



Multivariate non-normally distributed random variables in climate research - introduction to the copula approach

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Probability distributions of multivariate random variables are generally more complex compared to their univariate counterparts which is due to a possible nonlinear dependence between the random variables. One approach to this problem is the use of copulas, which have become popular over recent years, especially in fields like econometrics, finance, risk management, or insurance. Since this newly emerging field includes various practices, a controversial discussion, and vast field of literature, it is difficult to get an overview. The aim of this presentation is therefore to provide an brief overview of copulas for application in meteorology and climate research. We examine the advantages and disadvantages compared to alternative approaches like e.g. mixture models, summarize the current problem of goodness-of-fit (GOF) tests for copulas, and discuss the connection with multivariate extremes. An application to station data shows the simplicity and the capabilities as well as the limitations of this approach. Observations of daily precipitation and temperature are fitted to a bivariate model and demonstrate, that copulas are valuable complement to the commonly used methods.