Authors' response to Anonymous Referee #1

A. General comments

RC: The authors addressed a major issue of dealing with scarce data having different sources as well temporal and spatial scales for hydrological modelling purposes. The methodology was very clear and the obtained results are of high importance particularly for hydrologists and soil and water conservation specialists working in dry environments. The paper was very well written and illustrated. The bibliography is complete and relatively up to dated.

AC: The authors would like to express appreciation to Referee #1 for the time and effort dedicated to review the manuscript and provide in-depth comments, important suggestions and accurate technical corrections, which have obviously improved the quality of the manuscript. We would also like to thank the Referee for finding the potential of the presented work to assist areas most in need for such approaches and for positively commenting on the results, methodology, structure and technical status of the manuscript. We wish the point-by-point response below addresses the Referee's concerns and improves the manuscript.
A modified version of the manuscript is uploaded (a track-changes copy is also provided to facilitate finding edits).

B. Specific comments

1. **RC:** It is recommended to further justify the choose of the SWAT model (P4) with case applications particularly in similar environments:
   AC: Section (3.2 Model selection and structure) is modified to address this important suggestion.

2. **RC:** For the land use maps (p5): Did you consider that there were no major changes during the simulation period?
   AC: Yes, from the authors' knowledge of the relatively slow landuse change in the catchment supported by the available information/maps, it can be assumed that landuse change is negligible for this study. Other studies have found that main changes have happened by 1978 (our study starts from 1979). Please see the modified section (3.4.1 Landuse).

3. **RC:** A part from the Wala dam, are there other hydraulic structures (soil and water conservation, water harvesting, etc.) in the watershed. If yes, how did you represent them in the model ?
   AC: Not up to the authors' knowledge or published work and if any, they can be just small farm ponds/traps. The biggest in the area is the Wala dam with a reservoir surface area of 0.8 Km^2 (compared to ~ 2 000 Km^2 catchment) and it was constructed at the outlet in 2002 (hence, not represented in the model). A note added within Section 3.7 (Scenario comparison) regarding the beginning of impoundment.

4. **RC:** Provide a summary of the used soil characteristics for the two soil maps (p5-6) and indicate properly the measured and the estimated ones.
   AC: Comment addressed and section (3.4.2 Soil) is modified accordingly.

5. **RC:** Using average monthly discharge data (p7) in a dry environment needs to be well explained and justified. In fact, in these areas, flood events occur generally in most of the cases in very short periods (some hours). Therefore, even using daily averages may cause some problems with model calibration and validation!
   AC: We appreciate that ideally the use of daily information as both input and output would be preferable. Unfortunately, attempting to run the analysis at the daily temporal scale failed to achieve satisfactory results, this we feel could be the result of several factors (e.g. catchment lag, partial precipitation coverage of the catchment, data quality issues). The use of the monthly provided a more satisfactory output, we feel that this is the result of the temporally short (sub)daily precipitation being averaged over the month, removing the ephemeral nature of precipitation and subsequent river flows and sediment production. The original discharge measurements were daily and their monthly averages were calculated to match the simulation time interval.

6. **RC:** What do you mean by "Howard ´ Humphreys and Partners (1992) identify a strong log linear relationship . . .. after Tarawneh (2007)" ? (p7). May I understand that the sediment yield was estimated based on this relationship?
   AC: Yes, there are no direct measurements for the study period but the available sediment measurements (for a different period) are linked to discharge by that relationship for the purposes of designing the dam and managing the catchment. Hence, measured discharge is projected to that linear relationship to derive relevant sediment values (as the best available source of data). Equation added and text edited for clarification (section 3.7 Scenario comparisons).

7. **RC:** In Figures 3 (P24) and 4 (P25): are all these classes exist in the study watershed?
   AC: Yes, according to the cited landuse maps and general knowledge of the catchment supported by a field visit by the authors in 2013.

C. Technical comments

1. **RC:** P5 L10: Replace 'Luzio et al., 2002' by 'Di Luzio et al., 2002' (it is the same author):
   AC: Done.

2. **RC:** P5 L26: Check if it is Leon, 2007 or Leon, 2013 :
   AC: It is actually 2011 (Version 2). Edited in text and bibliography.

3. **RC:** P6 L23: Replace 'by (Neithsch et al., 2001)' by 'by Neithsch et al. (2001)'
   AC: Done.

4. **RC:** P7 L10: Replace 'see for example Zhang' by 'see for example Zhang'
   AC: Done

5. **RC:** Ageena et al (2014): not found in the text
   AC: EndNote error: Author name was missing and only years appear. Reference added properly.

6. **RC:** Ageena et al. (2013): not found in the text.

AC: EndNote error: Author name was missing and only years appear. Reference added properly.

7. **RC:** P16 L36: Check if the reference of Montheith is complete?
   AC: Reference completed.

8. **RC:** P17 L22: Check if you need to type twice 2009
   AC: Just once – edited.

9. **RC:** P17 L34: Check if you need to type twice 2008b
   AC: Just once – edited.

10. **RC:** P27: Correct 2000-200 !!
    AC: Corrected to 2003.

11. **RC:** Figure 9 (P30): Check if the scenarios 13, 18, 5 and 3 are included in the graphs!
    AC: Apologies, wrong figure was inserted – corrected now including the scenarios mentioned.