



Instrumental data in climate research

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History of meteorological measurements



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17th /18th century: start of development of measuring instruments for comparable measurements

Unorganised measurements (e.g. changing number of measurements per day, individual instruments)

1850/1870 founding of meteorological services and organised observations
common observation times: 7^{°°}, 14^{°°}, 21^{°°} (Mannheimer Stunden)

1971 Change in observation time: 21^{°°} → 19^{°°}

~1980 Start of Automatisierung (TAKLIS)

~1990 start of TAWES

Mountain stations



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End of 19th century:

weather prediction needed information on upper atmosphere

oldest station in Austria (since 1851): Hochobir (2160m)

Sonnblick(3105m) (since 1886)



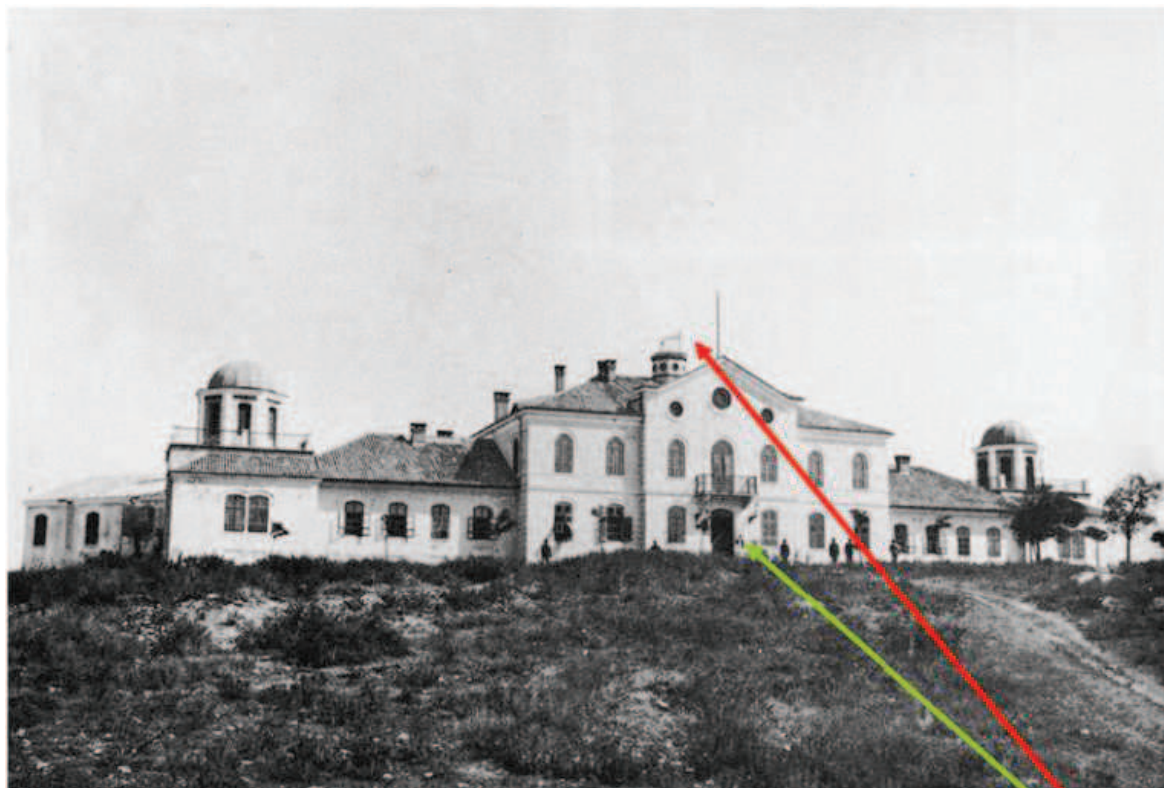
Additional problems due to exposed sites:
wind, snow and ice

Changing stations setup



Raingauge:

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Barometer

Changing stations setup

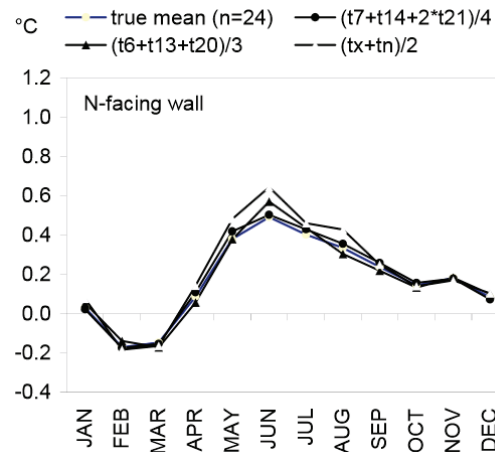
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Instrument shelter:

