

Interactive comment on “Spatial rainfall variability and runoff response during an extreme event in a semi-arid catchment in the South Pare Mountains, Tanzania.” by M. L. Mul et al.

Anonymous Referee #1

Received and published: 28 October 2008

The paper describes a flood event occurred in the South Pare Mountains on 1 march 2006. In the introduction the authors state that this monitoring experiment should be seen as part of a multi-method experimental study to analyse the main runoff processes at play in the basin. Extreme rainfall (up to 100 mm in 3 hours) was registered over the Makanya catchment that caused a devastating runoff event in the flood plain of the Vudee River. The event was recorded with a relatively dense (but not permanent) monitoring network: rainfall was monitored at 14 locations and water levels at five points. The flood hydrograph, however, could be reconstructed only for one of the gauging sites. The paper concludes that the event has been characterized by extreme

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



rainfall intensities with a strong spatial variability and by short concentration times. These characteristics enhance the unpredictable nature of such events, especially in scarcely monitored contexts.

OVERALL EVALUATION

The question addressed by the paper is indeed relevant, if intended for the comprehension of the triggering mechanisms of a flood event in a representative area. Such an outcome is particularly precious when referred to poorly gauged regions like sub-Saharan Africa that, as documented in a number of literature studies, are experiencing an increase of the flood risk due to population growth and consequent land use changes. The paper makes at first a clear reference to such an aim, but becomes rather elusive in the second part of the exposition, reaching generic conclusions on the predictability of this type of events. As a consequence of this, the reader ends up with a somewhat frustrating sensation of having missed the core of the study. With all the due respect to the authors' effort to collect an extremely valuable set of data in a scarcely known region of Tanzania, my overall recommendation is that the authors be encouraged to resubmit the paper after major revisions in order to reframe the paper structure and expand the scope of the investigation (see suggestions below).

SPECIFIC COMMENTS

- An introductive reference to the general aims of the Project by which this study is founded would help to understand why attention is devoted to this particular area and which are the expected final outcomes of the Project.
- The structure of section 3 needs to be redefined. This section, in fact, is characterized by a rather premature title (Results) and a strange mixture of contents (data description, basin description, methods description and then results). In the revised paper, all these sub-sections need to be properly described in dedicated sections that could be, for example: event description, methods and results.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



- In the event description several references to the flash-flood mechanism are made by the authors. Do the authors believe the event to be a flash flood event? If so, please specify the motivations.

- In paragraph 2662 it is stated that different estimates of the rainfall return period are obtained when using annual maximum daily rainfall or seasonal maxima. The authors state that "This is due to the fact that the sample size is smaller". Please clarify.

- In paragraph 2662 (line 21) the authors state "Only at the weir site the hydrograph could be reconstructed". Please clarify why.

- The assumptions at the base of the gradually varied flow calculation are not clearly outlined. The authors may also need to comment on the limitation of the method, given the strong simplifications on which it is based.

- Paragraph 3.2.4: It is unclear to me how the authors obtain the evapotranspiration estimates.

- The paper is closed by rather generic conclusions. I believe this part needs to be revised in order to clarify the potential, if any, of the study. I've already commented on the final sentence that, if referred to the specific case, would require some more discussion to establish if the results of the analysis are suitable or not to be transposed in poorly gauged situations (as stated in the introduction).

MINOR COMMENTS

- A clear description of each term in all equations would greatly improve the flow of the discussion. In Equation 2, for example, s remains undefined.

- Figures panels are sometimes referred to as left/right and sometimes as A/B. Please clarify.

- 2664 (line 15): "The boundary condition downstream... indicated by a circle in Fig. 5b". The circle is not visible.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



- Figure 6: the caption doesn't make reference to the variable represented by the histogram. The intersection of the rainfall and flows representations negatively affects the readability of the graph.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2657, 2008.

HESSD

5, S1652–S1655, 2008

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



S1655