Spatial Analysis for Production of Climate Classification Maps, West Part of Urmia Lake

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Extended Abstract

Introduction

In the modern era of communication, by increasing population the resources would be relatively scarce. Therefore, in order to deal with environmental serious problems and complex human-climate relationship in all dimensions of spatiotemporal and land use planning and programming practices, the climatic zone map was a sustainable developmental tool in the study area.

Methodology

The climate zones are recognized by investigating the analysis of various climatic factors, different empirical methods and spatial and nonspatial quantitative methods. The natural environmental areas have differential climate zones. Accordingly, different climate zones of Iran especially climate factors and local variables are neither studied nor recognized. Hence, the main purpose of the present study is to produce climate zones map of west part of Urmia Lake by the simultaneous analysis of spatial and nonspatial climate data. West area of Lake Urmia is studied in the present paper as a region of environmental problems; it is the main part of Urmia Township that contains Urmia city. This is the largest and capital city of West Azerbaijan Province. Various climate factors whether of local or global influences affect formation of climate types in the area. Inherent factors are (or genetical) global wind systems like westerlies, polar cell systems and complex local natural circumstances, vegetation cover, superficial water resources, elevation, geomorphology and topographic conditions, geographical directions, and geographical latitude and longitude. Climate producer factors have different properties. Accordingly, analyses of the obtained data are very difficult, so the spatial analysis methods are

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proposed as powerful tools for simultaneous analysis of the different data. In this research, diverse climate data and factors from various resources in different stations of the studied area such as Urmia, Naghadeh, Salmas, Oshnavieyeh, and kahriz together with height and geographical directions data have been analyzed to produce map of different climate zone. Hereby, analysis of different types of data such as spatial and nonspatial data is one of the most difficult challenges in climatic researches. In order to solve this challenge, GIS spatial analysis techniques, spatial and multivariate analysis algorithms such as Maximum Likelihood analysis (MLS), Principal Component Analysis (PCA) and Iterative Self Organizing Data Analysis Technique (ISO data) have been used to analyze different types of data. Structure of variables has been verified by application of the multivariate analysis of PCA method. The number and nature of the factors have also been analyzed to specify the rate and find out how they are affected by climate properties of the study area. By using PCA methods the effective factors have been employed to determine contribution rate of each factor in development of climate area.

Results and Discussion

The results show that there are 4 different climate types: mountainous cold, wet, semi – wet and semi – arid climates in the west part of Urmia Lake area. It is also shown that the local factors (such as height, geomorphologic features including aspect, slope, spatial arrangement of mountains and etc. under the control of external factors such as west, north and southwest wind systems entering into the area, play an important role in the formation of climate types. They also act as a reinforcement or adjustment of climatic conditions. Here, in survey of the present study, the term of named as morpho–climatic subject is as a new phase in studies of climatology.

Conclusion

Investigation of the results shows that the local condition and factors like geomorphology and topographic characteristics of a region in different scales under the control of external factors such as west, north and southwest wind systems play an important role in development of different climate types such as different patterns of the micro regional and local climates. This can be concluded that climate properties are developed by the influence of both geomorphologic and weather conditions of a specific region.