

Bioclimatic classification of Chahar-Mahal & Bakhtiari province using multivariate statistical methods

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Abstract

The temporal and spatial vegetation dynamics is highly dependent on many different environmental and biophysical factors. Among these, climate is one of the most important factors that influence the growth and condition of vegetation. Of the abiotic factors affecting the geographic distribution of vegetation type, climate is probably the most important. Ecological research has traditionally aimed to generalize vegetation types that are assumed to be homogenous. Most of climatic classifications related to bioclimate are focused on limited climatic factors such as temperature, precipitation and combination of them. As climate is a compound phenomena using limited factors cannot show the climate of a region, and as a result most climatic factors must be considered in bioclimatic classification. Therefore, a climatic study using various climatic factors could reveal the effective factors in distribution of vegetation. In order to determine bioclimatic zones in Chahar-Mahal & Bakhtiari province using multivariate statistical method, 71 climatic variables, which were more important in plant ecological conditions, were selected and evaluated by the factor analysis. The factor analysis revealed that the first three factors which explain %91.8 of total variance among the selected variables were temperature, precipitation, and radiation. According to results and using hierarchical cluster analysis in Ward's method, bioclimatic classification in Chahar-Mahal province was carried out and 5 bioclimatic zones were found. In addition, Chahar-Mahal province was classified by 4 traditional climatic classification methods (Koppen, Gaussen, Emberger and De Martonne) and those classes were compared to climatic classes obtained by multivariate statistical method. The latter comparison was suggestive of the fact that multivariate statistical method provides a more appropriate classification in comparison to the traditional methods, specially because more dominant vegetation species could be defined for each of the newly described climatic classes. Furthermore, dominant species were determined for each climatic region.

Keywords: Bioclimatic classification, Multivariate statistical methods, Factor analysis, Cluster analysis, Chahar-Mahal & Bakhtiari province, Vegetation

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