

# ***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***

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Comment 1:" 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." Response: The correct is stream flow. The runoff will change into stream flow in all sections of the paper.

Comment 2:" 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 tools

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for watershed modeling and management". Response: the sentence will change to "SWAT used to simulate the ecological, hydrological and environmental processes under a range of climatic and management conditions throughout the world (Gassman et al. 2007)".

Comment 3:" 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." Response: The authors agree with this note. The paragraph will divide into three parts.

Comment 4:" 4. Line 61: I don't understand the term of "agreement" in the sentence of "In previous studies, there is no agreement about the impact of DEM and LC resolution on simulated runoff by SWAT model". Please explain more on this." Response: Previous studies did not obtain a specific value or training of the impact of DEM and LC resolution on simulated runoff by SWAT model.

Comment 5:" 5. Line 67: Change the "runoff simulation model" to "SWAT model". Response: The authors agree with this note

Comment 6: " 6. Lines 78-80: Please consider to remove the sentence of "Accordingly, SWAT is considered as the efficient tool to investigate the complementary interactive effects of DEM and LC resolution on runoff simulation". Response: The authors think that it is an important sentence.

Comment 7 and 8:" 7. Lines 164-177: Why different DEM products are used in this study? .....DEM is reliable to be used in this region." And " 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. Response: Satellite products have a single spatial resolution for DEM. While for LC, only MODIS produces LC with different spatial resolution. The study did not find data for the same satellite with different resolution. Therefore, the study tested the ability of spatial resolution and product in

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general.

Comment 9:" 9. Line 197: More soil information of the study areas should be included." Response: The authors think that all the necessary information was included in the paper.

Comment 10:" 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." Response: Many studies (mentioned in the paper) proved that the CFSR is suitable for streamflow simulation using SWAT model Such as; Fuka (2013) and Tomy2016. Fuka (2013) Said that " SFSR weather data are suitable in un-gauged watersheds" and he suggested not to address the inaccuracy of CFSR data in using SWAT Model because it has no considerable effect on the results of a comparative study within watersheds of the same features. Also, the authors study the effect of the spatial resolution of DEM and LC for the same weather data.

Comment 11:" 11. Line 205: What is the time-scale of the collected runoff data? Daily or Monthly?" Response: The time-scale of the collected runoff data is daily.

Comment 12: " 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." Response: The HRU threshold was considered in the paper.

Comment 13:" Line 214: Why the slope is classified into five classes?" Response: Usually, the slope is classified based on modeller experience and progressively checked.

Comment 14:" 14. Lines 232-235: Repeat information as Lines 226-228." Response: The repeated information will remove.

Comment 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." Response: In this study, 60 scenarios were considered. All these scenarios were calibrated and validated. For each scenario, there are 13 parameters. Therefore, it is very difficult to include all these data in the paper. Just the results of the calibration and validation of the best-accepted scenarios were listed in the paper.

Comment 16: " Lines 240-280: More discussions . . . . . DEM 30m and LC 30m." Response: The answer is presented in lines 295 to 301.

Comment 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." Response: It is a very good note. A table of statistical parameter NSE and Rsq can be added.

Comment 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"" Response: Because Duhok watershed has a small area (133 km<sup>2</sup>). Therefore, the boundary and valleys of the 1000 m resolution DEM cannot accurately obtain. On the contrary of LC which is based on the type of land cover within the watershed which is specified by using DEM based method.

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