North window -> ...->



Stephenson shelter



Böhm et al.,2010: The early instrumental warm-bias: a solution for long central European temperature series 1760-2007, Climatic Change, 101,41-67

Parameters



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Temperatur, Pressure

Precipitation

Relative humidity, Cloud cover, Minimum temperature, Maximum temperature

Sunshine duration

Long term time series

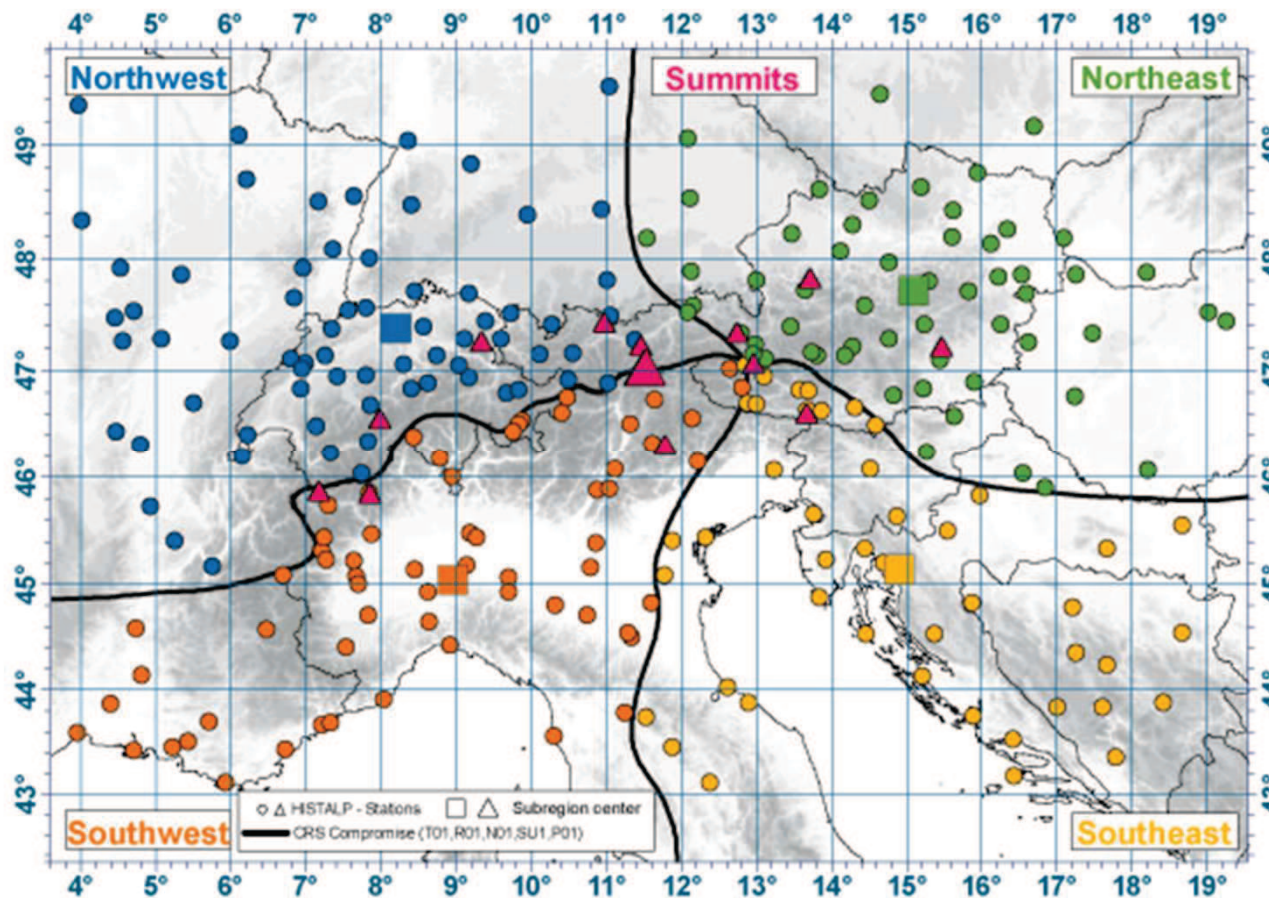
- Longest series monthly resolution
- Data gaps (e.g. lost due to war)
- Changes in location, instrumentation, ... (= Inhomogenities)

