

Paul A., Albenberger J., Bauer M., Galavics H., Gorka V., Lechner W., Lipa W., Manhard A., Mandl A., Stowasser R., Teuschler D.

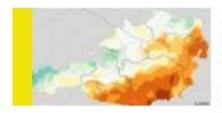
ZAMG - Zentralanstalt für Meteorologie und Geodynamik



BACKGROUND

Weather effects nature and people Climate-more and more in focus Analysis of Extreme events

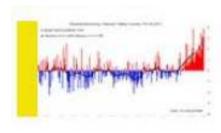
News aktuell



30.10.2019

Oktober 2019: ungewöhnlich warm

Vorläufige Monatsbilanz der ZAMG: Einer der 20 wärmsten Oktober-Monate der Messgeschichte. Im Süden und Osten Österreichs größtenteils sehr trocken, mehr •••



27.08.2019

Zweitwärmster Sommer der Messgeschichte

Sommer 2019 in vorläufiger Bilanz 2,7°C über dem Mittel und damit knapp hinter dem Rekord von 2003. Außerdem einer der sieben trockensten Sommer der Messgeschichte (minus 30 Prozent Niederschlag). mehr •••



BACKGROUND

People are more informed about weather and climate People are more interested in weather and climate Answer the needs of society

- -> What is in range and what is left outstanding?
- -> Has this historically been a trend and can we determine trends based on this data?
- -> Is the climate, in general, getting more extreme?

Investigation in climate change studies and analysis

Conditio-sine-qua-non: Long term data in high temporal resolution

Our task: Inform the people – change the system Collection, digitalization, quality control of relevant data sets -> historical impact data for investigations and models

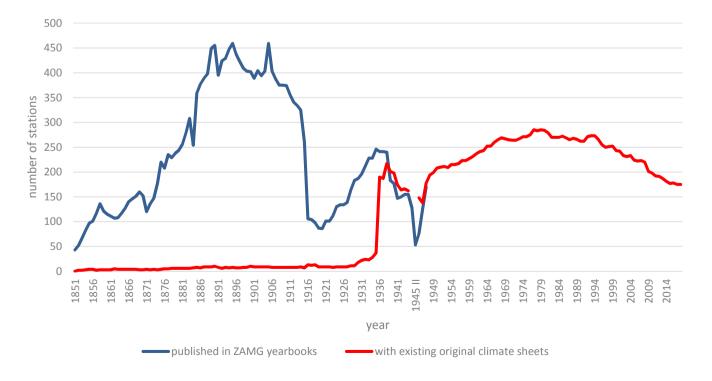


Historical background

1851 "Centralanstalt für Meteorologie und Erdmagnetismus 1895 max. number of stations and observations under the regency of Franz Joseph I.



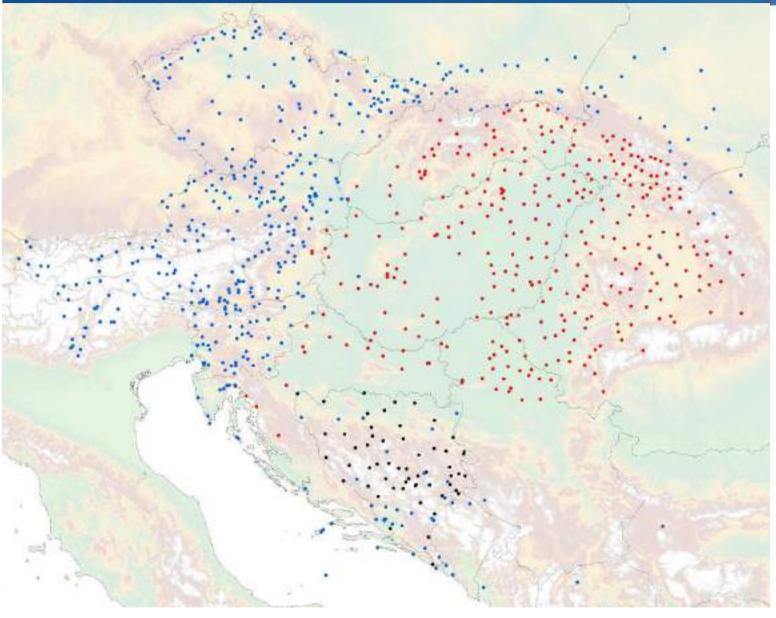
First Director of ZAMG Karl Kreil Source: Wikipedia





