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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Modelling extreme discharge response to several geostatistically interpolated rainfall using very sparse raingage data" *by* S. Ly et al.

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General Comments

The paper deals with a very interesting topic based on the relationship between simulated river flows and rainfall interpolation procedures. Then, some recommendations to interpolate rainfall would be elucidated. Specifically when disperse rain gauges are available. But this is also a very difficult problem because of mixing so many uncertainties. At least those related with the suitability of rain gauge network to estimate rainfall maps, the goodness of multivariate procedures to interpolate rainfall and the parameterization of a distributed hydrological model. Furthermore, they focused on extreme events simulated with a daily continuous hydrological model which seems to be another difficult task. After reading the paper I would recommend a major revision

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Discussion paper

of it because of: 1. There are so many techniques described that obscured what it may be their principal analysis: ". . . effect of different raingage densities and particularly the effect of the raingage positions for very sparse raingage data used for rainfall interpolation, on extreme flow". Note the ambitious of this study that encompasses rainfall interpolation, the analysis of rain gauge network, the use of a continuous hydrological model and the assessment of maximum discharges. 2. Conclusions aren't derived from a detailed analysis of results. My opinion is that the description of results is only descriptive of some specific simulations (scenarios) but causes aren't analyzed and authors don't offer clues to take into account in other basins 3. The complexity of the topic makes almost impossible to differentiate what is due to interpolation methodology and what is derived from hydrological modelling. Why the authors didn't use a cross validation technique to elucidate which are general recommendations for a multivariate interpolation procedure of rainfall in order to clarify their conclusions? 4. Main findings related to kriging are obscure and not directly useful. Authors remarked the importance of rain gauge position but they didn't offer insights of different rainfall samples and their representativeness of rainfall in each basin 5. An index is proposed to " . . . illustrate the quality of the raingage distribution with respect to the calculation of extreme discharge" but I found it that it wasn't properly described. Authors neither used a mathematical formula nor analyzed its sources of variability, i.e. its domain of values and their significance

Addressing scientific questions

Some scientific questions may be proposed to authors: 1. According to the use of multivariate methodologies, are there any sources of variability in rainfall and elevation relationships (temporal or spatially variation) that may affect parameterization of kriging and subsequently those methods compared? 2. What are the advantages of addressing the suitability of interpolation procedures by means of discharge extremes instead of using a cross validation procedure 3. Wouldn't be profitable to identify sources of uncertainty in your work? 4. There is an index proposed to describe how suitable is a rain

gauge network for hydrological modelling. But it doesn't work with elevation or aspect values that it is recognized to influence rainfall. Wouldn't it be a major disadvantage to use the index proposed?

Technical corrections

âĂć Whatever methodology is used or selected to interpolate rainfall, it can be objectively parameterized. No matter if it is deterministic or multivariate. Cross validation is a well know methodology that allows the estimation of errors and the optimization of interpolation procedures. âĂć I would recommend to use only one term to refer ground rain gauges: rain gauge, raingages or weather station âĂć Maximum elevation in analyzed basins is 693 m which can't represent high elevations. What is the variability of recorded rainfall? âĂć Daily records of rainfall, are free of errors and gaps?. âĂć âĂć The removing of outlier discharge is based on annual maximum daily analysis. As stated in the paper, outliers are also due to natural causes. So, their removal is an open question that can be discussed. I also wonder how the removal of such kind of data can affect to a continuous hydrological modeling âĂć How rainfall scenarios are designed and why are based on the selection of 70, 8 and 4 rain gauges. The same question for the positions. How are they selected? âĂć Can't see rain gauge positions in Figure 3 âĂć Figure 4 is not clear because of line thickness âĂć Wouldn't be useful to express mathematically the index used to describe the performance of the rain gauges in a basin?. And then, what are usual values, over what range would you say that rain gauge network is suitable for hydrological modelling, what are the criteria to select rain gauges to work with. How can we refer this index

Typing errors

General Recommendation: review of English Line 30, page 2: "serveral"Âů Line 2, page 3: "simuated"Âů

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