**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Modelling the statistical dependence of rainfall event variables by a trivariate copula function" *by* M. Balistrocchi and B. Bacchi

A. Cancelliere (Referee)

acance@dica.unict.it

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The paper deals with the issue of modelling the joint probability distribution of three rainfall event variables: rainfall volume, rainfall duration and interevent time. The authors address this problem through a copula approach. The paper is excellently written and structured, and its topic fits within the scope of HESS journal. In my view, the authors may publish their work after minor revisions, as explained below.

Although there is of course interest in modelling the three variables together, as evidenced by the references indicated by the authors, a minor weak point of the work is that the existence of a statistical dependence between interevent time and the other

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two variables is very poorly supported, as confirmed by the fact that no work that shows its existence is cited. As a matter of course, the authors find that there is no such a statistical dependence, for the all the rainfall time series they analyse. Consequently, speaking of a trivariate copula, although not erroneous, is somewhat improper. In fact, a bivariate copula is used to model the joint probability of rainfall volume and duration, while to obtain the "trivariate" copula the interevent time is taken into account by simply multiplying that bivariate copula for the cdf of interevent time (eqn. (24)). For these reasons the authors are suggested to put in evidence these facts, both in the abstract and in the conclusions. Also the the authors may consider changing the title by deleting "trivariate copula", and perhaps "Modelling the statistical dependence of three rainfall event variables through a copula approach".

Minor Points

P442 Eq.(7): It may be more correct to put the norm of vectors in the right-hand side, as it makes no sense speaking of a vector greater than another.

P443 R 23: Please replace "subset of the real number R" with "subset of the set of real numbers R".

P454 R18 Please replace "opposed" with "opposite".

P457 R13 Please deleted "the" into "is related to the a considerable"

P441 R25, and P458 R22, it may be more proper to speak of "discretization thresholds" rather than "IETD and IA".

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