HISTALP



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Historical Instrumental Climatological Surface Time Series of the Greater ALPine Region 4°-19° E, 43°-49° N



Longest Time series
(temperature):

1760: Basel, Genève-
Cointrin

for Austria

1767: Kremsmünster

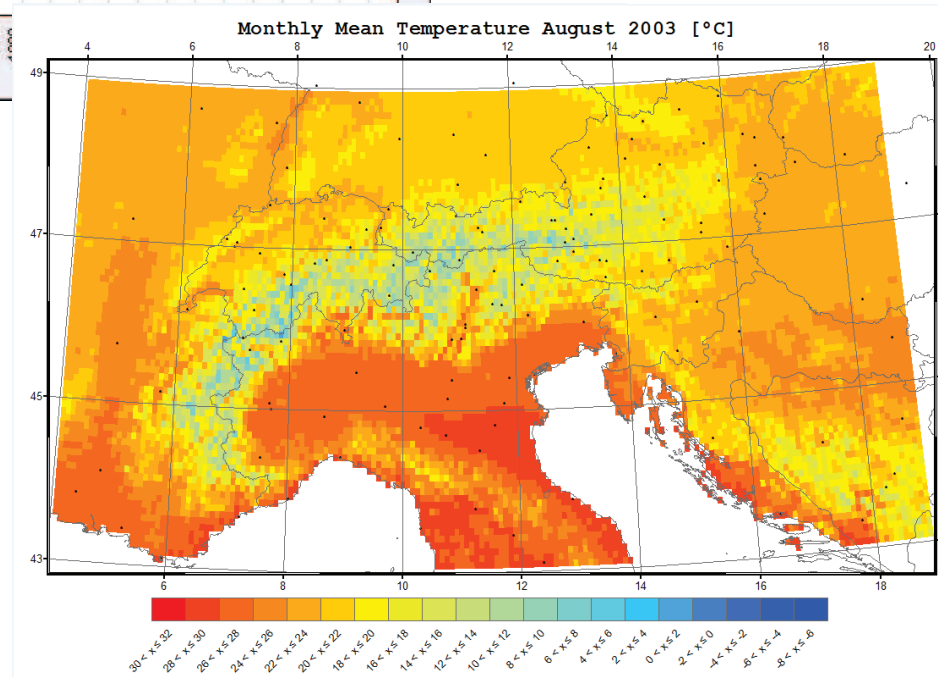
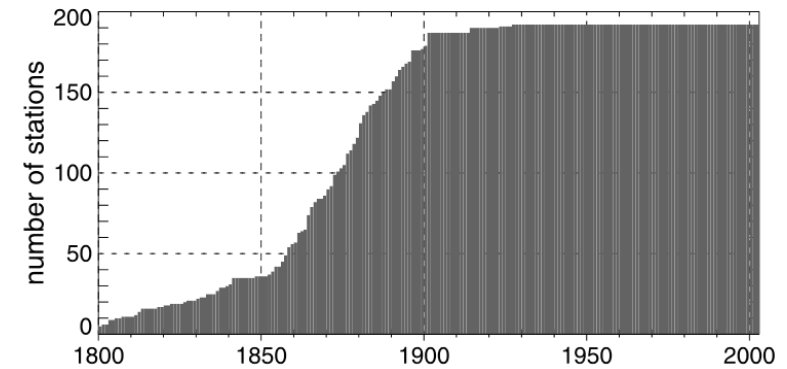
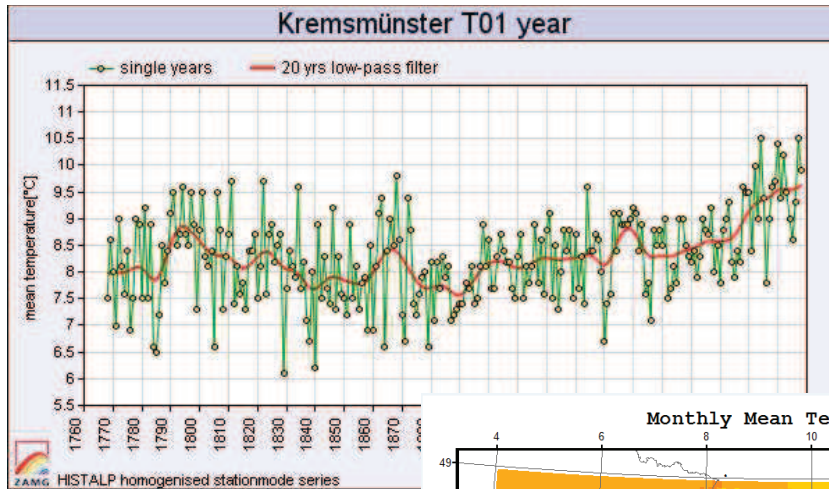
HISTALP