Emperor Franz Joseph I. Source: Wikipedia

observational network in 1895



stations published in

- Austrian
- Hungarian
- Bosnian yearbooks



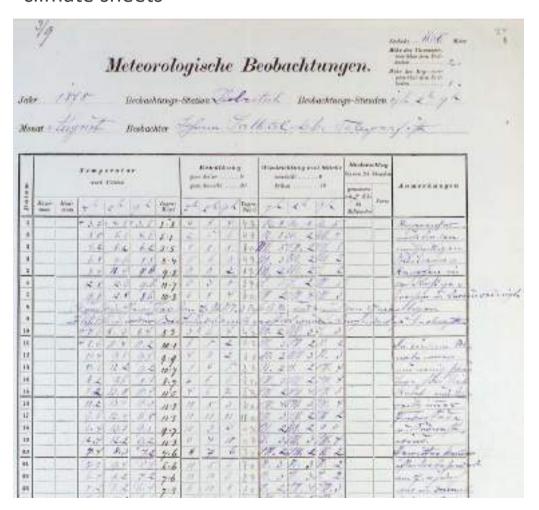
Original documents – yearbooks 1851-1992

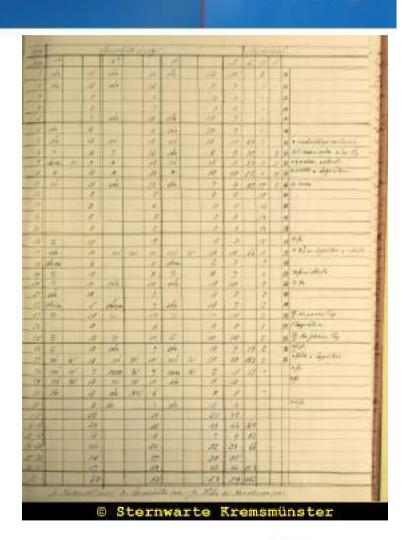
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Original documents

eldest data from observatory Kremsmünster (1762) climate sheets







Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy) Historical Austrian Yearbooks (1851-1948)

Austrian Climate Data Rescue Initiative (2008-2013)

Outcome:

- -) Complete Data inventory of ZAMG-Climate Sheets
- -) Digitalization of over 200.000 Climate Sheets as pdf (80% in DB)
- -) Data Quality Control of over 6000 station years –
 Continuous Improvement of quality control procedures ordinary tests to more sophisticated checks



Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy) Historical Austrian Yearbooks (1851-1948)

We found stations in:

Bosnia and Herzegovina

Bulgaria

Croatia

Czech Republic

Germany

Greece

Hungary

Italy

Romania

Russia

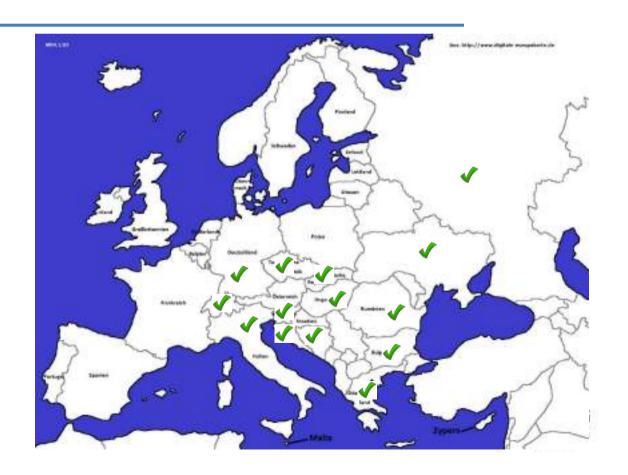
Serbia

Slovenia

Slovakia

Switzerland

Ukraine





includes:

