

Interactive comment on “Rainfall estimation over the Wadi Dhuliel arid catchment, Jordan from GSMaP_MVK+” by E. Abushandi and B. Merkel

E. Abushandi and B. Merkel

eyadshandi@yahoo.com

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We would like to thank Dr. Suhail Sharadqah for his insightful contribution, we take the opportunity to answer his questions and react to some of his suggestions:

1. It would be very useful to see a land use map, since the authors mentioned (page 8, line 8) the effect of land cover characteristics of dividing the catchment into two sub-catchments.

Answer: A figure of the land use map will be added to the modified manuscript. Land cover features will be derived from Enhanced Landsat Thematic Mapper Plus (ETM+) imagery (2005). The radiometric data are from 9 bands, with resolution of 15 m. The data will be digitally processed using ERDAS version 8.4 software. The classification

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process will then be supervised classification, based on ground datasets, Google earth, and our remote sensing experience

2. Bias analysis of the difference between observed rainfall and re-adjusted GSMaP MVK+ should be included.

Answer: Bias analysis will be added

3. The authors also need to note the connection between the output of this study and further hydrological studies in conjunction with climate change aspects. This should be made clear at least in the conclusions.

Answer: We will add this sentence to the conclusion: 'In a further research, a new framework of rainfall-runoff models application in arid catchment will be developed by integrating re-adjusted satellite derived rainfall dataset (GSMaP_MVK+) into these models.'

Climate change aspects: As we explained for the reviewer no 2, that the main evidence of observed climate change in Jordan is the rising of temperature gradients. However, studying the impact of climate change on rainfall variability requires long period of meteorological data. Although the GSMaP_MVK+ dataset has a short period, we do acknowledge that this particular issue should be addressed.

4. However, the authors must address the problem of the figures low resolution. The font sizes for the diagrams needs to be increased substantially before publication.

Answer: We will improve the quality of all figures and diagrams before publication.

5. It would be better if Figure 3 includes a scale bar indicates altitude.

Answer: a scale bar will be added to the figure

6. Completely agree with the authors that the over and underestimations of GSMaP_MVK+ may be influenced by different factors. Can the authors determine the factors in their special case study?

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Answer: As stated in the paper, there many reasons for the over and underestimations cited by different authors. It is challenging to point a single factor for the over and underestimations corresponding. Our next research project focuses on clouds micro-physical properties analysis (especially analysis of Dust Impacts) using MODIS imagery at 250m resolution to examine specific rainfall events derived from GSMaP_MVK+. This, will partially help us to understand the over and underestimates.

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