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Climate maps of air temperature and precipitation in Belgium

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The Royal Meteorological Institute of Belgium (RMI) has recently updated the precipitation and air temperature climate maps of Belgium in order to account for the reference period 1981-2010. These climate maps include information on the annual, seasonal and monthly normal values as well as on the mean number of precipitation days, heavy precipitation days, summer days, tropical days, frost days and winter days per year. These maps mainly rely on the observations of the daily precipitation quantities and daily extreme temperatures from the network of the climatological stations maintained by voluntary observers.

Several issues were investigated in this study. First, a tradeoff had to be found between the number of stations used in the mapping process and the level of data completeness of the corresponding time series. Second, the benefit of exploiting covariate data was investigated. A typical covariate for both precipitation and temperature is the orography. Another covariate for precipitation quantities results from measurements of the precipitation quantities made with an ancillary networks of rain gauges. In particular, the South part of Belgium, which exhibits a quite complex orography with respect to the rest of the country, is covered by an additional network of about 90 rain gauges that became operational in 2005. The 2005-2012 mean precipitation quantities at these stations enabled to improve the mapping of the precipitation normals for the period 1981-2010. Then, the possibility to consider observations uncertainties within the interpolation process was investigated. Finally, the annual cycle of the mean precipitation quantities was analyzed by principal component analysis (PCA).