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imaging during summer months:

• Time period: 1851-1919

Bulgaria (1 station in process)

Italy (8 stations)

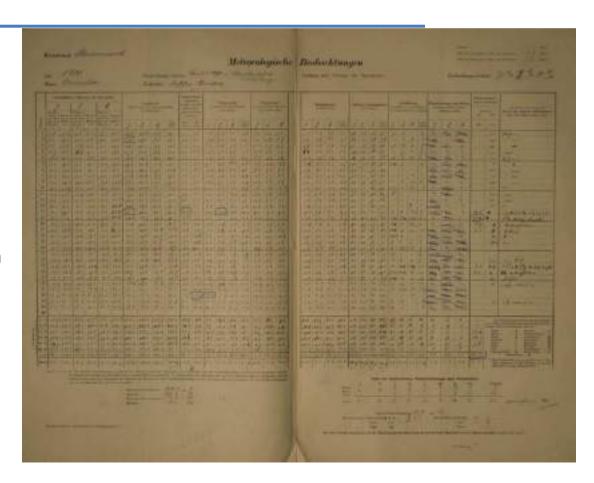
Serbia (8 stations)

Slovenia (62 stations)

Slovakia (8 stations)

method: taking pictures in high resolution

Output: tif files



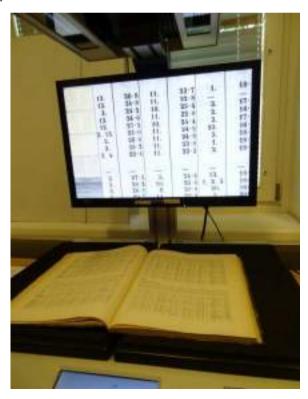
Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)
Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy)
Historical Austrian Yearbooks (1851-1948)

- Data inventory of historical yearbooks (station-wise, parameter-wise)
- Conception phase: training and first test scans at GBA (geological federal institute)
- using 'Bookeye' (specialized image access scanner)





Complete data inventory of our ZAMG-Climate Data Archive

includes:

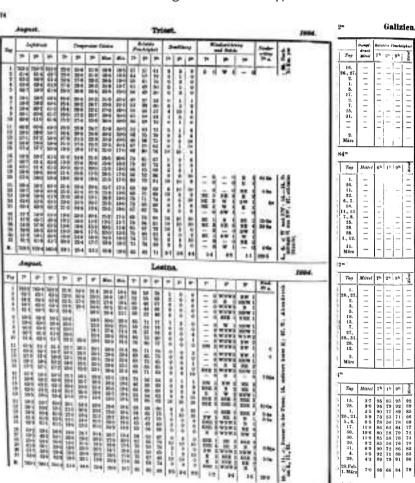
Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy)

Historical Austrian Yearbooks (1851-1948)

using 'Bookeye' (specialized image access scanner)

- Problems during digitalization process:
 - system shutdown at large tables
 - partly or no recording of pages
 - Performance problems when saving
- -> Lessons Learned



Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy)

Historical Austrian Yearbooks (1851-1948)

LESSONS LEARNED:

Purchase of a new device at ZAMG - Microbox Mosquito A1

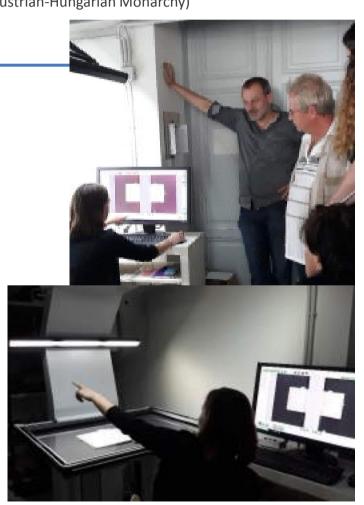
- + digitalization on site
- + better performance
- + coordinated and well adapted hard- and software
- + modern system
- + scan of formats up to size A1
- + 2 cameras with 400ppi, standard output 600 dpi
- costs of over 60.000 Euros
- Maintenance and running costs

