Evaluation of the Performance of SDSM and LARSWG Statistical Downscaling Models for Quantitative Screening in Predicting Climate Scenarios (Case Study: Dust Center South and Southeast of Ahvaz)

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1-Introduction

Climate change is a complex atmospheric-oceanic phenomenon on a global scale. This phenomenon leads to improper distribution of climatic factors, spatial and temporal heterogeneity of rainfall, changes in water and soil resources quality, and finally, erosion and destruction of lands. Therefore, proper simulation and analysis of the effects of climate change on the management of water and soil resources in the region and accurate estimation of land degradation in future periods are significant. Therefore, this study was conducted to predict the effects of climate change on land degradation and the development of dust centers in the future. Climate change and global warming are among the most important factors affecting the degradation of water and soil resources in arid and semi-arid regions, which increases dust. This study aimed to evaluate the performance of two statistical downscaling models of SDSM and LARSWG for quantitative screening in predicting climate scenarios and climate change in the dust center of south and southeast of Ahvaz.

2-Methodology

In line with this goal, one of the three-dimensional paired oceanic models - AOGCM atmospheric general circulation called HadCM3, simulate the time series of climatic variables such as the temperature, wind, precipitation, and evapotranspiration; Under the B2 and A2 emission scenarios, it was used in the future period (2042-2002 and 2083-2043) compared to the baseline period (1961-2001). The study area was concluded in the dust center No.4, in the southeast of Khuzestan province, located in the Ahvaz- Mahshahr

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plain). In order to downscale the climatic of daily data to produce climatic scenarios, the downscaling models of SDSM and LARS-WG were used.

3-Results and Discussion

The results showed that the simulated data of both models, compared to the observed data, were significant compared to the long-term mean of the base period and had a high correlation with a high coefficient of determination (R^2) for all parameters from 0.87 to 0.98. The results showed that the difference in the long-term average between all parameters in Ahwaz station under climatic scenarios shows that the value of the studied parameters increases in each decade compared to the previous decade; this increase for the minimum and maximum temperature parameters is 0.61 and 2.1 C, respectively. The Eva-transpiration parameter show will increase by 0.78 shortly compared to the base period, and the distant future will increase by 1.56 mm per day compared to the base period. The Rainfall parameter will increase soon compared to the base period of 11.78, and the future of the round will be 15.6 mm per year.

4-Conclusions

Finally, by confirming the existence of climate change in Khuzestan province and especially in the critical dust center of south and southeast of Ahvaz, SDSM model due to direct use of HadCM3 models and large scale NCEP data and the type of simulation process and also Combined structure in data mining scale with RMSE, MAE and ME 0.97, 0.18 and 0.021, respectively; has higher accuracy than LARSWG model in simulating climatic data in the dust center of southern Ahvaz. The SDSM model was also more successful in simulating daily temperature data and wind speed, and the LARSWG model had a better prediction of the daily precipitation parameter.

Keywords: Climatic Models, Scenario, HadCM$_3$, Downscaling, Dust center, Ahvaz.

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