EMS Annual Meeting Abstracts
Vol. 15, EMS2018-441, 2018

Daily precipitation grids for Austria since 1961—development and evaluation of a spatial dataset for hydroclimatic monitoring and modelling

Johann Hiebl (1) and Christoph Frei (2)

(1) Zentralanstalt für Meteorologie und Geodynamik, Vienna, Austria (johann.hiebl@zamg.ac.at), (2) Federal Office of Meteorology and Climatology MeteoSwiss, Zürich, Switzerland (christoph.frei@meteoswiss.ch)

Spatial precipitation datasets that are long-term consistent, highly resolved and extend over several decades are an increasingly popular basis for modelling and monitoring environmental processes and planning tasks in hydrology, agriculture, energy resources management, etc. We present a grid dataset of daily precipitation for Austria meant to promote such applications. It has a grid spacing of 1 km, extends back till 1961 and is continuously updated. It is constructed with the classical two-tier analysis, involving separate interpolations for mean monthly precipitation and daily relative anomalies. The former was accomplished by kriging with topographic predictors as external drift utilising 1249 stations. The latter is based on angular distance weighting and uses 523 stations. The input station network was kept largely stationary over time to avoid artefacts on long-term consistency.
Example cases suggest that the new analysis is at least as plausible as previously existing datasets. Cross-validation and comparison against experimental high-resolution observations (WegenerNet) suggest that the accuracy of the dataset depends on interpretation. Users interpreting grid point values as point estimates must expect systematic overestimates for light and underestimates for heavy precipitation as well as substantial random errors. Grid point estimates are typically within a factor of 1.5 from in situ observations. Interpreting grid point values as area mean values, conditional biases are reduced and the magnitude of random errors is considerably smaller. Together with a similar dataset of temperature, the new dataset (SPARTACUS) is an interesting basis for modelling environmental processes, studying climate change impacts and monitoring the climate of Austria.