**Performance evaluation of EPM and MPSIAC Models for determination of Erosion Status of Shahriari Watershed**

**Extended Abstract:**

Soil erosion is one of the most important issues in arid and semiarid regions and has a great impact on soil quality, quantity and productivity and ultimately desertification processes that this is mainly due to land use change, overgrazing, poor agricultural practices and low soil depth. Also soil erosion is one of the most important environmental issues in developing countries, including Iran that there is inaccurate information about its amount and distribution. For this purpose, the accuracy and distribution of erosion classes obtained from EPM and MPSIAC models as compared to BLM as ground truth values were evaluated in Shahriari watershed. First, the required data and information for MPSIAC, EPM and BLM models for basin erosion status such as: physiographic maps, hydrological units, Stream network, slope classes, geomorphology, geology, erosion susceptibility units, rock units, soil hydrological groups, vegetation type, land use map collected and it was stored in a database. Then, using ARC/GIS9.3 software, erosion class maps were prepared based on each model formula and they have been intersected with the ground-truth map. Also a point map containing 1400 random points was also prepared for sampling the maps obtained from the models. Then, based on random sampling points map, each of the statistical indices of RMSE, RRMSE, MAE, MBE, NSE, CD, CRM and MSE were calculated. Also, to verify the spatial accuracy of the erosion class maps derived from the error matrix models and the Kappa coefficient of agreement, overall accuracy, producer accuracy and user accuracy. The results showed that land use, land cover and surface erosion factors of the MPSIAC model are also factors affecting sediment yield, with the values of 17.4, 9.6 and 8.4 respectively, the highest values of the nine factors of the MPSIAC model were obtained. The results of EPM model factors also show that the coefficients of resistance of rock and soil to erosion, land use coefficient and slope factor are 1.21, 0.47 and 0.29, respectively. The results of the erosion of the models showed that the mean erosion intensity in MPSIAC model was 589 and in EPM model 287 m3/ km2.year that the basin erosion status is estimated to be moderate for the basin with the help of MPSIAC model and EPM model. Also the maps prepared for the two MPSIAC and EPM models showed differences and similarities. In the MPSIAC model, the distribution of erosion classes is mostly in 3 and 4 classes but in the EPM model it is mostly in 3 and 2 classes that this could be due to the influence of different layers used by the two models and the variety of conditions in these areas. The analysis of the above statistical indices shows that the RSME, MAE, MBE and MSE statistics in MPSIAC model have lower values. As a result, the MPSIAC model has less error than the EPM model. Also, evaluation of Nash and Sutcliffe's efficiency coefficients in two models showed that MPSIAC model is higher which indicates a better performance of this model in estimating erosion. CRM statistics also show that the CRM of the EPM model was negative and the erosion estimate by this model is overestimated. That is why the MPSIAC model is superior to the EPM model. Overall, the results of the statistical indices showed that the MPSIAC model's erosion classes were more in line with the BLM output (as a ground truth map) than the EPM model. The results also showed the accuracy of MPSIAC and EPM models in the error matrix that is, the manufacturer's accuracy for the MPSIAC model triple is 97.97% which shows that in 97.97% of Class Three estimates, there is a ground truth (BLM) MPSIAC model and the model also has good overlap with the BLM (reference). The accuracy of the classifier of the three EPM models also shows that 79.61% of the estimation of the EPM model is ground-truth in the event that the user accuracy for the above scenarios is set to low values. Also the kappa coefficient in MPSIAC is higher than in EPM model, therefore, the accuracy of the MPSIAC model erosion classes with the BLM (ground truth) model erosion levels is higher than the EPM model. Overall, the results show that the MPSIAC model erosion class maps overlap with the BLM model and in fact with the actual conditions of the area. These results are from the data of this region and are applicable to similar regions. Finally, it is recommended that further research be carried out in different areas in terms of climatic characteristics, morphology and land use.

**Key Words:** Kappa coefficient, Accuracy of erosion classes, erosion, BLM, Shahriari, Spatial accuracy, MPSIAC