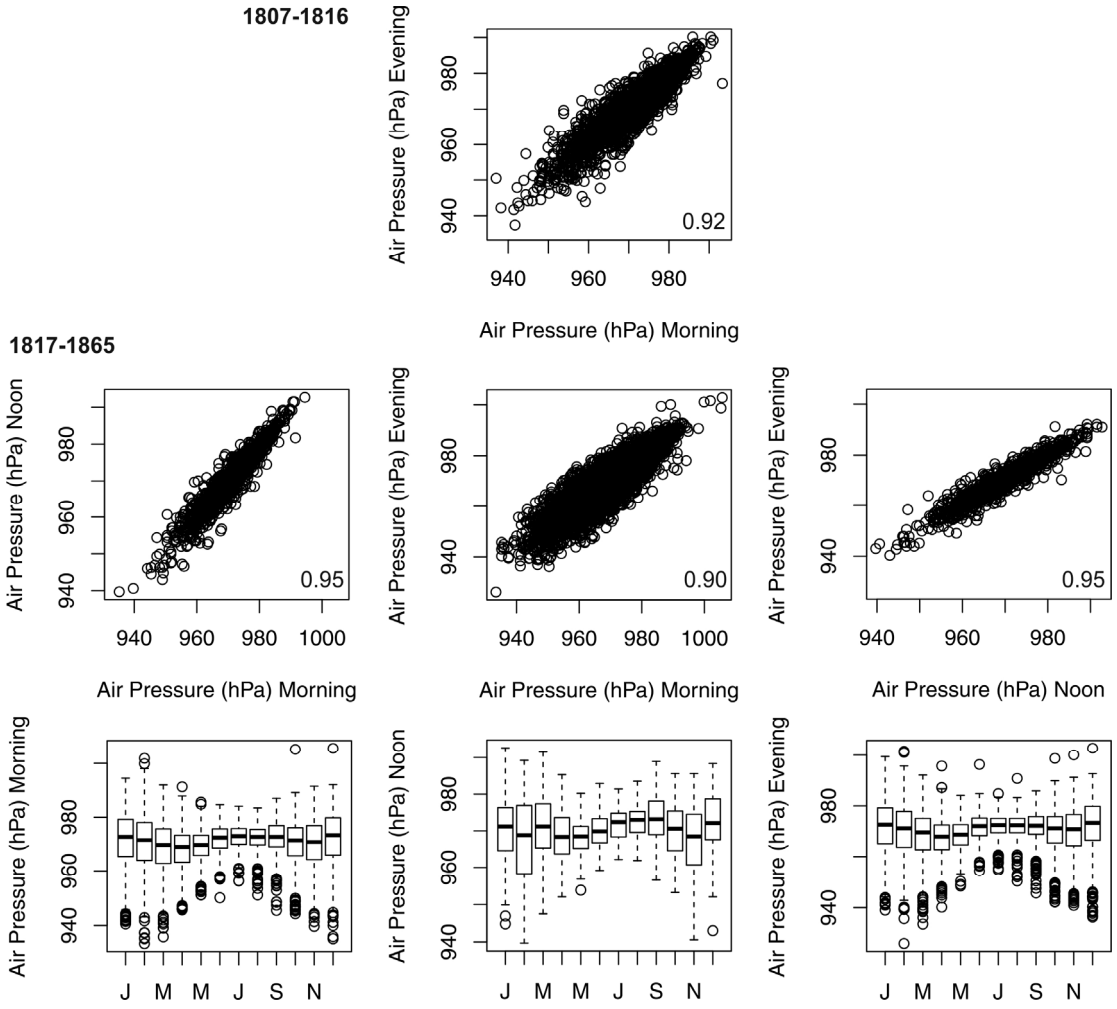

Figure 3. Analysis of pressure data from the Zschokke series. The top rows show mutual comparisons of morning, noon, and evening series (the number in the lower right corner of the panel indicates the Pearson correlation coefficient). Note that for the period 1807–1816, only twice daily data are available. The bottom row shows box plots for morning, noon, and evening series for 1817–1865 as a function of calendar month (box indicates quartiles and median, whiskers extend to at most 1.5x the interquartile range from the box).

short period of measurements at Biberstein), *i.e.,* the data measured at Rain 18 and those measured at Blumenhalde. For pressure, the first period only has twice daily observations. A good correlation is found between them (0.92). Also for the second period, correlations are relatively high, between 0.90 and 0.95 (lowest when comparing morning with evening, as is expected). The box plots (Fig. 3, bottom; corresponding to the second period) show a climatological pressure minimum in April.

