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High resolution climatology
- towards climate change services

Multi-methodical realisation of the new Austrian climate maps for 1971–2000

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Constantly changing climate, the further development of geostatistical interpolation methods and the availability of a higher resolved digital elevation model gave reason for updating the most frequently demanded climate maps out of the Austrian digital climate atlas (ÖKLIM) from 1961–1990 to 1971–2000. The resulting 19 grids concern 30-year-means of air temperature (annual, January, July means) and derived indices (ice days, frost days, freeze-thaw days, summer days, hot days, heating degree days), precipitation (annual, winter half-year, summer half-year sums) and derived indices (days with precipitation, percentage of solid precipitation), snow (sum of fresh-fallen snow, snow cover duration, maximum snow depth) and sunshine (January, July absolute sunshine duration) parameters. For application in all branches of geosciences (e.g. climate variability and modelling, hydrology, biogeography, natural hazards) as well as for planning in all kinds of contexts (e.g. agriculture, tourism, generation of renewable energy, climate change adaption) such digital grids of standard climate information are greatly demanded and likely to gain even more importance in the near future.

Data preparation was carried out with large effort. In order to avoid adverse border effects and to guarantee an equal state of quality across all parts of the country, the study region was extended beyond the national borders and stations from all neighbouring countries were requested. The final data collection includes between 319 (percentage of solid precipitation) and 1,399 (annual precipitation sum) records from eleven national and foreign institutes. To achieve a station density as high as possible, data gaps of up to five or ten years were filled considering the same parameter at reference stations or a related parameter station-wise.

According to the climate parameter, different geostatistical interpolation methods were applied. Multiple regressions against elevation, longitude, latitude and distance from the coast in several horizontal regions and vertical layers were used for temperature interpolation. This approach allows for a strong elevation dependency besides the consideration of additional macroclimatic variables and captures temperature modifications in cold air pools. In contrast, precipitation sums and snow parameters were gridded by geographically weighted regressions, a method, which is also elevation dependent but offers a higher spatial variability. The spatial distributions of indices derived from air temperature or precipitation were explained due to the correlation to their underlying parameter by fitting techniques. By doing so, the higher spatial information from observations of air temperature or precipitation could be utilised. In addition, adjustments regarding features of mesoscale climatology were applied on the temperature and precipitation maps.

The new Austrian climate maps account for the recent development of interpolation methods and demonstrate the quality improvement in the ÖKLIM product line. The finished digital grids can freely be obtained for scientific and planning purposes by e-mail. Map images can be requested via the ZAMG-website.Constantly changing climate, the further development of geostatistical interpolation methods and the availability of a higher resolved digital elevation model gave reason for updating the most frequently demanded climate maps out of the Austrian digital climate atlas (ÖKLIM) from 1961–1990 to 1971–2000. The resulting 19 grids concern 30-year-means of air temperature (annual, January, July means) and derived indices (ice days, frost days, freeze-thaw days, summer days, hot days, heating degree days), precipitation (annual, winter half-year, summer half-year sums) and derived indices (days with precipitation, percentage of solid precipitation), snow (sum of fresh-fallen snow, snow cover duration, maximum snow depth) and sunshine (January, July absolute sunshine duration) parameters. For application in all branches of geosciences (e.g. climate variability and modelling, hydrology, biogeography, natural hazards) as well as for planning in all kinds of contexts (e.g. agriculture, tourism, generation of renewable energy, climate change adaption) such digital grids of standard climate information are greatly demanded and likely to gain even more

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