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Estimating daily amd monthly mean temperatures from daily minima and maxima

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While historical near-surface air temperature data are often available as time series of daily minimum and maximum temperatures, the estimate of the daily mean temperature as the average of the extremes is prone to large errors. We propose a method for estimating the mean daily temperature on the basis of minima and maxima which accounts for the temperature trend by including also the minimum temperature on the following night. This and a few conventional methods are tested on temperature time series from Munich, Germany and Innsbruck, Austria. The proposed algorithm approximates the value of the actual mean daily and monthly temperatures much better than the average of extreme temperatures. Further, its bias and daily and monthly root mean squared error approach those of the algorithms that require several temperature records per day.