



## A New Long-Term Gridded Precipitation Data-Set for the Alps and its Application for Map and Alpclim

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**Abstract.** One of the objectives of EU-project ALPCLIM is the generation of a gridded data-set of monthly instrumental precipitation data. The area of investigation covers the Alps and wide regions of the surroundings from 4° to 18°E and 43° to 49° N. Grid distance is 1 deg longitude and 1 deg latitude. The project is not finished yet, more than 140 single series have been collected by now and are in the state of homogeneity testing and adjusting. The average linear distance of the stations is 75 km. Furthermore first results can be shown, dealing with the main purpose of the generation of the instrumental data-set within ALPCLIM—to use the instrumental data (both temperature and precipitation) to create a longer temperature proxy-data-set based on stable isotope ice core data from high elevation sites in the Monte Rosa and Mont Blanc region. The ice core temperature proxies are supposed to be at least 500 years long. The precipitation series will be used to analyse the problem that ice-cores in principle carry information only for precipitation days, not for all days. Analyses on daily temperature and precipitation data of 50 years series have shown already a way to construct “precipitation-mass weighted mean temperatures” for the longer series based on monthly values. The degree of correlation of those “precipitation-mass-weighted” temperatures with real temperatures will decide on the possibility to use stable isotope proxies from high level sites as temperature information. In addition to the described use within ALPCLIM; also projects like MAP may profit from the outcome of the ALPCLIM precipitation data-set. It will provide the MAP community with carefully homogenised monthly precipitation series to see the situation of MAP-results in a long-term context. © 2001 Elsevier Science Ltd. All rights reserved

### 1. Introduction

The Alps are a region of high potential in climatological research. On the one hand they offer a large scale of different climates from Mediterranean and Atlantic influences in the South and West to continental features in the East and from low elevation plains, valleys and basins to high elevation mountain climate in the regions above tree line and snow line. On the other hand they offer a wealth of climate data not easily obtainable elsewhere. The paper discusses the way to a data set of alpine wide coverage based on homogenised monthly precipitation series. It shows also some first applications within the Projects MAP (Mesoscale Alpine Project) and ALPCLIM (Environmental and Climate Records from High Elevation Alpine Glaciers).

### 2. The long term precipitation data set

The area of investigation covers the Alps and wide regions of the surroundings from 4° to 18° E and 43° to 49°N. Grid distance is 1 deg longitude and 1 deg latitude. Unfortunately, practically all long term instrumental data series are disturbed by inhomogeneities caused by changes in instrumentation, station moves, relocations of instruments and also changes in the local environment, etc. Such inhomogeneities have to be removed, otherwise the results of climate change studies can be erroneous. The procedure of homogenisation is based on two steps. Step one is the elimination of documented breakpoints with the help of metadata information, step two the application of relative homogeneity tests. For precipitation series breakpoints with documented adjustment values are most commonly related to gauge relocations with parallel measurements or instrumental changes with parallel measurements.

In the Austrian precipitation network (Auer et al, 2000) a general tendency from higher installations (above ground) of rain gauges to lower ones could be found, thus causing a systematic bias of increasing precipitation in the original data.

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