Temperature shows somewhat lower correlations (Fig. 4), particularly during the second period. Note that in the first part of the record, the resolution was only 1 °R, which would contribute to lower correlation, yet correlations exceed 0.90 and are particularly high for the comparison of noon and evening measurements. The second period show clearly lower correlations, particularly between morning and noon. This is either due to local climate effects or due to problems with the morning measurements. Local climate effects are probable. Blumenhalde is at the foot of a slope, thus perhaps affected by cold air drainage. In any case, in order to obtain a homogeneous temperature series, a careful analysis and homogenization of the different segments is necessary.

Figure 5 shows the scatter plots (both pressure and temperature) for the Bronner series, 1826–1830. The QC procedure resulted in 38 (pressure) and 25 (temperature) flagged values out of 4731, corresponding to 1.7 and 0.5%, respectively. Pressure correlations between measurements at different times of the day exceed 0.99 and also all three temperature correlations are above 0.96. The series, albeit short, can therefore be considered of high quality. This is another reason for choosing this series as a substitute of the Zschokke series.

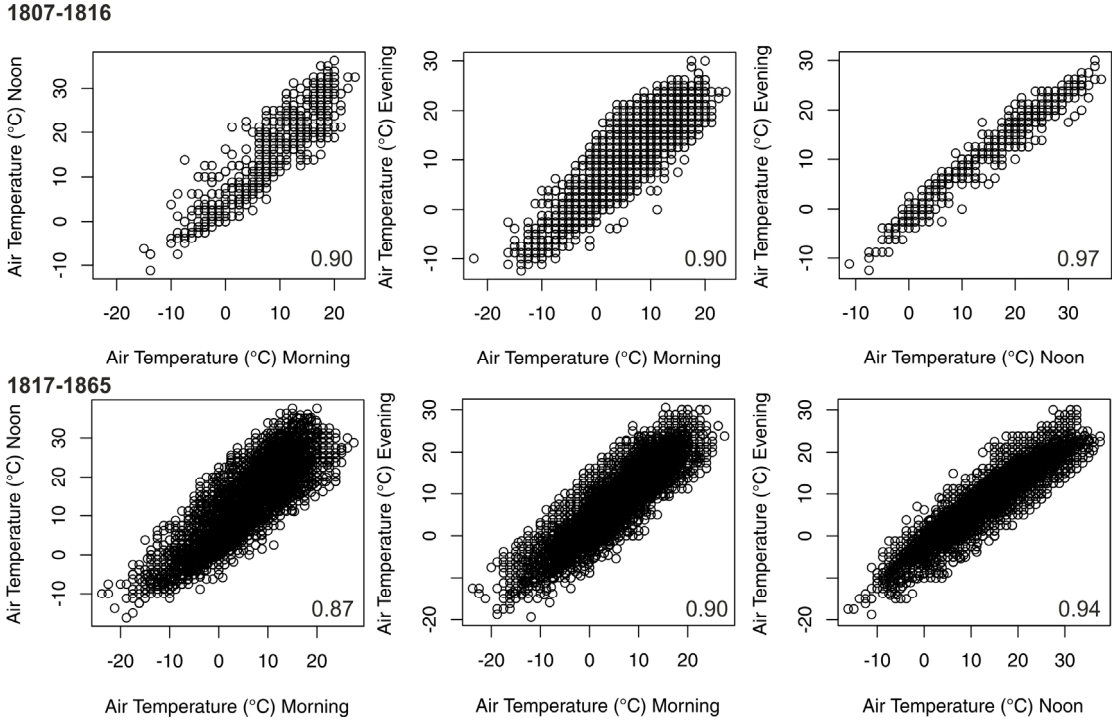

Figure 4. Analysis of temperature data from the Zschokke series for (top) 1807–1816 and (bottom (1817–1865). Shown are mutual comparisons of morning, noon, and evening series (the number in the bottom right of each panel indicates the Pearson correlation coefficient).