02-2019: delivery of the image scanner

05-2019: tests, configurations, fine tuning

06-2019: training of the staff

summer 2019: acquisition (imaging) of 20 yearbooks



Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)
Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy)
Historical Austrian Yearbooks (1851-1948)

- Digitalization of remaining yearbooks in order of priority and requirement
- Formatting and converting work with freeware ScanTailor
- Testing OCR Software and evaluation of first results







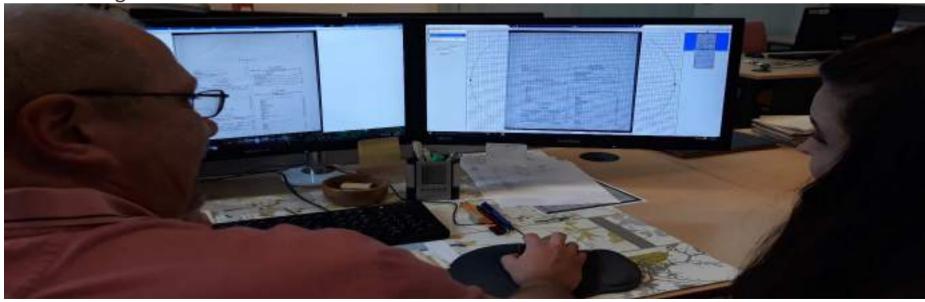


Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)
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Historical Austrian Yearbooks (1851-1948)

- Digitalization of remaining yearbooks in order of priority and requirement
- Formatting and converting work with freeware ScanTailor
- Testing OCR Software and evaluation of first results



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- Shifting, rotation, cropping
- Adjustments of brightness and/ or contrast
- Removal of grey fog, yellowing, discoloring, finger –prints, transparent prints of the rear side
- Removal of dust, dirt handwriting

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Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)
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Historical Austrian Yearbooks (1851-1948)

- Digitalization of remaining yearbooks in order of priority and requirement
- Formatting and converting work with freeware ScanTailor
- Testing OCR Software and evaluation of first results
- Use of open source software tesseract 4.1.0
- converts tif to pdf
- Recognition of texts and figures
- Challenge: tables
- Tests with transkribus.eu in a working group
- 98% OCR recognition rate of handwritings
- 72% correct allocation of cells -> not good enough



Complete data inventory of our ZAMG-Climate Data Archive

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Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy) Historical Austrian Yearbooks (1851-1948)

VI

Verzeichnis

der Behörden, Institute, Gesellschaften und Personen, an welche das Jahrbuch der Central-Anstalt versendet wird.

Inland.

Wien.

Seine Excellenz der Herr Unterrichtsminister.

Das k. k. Ministerium für Cultus und Unterricht.

Das k. k. Ministerium des Innern.

Das k. u. k. Reichs-Finanzministerium.

Das k. k. Handelsministerium (Hydrotechn. Bureau).

Das k. k Eifenbahnministerium

Das k. k. Ackerbauministerium.

Die k. k. nied, öfterr. Statthalterei (Sanitäts-Departement).

Die k. u. k. Hofbibliothek.

Das k. u. k. natur-historische Hofmuseum.

Die Marine Section des k. u. k. Reichs-Kriegsministeriums.

Die kaiferl. Akademie der Wiffenschaften.

Das k. u. k. militär-geographische Institut.

Das k. u. k. Landesbeschreibungs-Bureau des Generalstabes.

Das k. k. Gradmeffungs-Bureau.

Die k. k. statistische Central Commission.

Die k. k. General-Inspection der Eisenbahnen.

