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Determination of the Best Model to Estimate Suspended Sediment Load of Abshine Watershed Dam Hamedan

Alireza Ildoromi[1*], Mehran Mohammadpanahe Moghdam[2]

1- Associate Professor of Geomorphology, Faculty of Natural Resources and Environment, Malayer University
2- M.Sc, Rangeland and Watershed Management, Faculty of Natural Resources and Environment, Malayer University

1-Introduction

At present, it is important to accurately predict the hydraulic parameters of flow and sediment for better operation and management of rivers.Today, quasi-two-dimensional mathematical models have been widely used as an optimal and efficient solution in the hydraulics of river flow and sedimentation Zahiri et al. (2018). Mathematical models are one of the most important and accurate tools for predicting the amount of sedimentation in riverbeds and dam reservoirs, which are based on the equations governing the phenomena affecting the transfer, sediment accumulation. Gholami,et al. (2017).

Raeisi et al. (2019), in examining the temporal phenomena of the sediment measurement curve and comparing it with several statistical methods to estimate the suspended sediment load of Gamasiab watershed, showed that the time series model of the transfer function compared to other models used has higher performance.

Lai et al. (2019) in a study of the capacity of current and sediment transfer with 3D model for open surface channels showed that the model of good simulation between flow and sediment for forecasting is presented and is well matched with experimental data.In the present study, an attempt has been made to examine and determine the most appropriate models for estimating the suspended sediment load of the watershed of Hamedan River by using different models.

2-Methodology

Abshineh basin is located in the southeast of Hamedan city and its river regime is under the semi-humid cold mountainous snow-rainy and permanent climate.In this study, the amount of sediment yield of Hamedan Abashineh dam watershed using USBR models, the middle curve of the categories Seasonal measurement curve and FAO method were estimated and while direct sampling of suspended load, the selected model by

* Corresponding Author; **E-mail**:Ildoromi@gmail.com

logarithmic conversion error correction method (CF1, CF2) and GS + model were statistically analyzed and evaluated.

3-Results and Discussion

Examination of CF1 and CF2 correction coefficients shows that the FAO method has evaluated the amount of suspended sediment over time better than the two linear USBR methods and the intermediate method with the least amount of error.In the model without data segmentation, the FAO method with the lowest relative error percentage and the mean power of the second error was selected as the optimal method, and the similar hydrological period method was selected as the most inappropriate method for estimating suspended sediment in the basin. The results show that the USBR method follows the normal distribution to some extent and the FAO method follows the perfectly normal distribution.The results of data analysis in Kriging method show that the regression line fitted in USBR method is not well adapted and could not provide a complete analysis of sediment observation data. However, in the FAO method, it is observed that the computational data have a high and good agreement with the fitted regression line.

The results showed that FAO method, due to considering more parameters in boundary conditions and the lowest amount of correction coefficients of CF1 and CF2, estimates the amount of suspended sediment with the least amount of error compared to other methods over time with more acceptable accuracy and efficiency.Also, the results of the Gs + model show that the FAO method calculates suspended sediments more accurately in terms of tons per day and has more fit and consistency with the observed sediment values, and the USBR method has the least fit.

4- Conclusion

The output results of Gs + model and comparison of suspended load estimation in models show that FAO method due to more compatibility and accuracy, more accurate sedimentary fit with observational data and with least error, as the best model and USBR method with matching and fitting Less with observational data in the next degree and similar hydrological period with the highest relative error percentage of 100.34 and low correlation coefficient were selected as the most inappropriate method for estimating suspended sediment in the basin.Reviews show that hydrological models had different results than each other. So that in the model without data segmentation, FAO method compared to other methods with the lowest percentage of relative error and the average power of the second error as the optimal and appropriate method of more

accuracy and efficiency for estimating suspended sediment in a modified form in the Abshineh basin Hamedan.

Keywords: Suspended load, FAO model, USBR model, sediment rating curve, Abshineh Watershed, Hamedan

5-References

Gholami, L., Ghorghi, H., Abdollahi, J., Khaledi, Z., & Darvishan, A. (2017). Comparison and evaluation of suspended sediment estimation methods using data classification (Case study: Doork Merk, Shirgah and Krikla water stations), *Journal of Water Resources Research Iran*, 13(3), 187-193.

Lai, Y.G., & Wu, K. (2019). A Three-Dimensional Flow and Sedimen Transport Model for Free-Surface Open Channel Flows on Unstructured Flexible Meshes, *Fluids*, 4(1), 18-28.

Raeisi, M., Najafinejad, A., & Azim Mohseni, M. (2019). Investigation of time phenomena of sediment measurement curve and its comparison with several statistical methods for estimating suspended sediment load (Case study: Gamasiab watershed), *Journal of Basin Management Watershed*, 20, 83-96.

Zahiri, A. R., Qoli Nejad, J., & Dehghani, A. (2018). Calculation of transverse distribution of river sediments using a quasi-two-dimensional mathematical model (Case study: Qarasu River), *Journal of Water Resources Engineering*, 11(38), 83-93.