Database of station data and gridded data in monthly resolution

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Adequate dataset for research on climate variability and climate change

LONGTERM Datasets (fully exploiting the potential of systematically measured data)

DENSE station network (network density adequate in respect to the spatial coherence of the given climate element)

QUALITY IMPROVED data (outliers removed, gaps filled)

HOMOGENISED data (earlier sections adjusted to the recent state of the measuring site)

MULTIPLE parameters (covering more than one climate element)

USER FRIENDLY (well described and kept in different modes for different applications)

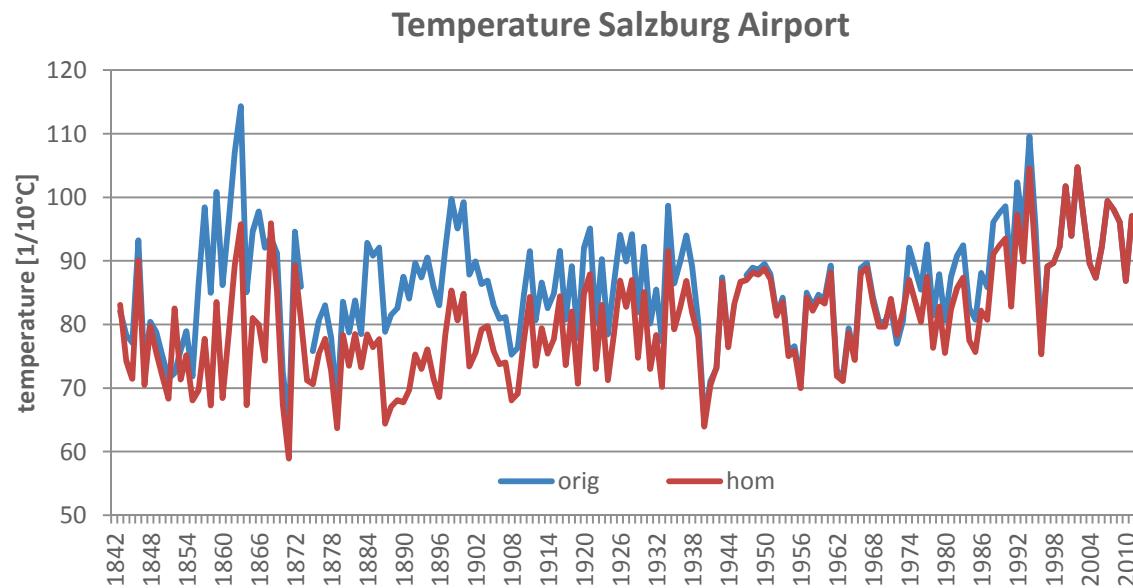
Homogenisation



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Remove non-climatological signals (e.g: Station relocation)

- *) use of highly correlated stations
- *) break detection
- *) Correction using montly adjustments
- *) use of METADATA



Content of HISTALP

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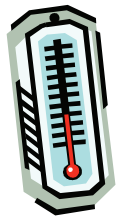


Parameters (station data):

- Air Pressure
- Precipitation
- Sunshine
- Temperature
- **Cloudiness**
- **Relative Humidity**
- **Vapour Pressure**



- Coarse resolution:
 - Regional means (sunshine duration, precipitation sum, cloudiness, temperature)
- Grid-resolution:
 - 1x1 degree (temperature, precipitation, pressure; low and high elevation)
 - 5x5 arcminutes (temperature, precipitation, solid precipitation)



Data Availability



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Data Download (www.zamg.ac.at/histalp):

- Station data: partly restricted
- gridded datasets: unrestricted

HISTALP 2007

HISTALP

Home News The Project Data Links

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Welcome to HISTALP!