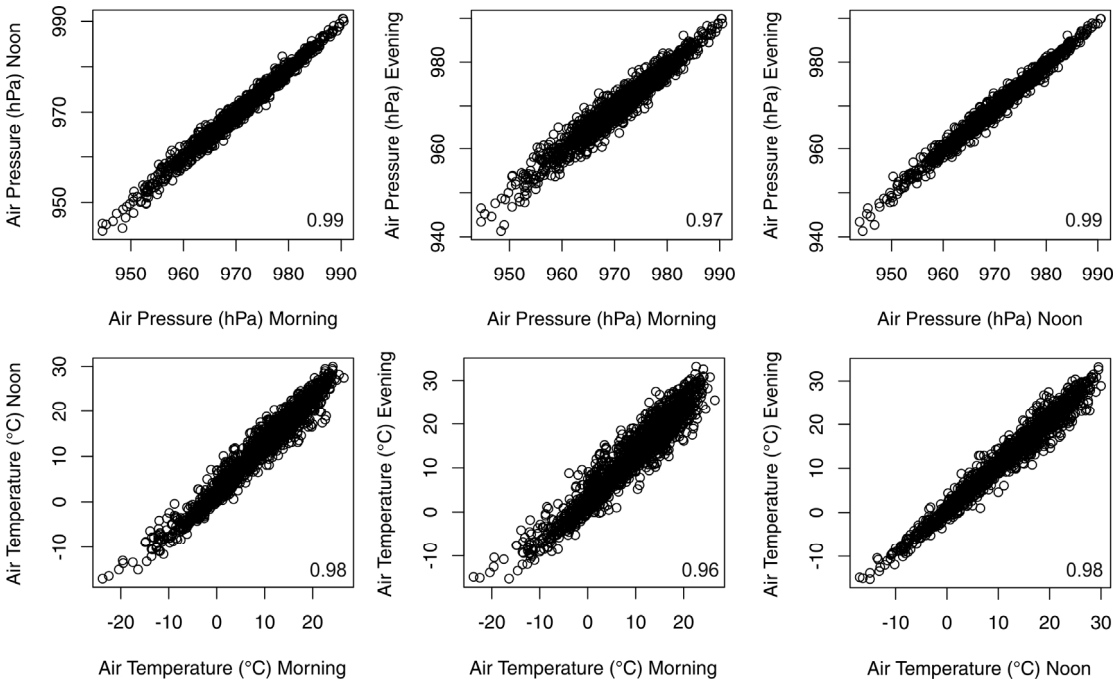

Figure 5. Mutual comparisons of morning, noon, and evening series (the number in the bottom right of each panel indicates the Pearson correlation coefficient) from the Bronner data for (top) pressure and (bottom) temperature.

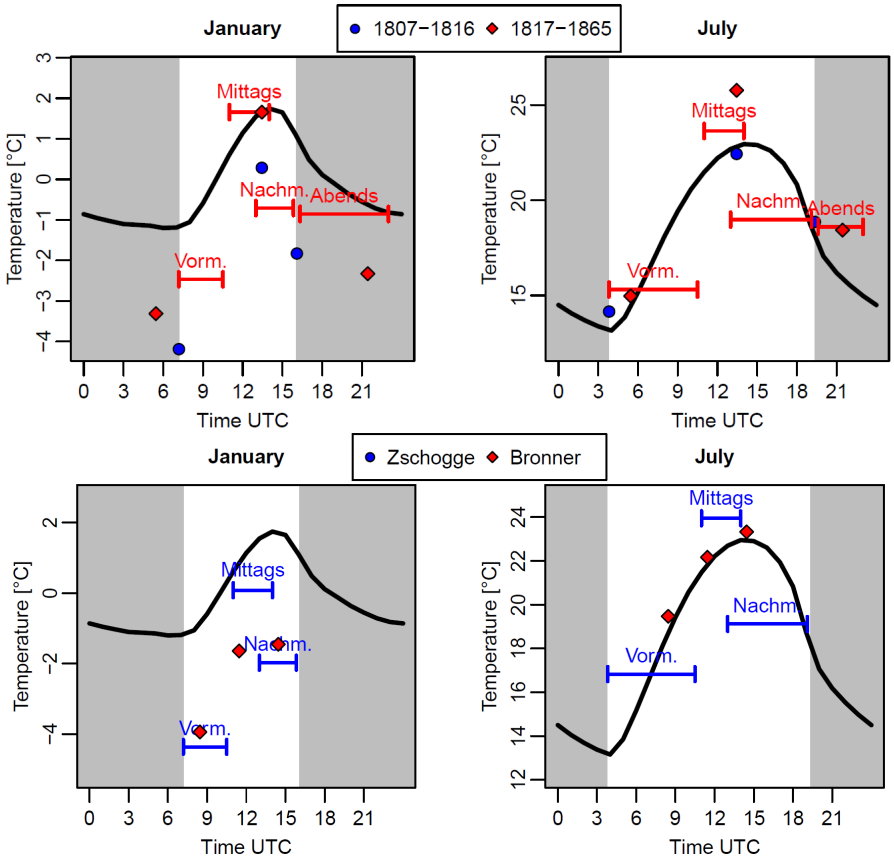

Figure 6. Diurnal temperature cycle in January (left) and July (right) in present-day (1984–2013, -1 °C to account for global warming) MeteoSwiss data (thick black line) as well as in the series from Aarau for (top) the Zschokke data from 1807–1816 and 1817–1865 and (bottom) from the series by Zschokke and Bronner during their overlapping period. Note that exact times are not known for all measurements; they are represented with bars and labelled according to the original entries ("Vorm.": morning, "Mittags": noon, "Nachm.": afternoon, "Abends": evening). Grey shading indicates nighttime.

