Hydrology and Earth System Sciences

Discussions

HESSD

Interactive
comment

Interactive comment on "Integrated Impact of Digital Elevation Model and Land Cover Resolutions on Simulated Runoff by SWAT Model" *by* Mahmoud Saleh Al-Khafaji and Fouad Hussein Al-Sweiti

Anonymous Referee #1

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In this manuscript, the authors evaluate the impacts of Digital Elevation Model (DEM) and Land Cover (LC) resolutions on runoff simulations using the SWAT model. In general, this is an important research topic because the understanding of input data uncertainty in SWAT modelling is still limited and require more evaluation. However, there are several major issues, particularly in the methodology and discussion sections, need to be resolved and clarified before the manuscript is suitable for publication. Besides that, proof-reading and English editing services are required to ensure the English of the manuscript is up to the publication standard. Please find more comments as follows:

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[Discussion paper]

1. Lines 7-8: The authors mentioned "runoff" in the abstract and objective sections, but the figure 16 shows the streamflow data. They are different hydrological parameters.

2. Lines 23-24: References are needed for the statement of "Recently, Soil and Water Assessment Tool (SWAT) is considered as one of the most useful tool for watershed modeling and management".

3. Lines 30-60: The second paragraph is too long. The authors should divide the paragraph into three different paragraphs that compile/discuss the related studies of (1) DEM resolution; (2) LC resolution, and (3) combined DEM and LC resolutions, in SWAT modelling.

4. Line 61: I don't understand the term of "agreement" in the sentence of "In previous studies there is no agreement about impact of DEM and LC resolution on simulated runoff by SWAT model". Please explain more on this.

5. Line 67: Change the "runoff simulation model" to "SWAT model".

6. Lines 78-80: Please consider to remove the sentence of "Accordingly, SWAT is considered as the efficient tool to investigate the complemental interactive effects of DEM and LC resolution on runoff simulation".

7. Lines 164-177: Why different DEM products are used in this study? Ideally, the authors should apply only one DEM product with different spatial resolutions in the evaluation. ASTER, SRTM and GTOPO 30 DEMs were generated by different sensors and approaches, so application of different DEM products might lead to misleading outputs. The authors should decide which DEM is reliable to be used in this region.

8. Lines 179-192: Similar to the comment #7. Besides that, the authors should also report the accuracy / reliability of the selected land use products.

9. Line 197: More soil information of the study areas should be included.

10. Line 199-203: Many studies found that the NCEP-CFSR product is not suitable to

be used in the SWAT modelling, particularly in the tropical and sub-tropical regions. Are there any published manuscripts can be used to prove the reliability of the NCEP-CFSR product over Iraq. Otherwise, I would recommend the authors use the ground-based climate data in the modelling.

11. Line 205: What is the time-scale of the collected runoff data? Daily or Monthly?

12. Line 213: What different threshold values are used? To evaluate the sensitivity of the input data in SWAT modelling, other settings such as HRU threshold, soil data, climate data and so on should be consistent.

13. Line 214: Why the slope is classified into five classes?

14. Lines 232-235: Repeat information as Lines 226-228.

15. Line 240: Since the authors calibrated the model, so a section about the parameters sensitivity analysis, calibration and validation should be included in section 3.

16. Lines 240-280: More discussions should be included in the section 3. For example, the authors could compare their findings with other similar studies. They should also discuss why each watershed has their own best DEM and LU resolutions. For example, Dokan watershed: DEM 90m and LC 1000m for Dokan Watershed, Adhaim watershed: DEM 250m and LC 1000m; and Duhok: DEM 30m and LC 30m.

17. Lines 271-280: Why the authors only reported the best results? A table lists the statistical analysis values of all evaluated resolution combinations should be added.

18. Line 410 (Table 3): why there are missing values in the Duhok at DEM with 1000m resolution? I don't understand the sentence of "no model in this resolution".