An Introduction to Cloudiness

ZAMG’s climate variability working group has created a comprehensive (several hundred single series), multiple (7 climate elements), long (longest series back to 1760), quality improved (thousands of inhomogeneities and incorrect outliers removed) and completed (original gap rate 5%) dataset of monthly instrumental climate time-series in the “Greater Alpine Region” (GAR, 4°19'E, 43°49'N). Data were collected from approximately 20 providers of the 10 countries in the region. The creation of HISTALP was partly funded by several national and international projects and is maintained by ZAMG with the support from the data providers as a quality orientated climate monitoring activity. Homogenisation and the implementation of major improvements take place almost every 5 years. The data is kept in three different modes: station mode (single station series, original and homogenised), CRSM-mode (coarse resolution subregional mean anomalies for 5 objectively regionalised main subregions) and in grid-modes.

Unrestricted access to the data is given on the webpage: www.zamg.ac.at/histalp

2. CRSM-MODE

(Anomalies to 20th Century Mean, 5 Subregions)

A regionalization of the GAR (Fig. 5) based on PCA (for details see Auer et al., 2007) for each of the five leading climate elements (temperature, precipitation, pressure, cloudiness and sunshine) resulted in similar principal subregions. The advantage of the common subregions is to allow direct comparisons of different climate elements by representative CRSM-series (coarse resolution subregional mean series). The 5th CRS consists of the high elevation mountains (not displayed here).

Fig. 4 shows some examples of CRSM-series in the more conventional way of single year - and lowpass filtered series.

Ingeborg Auer, Reinhard Böhm, Manfred Ganekind, Barbara Chimani, Wolfgang Schöner, Markus Ungersböck, Anita Jurkovic, Alexander Orchist
Central Institute for Meteorology and Geodynamics (ZAMG), Vienna, Austria

INTRODUCTION

ZAMG's climate variability working group has created a comprehensive (several hundred single series), multiple (7 climate elements), long (longest series back to 1760), quality improved (thousands of inhomogeneities and incorrect outliers removed) and completed (original gap rate 5%) dataset of monthly instrumental climate time-series in the “Greater Alpine Region” (GAR, 4°19'E, 43°49'N). Data were collected from approximately 20 providers of the 10 countries in the region. The creation of HISTALP was partly funded by several national and international projects and is maintained by ZAMG with the support from the data providers as a quality orientated climate monitoring activity. Homogenisation and the implementation of major improvements take place almost every 5 years. The data is kept in three different modes: station mode (single station series, original and homogenised), CRSM-mode (coarse resolution subregional mean anomalies for 5 objectively regionalised main subregions) and in grid-modes.

Unrestricted access to the data is given on the webpage: www.zamg.ac.at/histalp

1. STATION MODE

All station mode series (Fig 1) are present in the dataset as standard data (with gaps, inhomogeneities and outliers) and as inhom using mode (detected breaks and outliers removed, gaps filled). The collected parameters are temperature, precipitation, pressure, sunshine duration, cloudiness, relative humidity and vapour pressure (Fig. 2). Since 2008 the systematic bias in temperature due to early instrumentation (Böhm et al. 2010) is corrected. (Fig. 3)

Fig. 2 Evolution of the stmod-series of five main climate elements 1760-2003.

3. GRID-MODES

For three climate elements (air pressure, air temperature and precipitation) different grids have been prepared. 2 different resolutions are available: 1° and 5 arcmin, with varying parameters. Different orographically modified inverse distance interpolations were used to create the grids. Details are given in Auer et al., 2007, Efthymiadis et al. 2006, Heßl et al. 2009, Chimani et al. 2011.

Fig. 6 The two grid modes for temperature (high and low elevation)

The 5’ grids (Fig. 7) are available for absolute temperature, precipitation and solid precipitation. While the beginning for the available time-series is not the same for each grid point of the 1° grid, it is the same in the 5’ grid. To achieve this goal for temperature, recombination of missing data back to 1780 was done using EOF on the station data anomalies. Absolute values are calculated by blending the anomaly analysis with high resolution climate means (Hiel et al. 2009). For precipitation a refinement of the monthly precipitation data of Efthymiadis (Efthymiadis et al. 2006) was done.

Solid precipitation is the result of an temperature dependence approximation for the percentage of solid precipitation and the precipitation amount.

REFERENCES


4. HISTALP-NEWSLETTERS

In seasonal and annual intervals a HISTALP Newsletter is produced, giving information on the recent development of the region and the issues which are relevant for the signatory countries. The newsletter contains also an overview of current research activities in the “Greater Alpine Region”.

Fig. 8 Mean temperature anomaly (upper graph) and precipitation sum anomaly (lower graph) of spring 2011 to the longterm mean of 1901-2000. (black: low -north grey: high)

Some data is not available via the Histalp-Homepage! Feel free to ask for those additional data! We will be glad to assist you.

Acknowledgement: HISTALP was developed and systematically implied under the umbrella of the Austrian nationally funded project CLIVALP (Austrian FWF, P10758-N16). Further support came from a number of national and international projects: ALPCLIM (EU, ENV-4CT96-0426), ALP-MIP-SI (EU), CT-2002-0161, ALP-RM-SI (EU, CT-2002-0168), CLIMAP (DM 3377/3033/2002, DM 3378/3033/2003, F047/3033/2003), CNR Special Project “Reconstruction of the Past Climate in the Mediterranean area” (02-0205/97-07061), the Swiss Projects KLM496 and NORM 90, the Italian Meteorological Society project CLIMWEV (Fondazione CRT) and the DNMZ and the Croatian Ministry of Science Project “Climate Variability and Change and Their Impacts” (0984610/03).

More information: Homepage: www.zamg.ac.at/histalp
Email: reinhard.boehm@zamg.ac.at
manfred.ganekind@zamg.ac.at
wolfgang.schoener@zamg.ac.at
klimaforschung@zamg.ac.at

Further projects include the Histalp-Digialpin (coordinated by the HISTALP team) and the Histalp-MAES project (coordinated by the HISTALP team).