

A NEW INSTRUMENTAL PRECIPITATION DATASET FOR THE GREATER ALPINE REGION FOR THE PERIOD 1800–2002

INGEBORG AUER,^{a,*} REINHARD BÖHM,^a ANITA JURKOVIĆ,^a ALEXANDER ORLIK,^a ROLAND POTZMANN,^a WOLFGANG SCHÖNER,^a MARKUS UNGERSBÖCK,^a MICHELE BRUNETTI,^b TERESA NANNI,^b MAURIZIO MAUGERI,^c KEITH BRIFFA,^d PHIL JONES,^d DIMITRIOS EFTHYMIADIS,^d OLIVIER MESTRE,^e JEAN-MARC MOISSELIN,^e MICHAEL BEGERT,^f RUDOLF BRAZDIL,^g OLIVER BOCHNICEK,^h TANJA CEGNAR,ⁱ MARJANA GAJIĆ-ČAPKA,^j KSENIJA ZANINOVIĆ,^j ŽELJKO MAJSTOROVIĆ,^k SÁNDOR SZALAI,^l TAMÁS SZENTIMREY^l and LUCA MERCALLI^m

^a ZAMG—Central Institute for Meteorology and Geodynamics, Vienna, Austria

^b Istituto ISAC-CNR, Bologna, Italy

^c Istituto di Fisica Generale Applicata, Università di Milano, Milan, Italy

^d CRU—Climatic Research Unit, University of East Anglia, Norwich, UK

^e Météo France, Toulouse, France

^f MeteoSchweiz, Zürich, Switzerland

^g Masaryk University, Brno, Czech Republic

^h SHMU, Bratislava, Slovakia

ⁱ HMZS, Ljubljana, Slovenia

^j DHMZ, Zagreb, Croatia

^k FMZ, Sarajevo, Bosnia and Herzegovina

^l HMS, Budapest, Hungary

^m SMI, Torino, Italy

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ABSTRACT

The paper describes the development of a dataset of 192 monthly precipitation series covering the greater alpine region (GAR, 4–18°E by 43–49°N). A few of the time series extend back to 1800. A description is provided of the sometimes laborious processes that were involved in this work: from locating the original sources of the data to homogenizing the records and eliminating as many of the outliers as possible. Locating the records required exhaustive searches of archives currently held in yearbooks and other sources of the states, countries and smaller regional authorities that existed at various times during the last 200 years. Homogeneity of each record was assessed by comparison with neighbouring series, although this becomes difficult when the density of stations reduces in the earliest years. An additional 47 series were used, but the density of the sites in Austria and Switzerland was reduced to maintain an even coverage in space across the whole of the GAR. We are confident of the series back to 1840, but the quality of data before this date must be considered poorer. Of all of the issues involved in homogenizing these data, perhaps the most serious problem is associated with the differences in the height above ground of the precipitation gauges, in particular the general lowering of gauge heights in the late 19th century for all countries, with the exception of Italy. The standard gauge height in the early-to-mid 19th century was 15–30 m above the ground, with gauges being generally sited on rooftops. Adjustments to some series of the order of 30–50% are necessary for compatibility with the near-ground location of gauges during much of the 20th century. Adjustments are sometimes larger in the winter, when catching snowfall presents serious problems. Data from mountain-top observatories have not been included in this compilation (because of the problem of measuring snowfall), so the highest gauge sites are at elevations of 1600–1900 m in high alpine valley locations. Two subsequent papers will analyse the dataset. The first will compare the series with other large-scale precipitation datasets for this region, and the second will describe the major modes of temporal variability of precipitation totals in different seasons and determine coherent regions of spatial variability. Copyright © 2005 Royal Meteorological Society.

KEY WORDS: monthly precipitation time series; homogeneity; instrumental period; greater alpine region

*Correspondence to: Ingeborg Auer, Central Institute for Meteorology and Geodynamics, Hohe Warte 38, A-1190 Wien, Austria; e-mail: ingeborg.auer@zamg.ac.at