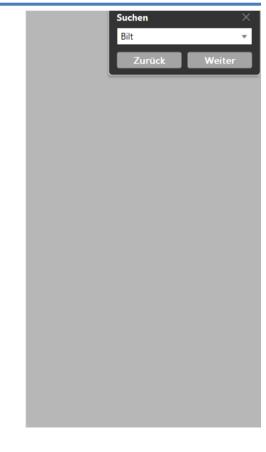
Die k. k. geologische Reichsanstalt.

Das k. u. k. technisch-administrative Militär-Comité.

Die k. k. Universitäts-Bibliothek.

Des geographische Inflitut der b. k. Universität

Graz Hofrath Prof. Dr. J. Hann. Innsbruck, k. k. Universitäts-Bibliothek. naturhistorisches Landes-Museum von Kärnten. Klagenfurt, Oberbergrath F. Seeland. Krakau, k. k. Sternwarte. physiographische Commission. Kremsmünster; Sternwarte. Laibach, Landes Museum für das Herzogthum Krain. k. k. hydrographifches Bureau. geogr. Justitut der k. k. Universität. Lemberg, polytechnischer Verein. technisches Departement der k. k. Statthalterei. Luffinpiccolo, nautische Schule. Mariabrunn. k. k. forftliche Verfuchsanstalt. Pilfen, statistisches Amt der kgl. Stadt. k. k. Berghauptmannschaft. St. Pölten. k. u. k. hydrographifches Amt. Pola, k. böhmische Kaiser-Franz-Joseph-Akademie. k. böhmische Gesellschaft der Wissenschaften. k. k. Sternwarte. k. k. öffentliche und Universitäts-Bibliothek. k. k. deutsche Karl-Ferdinands-Universität. das hygienische Institut der k. k. deutschen Karl-





PRESENT + FUTURE

Complete data inventory of our ZAMG-Climate Data Archive

includes:

Austrian Climate Sheets (->Project Austrian Climate Rescue)

Third Party Climate Data Sheets (primary countries that belonged to Austria in times of Austrian-Hungarian Monarchy)

Historical Austrian Yearbooks (1851-1948) - Digitalization and Data Quality Control

- Digitalization of historical yearbooks (1851-1948) with book scanner into pdf
- Use of OCR Software on tables
- Automatically import in the DB
- Data quality control of the datasets correction of not plausible values due to meteorological aspects
- Publication of the datasets recalculation of extreme values



CONTACT

FURTHER INFORMATION:

http://www.zamg.ac.at/cms/de/klima/messnetze/datenpruefung

contact persons:

Anita Paul

Rainer Stowasser – technical support





OUR TEAM



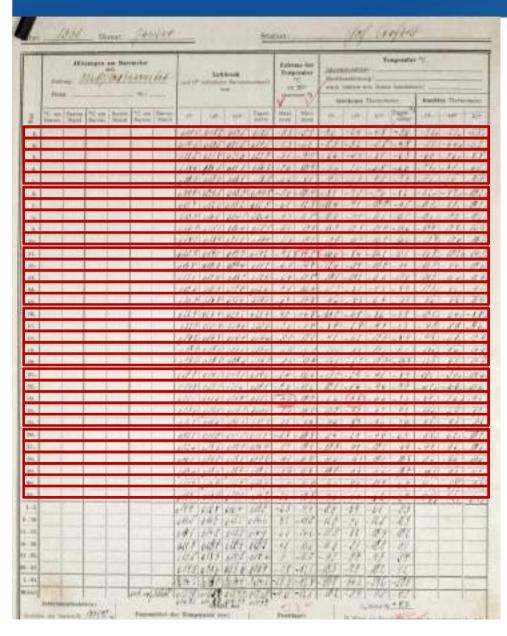




THANK YOU FOR YOUR ATTENTION!!!!



Any questions?



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19350103 8300	8291	8288	8293	-31	-90	-64 -43	-81	-61 9	9999	9999	9999
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