Geophysical Research Abstracts
Vol. 12, EGU2010-4068, 2010
EGU General Assembly 2010

Modelling dependence structure in drought simulations

Geraldine Wong (1,2), Michael Leonard (3), Andrew Metcalfe (4), and Martin Lambert (3)

(1) Hydrology and Quantitative Water Management Group, Wageningen University, Wageningen, The Netherlands(geraldine.wonghuiyin@wur.nl), (2) Department of Geosciences, University of Oslo, Oslo, Norway, (3) School of Civil, Environmental and Mining Engineering, The University of Adelaide, Adelaide, Australia, (4) School of Mathematical Sciences, The University of Adelaide, Adelaide, Australia

[12pt]article geometry graphicx url amsmath amssymb a4paper

Modelling dependence structure in drought simulations

January 15, 2010

Abstract

Drought is a global phenomenon and is a common characteristic of climate. It is widely considered the world's costliest natural disaster in annual average terms, and the effects are equally devastating to both the agricultural and social economy. Drought modelling would enable decision makers to mitigate these effects by managment of water systems and agriculture. Hence, it is neccessary to consider the dependence structure of the characteristics of drought, in order to better understand drought occurrences. The essential characteristics of drought are peak intensity, average intensity and duration. These variables are highly correlated among themselves and their correlation structure can be described by copulas. Copulas are multivariate uniform distributions which allows for separate marginal and joint behaviour of variables to be modelled. It has been shown that trivariate asymmetric Gumbel copula can adequately model the multivariate dependence structure of drought characteristics in rainfall districts in Australia. In this talk, the application of the t-copula will be demonstrated and will also be compared with the trivariate asymmetric Gumbel copula in describing the dependence between these drought characteristics from the same rainfall district. Simulations from both these copula families will then be compared and analyzed against the simulations sampled from marginal distributions that assume independence between these drought characteristics.