

## ***Interactive comment on “A stochastic model for drought risk analysis in The Netherlands” by Ferdinand L. M. Diermanse et al.***

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Dear Ferdinand,

Concerning correlation: of course, I saw that you used the formula  $\rho = \sin(\tau/2)$ , but what I meant is that this transformation gives you the parameters of the Gaussian copulas corresponding to a given  $\tau$  matrix. However, these parameters are generally different from the correlation coefficients of the original variables, especially when marginals are strongly different from Gaussian, skewed, etc. In other words, that transformation does not account for the effect of marginals, and the (linear) correlation ( $\rho$ ) that you show in Fig. 7 depends on marginals (Pearson correlation always depends on marginals!). Please be careful, do not confuse Gaussian copula parameters with

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linear correlation of the original variables. This justifies e.g. the approach described by Papalexioiu (2018) to exactly reproduce the target correlation of the original variables, and can explain part of the bias you observe (this also happens when the variables are temporally independent). Please, pay attention, things are less simple than they can seem. For further discussion of these issues please refer to e.g. Embrechts et al. (2002) and references therein.

With best wishes

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Embrechts P., McNeil A. J. and Straumann D., Correlation and dependence in risk management: Properties and pitfalls in Risk Management: Value at Risk and Beyond, edited by Dempster M. A. H., (Cambridge University Press, Cambridge, UK) 2002 pp. 176–223.

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