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Natural Hazards and Earth System Sciences
Discussions



# *Interactive comment on* "Intensity-Duration-Frequency (IDF) rainfall curves in Senegal" *by* Youssouph Sane et al.

**Anonymous Referee #2**

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Page 3, line 11: As regards the IDF calculation for African countries the work of De Paola et al. (2014) should be considered. De Paola et al. (2014) also tried to asses how extreme rainfall will be modified in future climate performing analysis of observed data and future simulations in three African cities, Addis Ababa, Dar Es Salaam and Doula. De Paola et al. found a methodology for the evaluation of the IDF curve from daily rainfall data; to obtain duration shorter than 24 hours they applied two different models of disaggregation to the historical data available, later the IDF curves were obtained using the probability distribution of Gumbel. Finally, the same procedure was applied to rainfall projections over the time period 2010-2050 in order to estimate the influence of the climate change on the IDF curves. As regards the results of the climate model projections, they suggest an increase of rainfall in terms of frequency.



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Page 3, line 13: The Extreme Value Distributions well interpret the maximum daily rainfall with reference to the city of Dar Es Salaam (See Cluva Chapter 2, Giugni et al. , The Impacts of Climate Change on African Cities, 2015); in particular, their work shows that the distribution of annual maxima is well modelled by the GEV distribution and that the shape parameter of the GEV distribution is essential to the determination of the characteristics of extreme value behaviour. Moreover, they showed that the estimation of GEV parameters by methods such as maximum likelihood can be unreliable in case of short rainfall records, but the estimation of the shape parameter done using the Bayesian method is more precise restricting the shape parameter to a physically reasonable range.

Page 7, lines 6-7: it is not really correct to state that the GEV distribution reduces to the Gumbel distribution when x is equal to zero; actually the GEV is not defined for x equal to zero, the GEV reduces to the Gumbel distribution when x tends to zero.

Page 8, lines 32-33: the definition of robustness is not clear since a robust statistic returns inferential results that are relatively insensitive to changes in the assumptions of the statistical model.

Page 12, lines 23-24: it is not clear from where we can deduce that considering higher moments of return periods the sample size explains 80% of the variance of the confidence interval width for $\mu$, 70% for s, 55% for x and 4% only for iT=100. Therefore this part should be better explained.

De Paola, F. Giugni, M., Topa, M.E. and Bucchignani E.,Intensity-Duration-Frequency (IDF) rainfall curves, for data series and climate projection in African cities SpringerPlus 2014, 3:133 doi:10.1186/2193-1801-3-133.

Giugni et al. The Impacts of Climate Change on African Cities, Chapter 2, Editors: Pauleit, S., Coly, A., Fohlmeister, S., Gasparini, P., Jørgensen, G., Kabisch, S., Kombe, W.J., Lindley, S., Simonis, I., Yeshitela, K. (Eds.), Urban Vulnerability and Climate Change in Africa, Springer, 2015.

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