Geophysical Research Abstracts
Vol. 14, EGU2012-5364-1, 2012
EGU General Assembly 2012

Comparison of five different interpolation methods for daily temperature

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Investigation on air temperature has been and will be very important in hydrology and other climatological sciences. Air temperature is an important input to a variety of hydrological and ecological models. Since most near-surface air-temperature data are collected at irregularly spaced point locations rather than over continuous surfaces, point-based temperatures must be accurately interpolated over the landscape in order to be useful in practice. In this study, five interpolation techniques are investigated: (1) lapse rate method, (2) ordinary kriging, (3) external drift kriging and (4) ordinary kriging with residuals which are considered as the reference methods to compare the results of a newly developed method, named (5) quantile kriging. The study area is located in South Africa and the data are provided from four different sources with daily resolution of Tmax and Tmin. The interpolation techniques were used to estimate the temperature data for three sets of data and results were compared. It has been found that cross-validation has been improved by eliminating the outliers (dataset B), and furthermore by infilling the missing data by multi linear regression (dataset C). According to the geographical position of the country, a seasonal fluctuation has been further detected in the daily correlation coefficients.