Desert Ecosystem Engineering Journal

University of Kashan

Evaluation and Regionalization of Climatic Comfort in South & southwest of Iran by Comparison of Bioklima Model Indices

Akbar shaemi barzoki*[1], Nasrin Nikandish[2], Aboalghasem mozafari[3]

Extended Abstract

Introduction: Climate conditions are the most important factors affecting human activity on short- and long-term scales. The study of the effect of climate conditions on human life and behavior investigate in the branches of science called human bioclima. The condition of comfort is a set of conditions that, in terms of heat and humidity, at least 80% of the individuals randomly selected and placed in those conditions have mental judgment of comfort. Climate comfort models are considered as useful tools for illustrating the interactions of environmental stressors and human responses that are expressed in terms of empirical classification. In the present study, we try to determine the spatial and temporal patterns of climatic comfort in southern Iran and the ability of bioklima model indices to detect it.

Materials and Method: In this research, the methods of analysis of bioclimatical indices have been used. Initially, monthly average temperature, relative humidity, wind speed, water vapor pressure and cloud cover data of 39 synoptic meteorological stations in southern Iran were collected from the Meteorological Organization during the period 1988 to 2017. In the next step, the above datas was arranged by using Excel software. Then with using of biklima software comfort indices (UTCI, PHS, SST PST, STI, and HIS indices) calculated and graphs are plotted by using Excel software. In order to zoning the studied area, we using the correlation between bioclimatic indices and height in ArcGIS software and in the Geostatical Analysis. The bioclima model was developed by Professor Christoph Blansky in 2003 that includes various indicators of human bioclimate. By using this model, we can calculate 60 variables related to biomclimate and thermal physiology. Its input data includes two groups of meteorological data and data related to human physiology conditions.

Results: Analysis of the outputs from the implementation of the bioklima model shows how the heat sensation

in different months at each station is based on the six indices of the bioklima model separately. Qualitative evaluation of the results of the bioclima indices in the South & southwest in spring shows that the output of the SST and PST indices are more consistent and the STI and HSI index have the least consistency with other indices and because their output reflects geographical realities, especially topographic diversity. On the contrary, PhS, SST and PST indices reflect the better picture of climatic comfort at this season. A qualitative assessment of the results of the benchmark indices in the study area in the fall season shows that the SST indices reflects a better picture of climate comfort. On the contrary, HIS, STI and PhS indices are not fully effective in reflecting climate realities. The results of this study indicate that HSI and STI indices are not suitable for reflection of climatic comfort conditions in winter. Conversely, the pattern of zoning from the SST index shows that this index is more effective in reflecting the regional climatic realities.

Discussion and Conclusion: In this study, by using the six bioclimatic indices of the bioklima model, the bioclimate condition of south & southwest of Iran was analyzed at monthly and seasonal in 7 southern provinces of Iran. The results of this study show that spatial and temporal patterns of thermal comfort do not correspond to each other. Increasing the time of climate unhealthy conditions in the warm season of the year and Low altitude areas & lower latitudes reveals the combined effect of these factors in creating the above conditions. Maximum annual thermal comfort conditions in southern Iran is during the cold period of the year. Also, seasonal patterns indicate that there is maximum comfort in the high areas and Zagros region at period of warm. This condition confirmed in southern coasts and the Khuzestan plain in cold period of the year. Seasonal evaluations of the thermal comfort by apply of six indices of the bioklima model are not match with together, therefore application of these indicators are requires localization and calibration.

Keywords: Comfort climate, zoning, bioclimate indices, Iran.