Figure 6 (top) shows the comparison of the mean temperature values at the different observation times of the two main periods of the Zschokke record with the diurnal cycle of the modern MeteoSwiss station at Buchs-Aarau, 1984–2013 (1 °C was subtracted to take global warming into account). The superior quality of the earlier period is confirmed by the comparison for July. The most recent data appear too warm in the afternoon, particularly when observations were taken at 2 PM (*i.e.,* after 1854). In January, all data show a too large amplitude of the diurnal cycle, which is expected from unscreened thermometers. The mean temperature in the earlier period is much lower than expected, which might also indicate particularly harsh winters. Another useful information that emerges from the comparison is that the observation time labelled as "Vormittag" was probably made in the early morning, not long after sunrise, and that the times labelled as "Nachmittag" (until 1838) and "Abend" (after 1838) probably indicate the same observation time (close to sunset).

Figure 6 (bottom) shows another comparison with the modern diurnal cycle of temperature, in this case comparing the records of Zschokke and Bronner during the overlapping period. It is clear that Bronner's data are of better quality, whereas Zschokke's data seem more affected by radiation. On the other hand, Zschokke's observations are better spread over the day, particularly in summer. Again we see very low mean temperatures in winter that might in part reflect a true climatic signal.

Finally, Figure 7 shows time series of monthly mean pressure from the Zschokke and Bronner series. Note that for pressure, diurnal variations are small and were not corrected for, *i.e.,* monthly means were also calculated for the period with unknown measurement times (see Brugnara et al., 2020). The two series agree very well, both in terms of absolute values and variations. The correlation between the two series is 0.97.

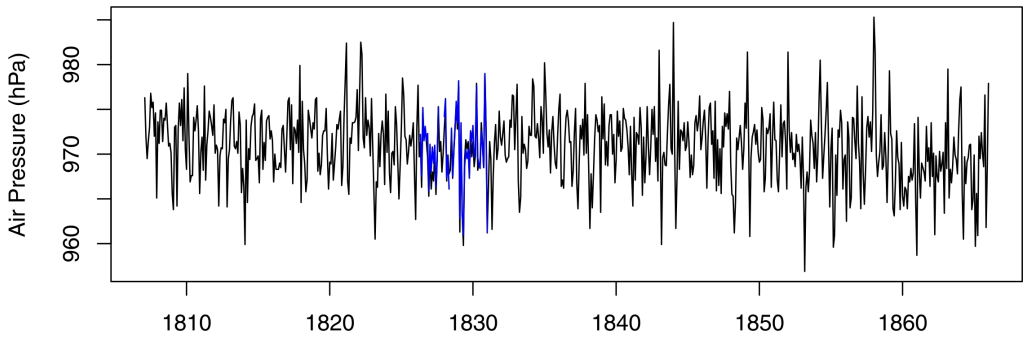

Figure 7. Time series of monthly mean pressure from the Zschokke (black) and Bronner (blue) series.

5. Conclusions

The Aarau series from 1807 onward, initiated by Heinrich Zschokke and continued by his son Theodor Zschokke, is among the longest series in Switzerland. When combined with the Bronner series for the period 1826–1830 (which covers the particularly cold winter of 1829/30) and complemented after 1863 with the MeteoSwiss series of Buchs-Aarau, a new 210-year long series can be generated. In this paper we present the station history and the processing of the series. Although the series has few gaps, the quality control and analysis reveals that during some periods, the quality of the temperature measurements in the Zschokke series (as evidenced in the correlation between morning and evening measure-

ments) might require further attention. Possible causes include local climatic effects. Careful analysis is necessary prior to homogenization of the series. The pressure series shows a high internal consistency. The Bronner series from 1826 to 1836 appears to be of a very high quality.

The Aarau data presented in this paper are published by Brugnara et al. (2019) (https://doi.pangaea.de/10.1594/PANGAEA.909141) and will be offered to the public via the MeteoSwiss Data Warehouse, the C3S data repository (Thorne et al., 2017) as well as EURO-CLIMHIST (Pfister et al., 2017). The images can be downloaded from the site: https://zenodo.org/record/3066836#.XVv-fGRS8-U.

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