HISTALP - HISTORICAL INSTRUMENTAL CLIMATOLOGICAL SURFACE TIME SERIES OF THE GREATER ALPINE REGION

This site is dedicated to the HISTALP project and its database, consisting of monthly homogenised temperature, pressure, precipitation, sunshine and cloudiness records for the „Greater Alpine Region“ (GAR, 4-19 deg E, 43-49 deg N, 0-3500m asl). The longest temperature and air pressure series extend back to 1760, precipitation to 1800, cloudiness to the 1840s and sunshine to the 1880s.

An introduction in German about the project can be found in the publication: *EINE NEUE WEBSITE MIT INSTRUMENTELLEN QUALITÄTS-KLIMADATEN FÜR DEN GROSSRAUM ALPEN ZURÜCK BIS 1760* Böhm et al 2009

[to the description of this map \[D\]](#)

Eine detaillierte Einführung in das Projekt und die Webseite kann der Publikation *EINE NEUE WEBSITE MIT INSTRUMENTELLEN QUALITÄTS-KLIMADATEN FÜR DEN GROSSRAUM ALPEN ZURÜCK BIS 1760* Böhm et al 2009 entnommen werden

contact: histalp@zamg.ac.at

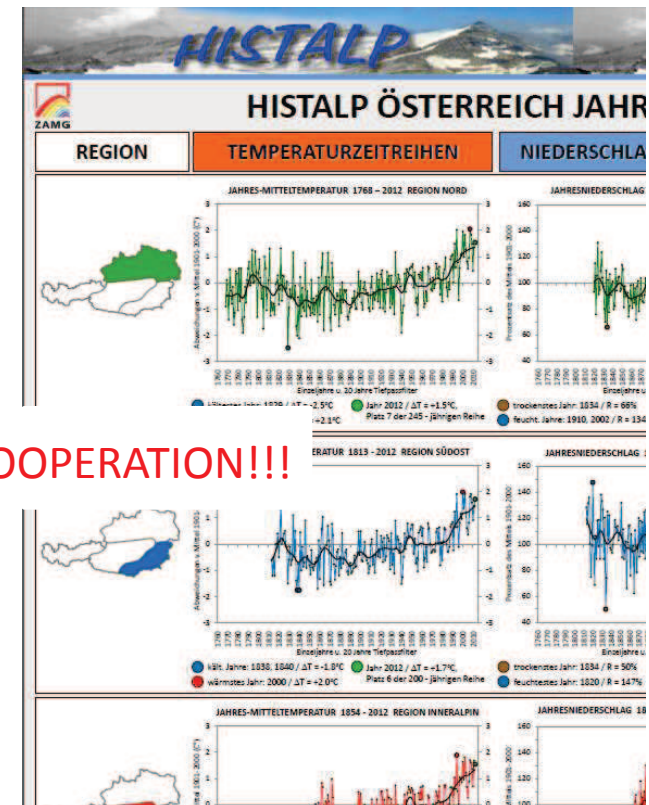
Operational Duties of HISTALP

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- Data Update including Quality Control
 - Austrian stations seasonally Includes
 - quality control
 - Filling of data gaps
 - Other stations as soon as the data is available

THANKS TO ALL THE DATA PROVIDERS FOR THEIR COOPERATION!!!

- 3 Newsletter a year (year, summer, winter) with longterm climate information (for Austria, in German)



