Hydrol. Earth Syst. Sci. Discuss., 8, C1617–C1619, 2011
www.hydrol-earth-syst-sci-discuss.net/8/C1617/2011/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Building hazard maps of extreme daily rainy events from PDF ensemble, via REA method, on Senegal River Basin" *by* J. D. Giraldo and S. G. García Galiano

Anonymous Referee #1

Received and published: 19 May 2011

This study examines possible changes in extreme rainfall for the Senegal River Basin. I think this is an interesting topic and the manuscript is generally well-written. I have different major and minor comments that should be addressed before considering the manuscript for publication.

- Which scenario was considered?

- Pg. 3823, lines 19-20: the sentence "The first of them consists in a model performance criterion (RB), considering the present-day climate" seems incomplete.

- Pg. 3823, lines 20-21: the "convergence" to what?

- Pg. 3823, equation 1: why were m and n set equal to 1? How sensitive are the results to different values of m and n?

- Section 3.2: the authors use non-stationary statistical model to describe AMDR time series. However, have they first checked that there is statistical evidence against the use of a stationary model?

- Is it really meaningful to model a 20-year record of annual maxima with a non-stationary model which uses a large number of degrees of freedom for the fit? I personally think that 20 years are not enough.

- A much more extensive discussion of the statistical modeling should be provided. After reading the manuscript, I still have several questions: 1) how did the authors select their final distribution? 2) What distribution was generally chosen? 3) Can this be generalized?

- Figure 3: based on this figure, I find it a bit hard to believe that the statistical models are really able to describe the data. I would be interested in seeing the corresponding residual plots used to assess the goodness of fit. I am not sure that the statement on pg. 3828, line 6 ("the good fit of the GAMLSS statistical model to simulated AMDR time") is really supported by the results presented.

- Figure 3: please add the corresponding time series from the data. It would be interesting to see whether the models can actually reproduce the patterns in the data.

- Pg. 3825, lines 20-24: the authors mention how they checked the goodness of the fit but don't state whether the residuals supported their choice of models.

- Pg. 3827, last paragraph: why are the results in Garcia and Giraldo (2011) "numerically quite different"? Please explain.

- Figure 5 and others: the authors should mention more clearly in the text that the results in the south-west part of the domain are based only on interpolation, since no data are available.

- Pg. 3821, line 11: “Smirnov-Kolmogorov”

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