Daily data in climate research

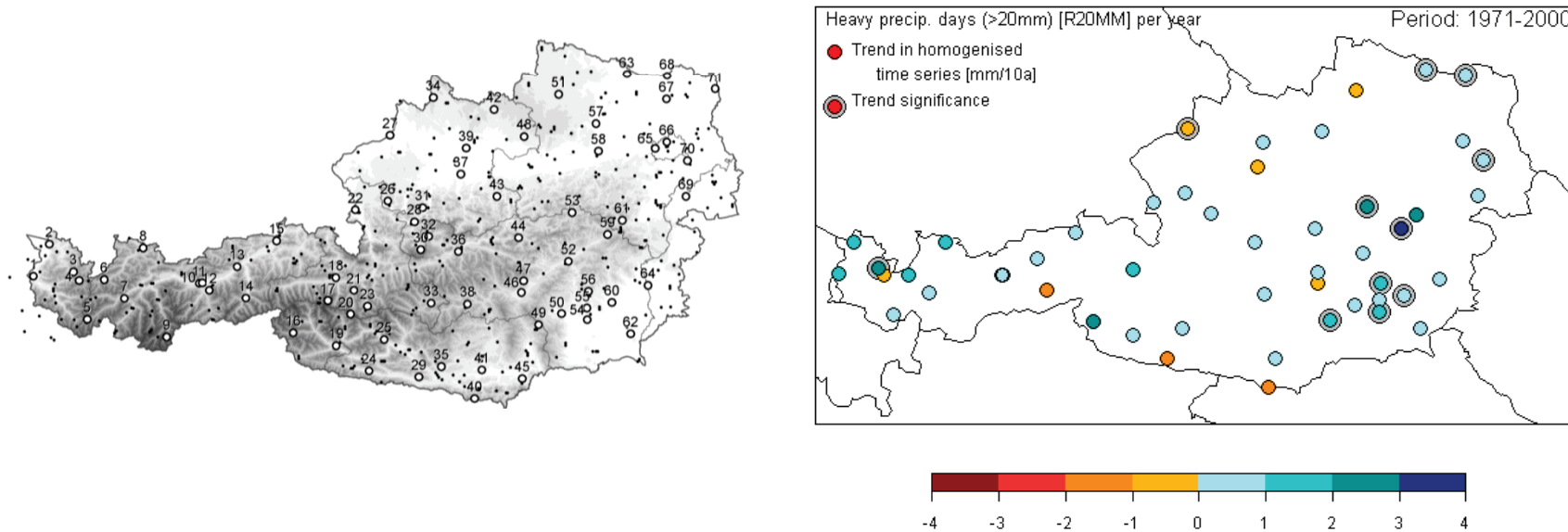


Shorter time series for daily data available

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Homogenised daily data for temperature and precipitation in Austria (~60 years)



Nemec, et al. 2012: Trends in extreme temperatur indices in Austria based on a new homogenised dataset, International Journal for Climatology, 33, 1538-1550
HOMSTART-Endbericht

Data Rescue Projects



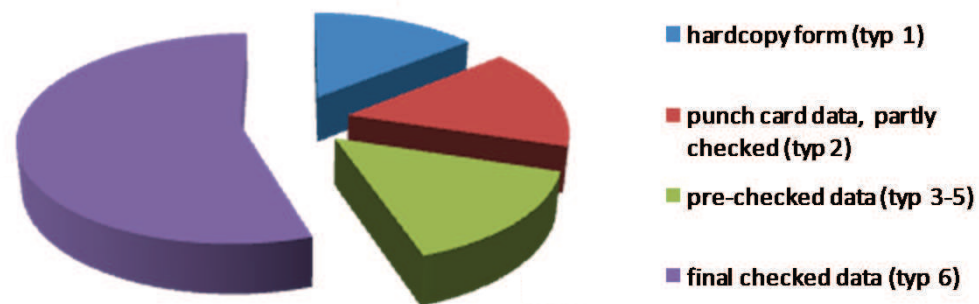
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Lot of data in paper archives => valuable information on climate but not used until now

ZAMG -> Data digitalisation and quality control project since 2007

Daily data reaches back up to 150 years

Inventory of daily data (1872-1983) status quo: April 2011



Similar activities: eg. Switzerland (DigiHOM), Mediterranean area (MEDAR)

Data Rescue Projects



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EUMETNET-Initiative

First AIM:

Data inventory on the web for estimation on available and still unavailable longterm datasets

Activities so far:

Questionnaire about previous rescue activities and further potential of archives

Main interest: long term data (>100 years), mountain observations

Workshop in November: „Climate data supporting Climate Services”

(http://www.meteorologie.at/docs/1st_Announcement_9th_DMWS.pdf)

Future of HISTALP

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- new **homogenisation** of parameters (monthly) due to 10 years of new data since last homogenisation
- new **webdesign** with improved download possibility
- **update** of gridded datasets
- including of **daily homogenised data**
- including **additional parameters** (e.g: wind)

Further wishes on the database?

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