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# Study of the relation between NCPI and CACO indices with autumn precipitation of Southern Coast of Caspian Sea

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## Abstract

In this research, the relationship between NCPI and CACO indices with autumn precipitation of Southern Coast of Caspian Sea (SCCS) was investigated. In this regard, two sets of data were used (Aphrodite and Station). And the days with more rainfall than long-term average rainfall station and on condition that the rainfall is more than 70% of the region rainfall, were chosen as a day of widespread rainfall. The sea level pressure data was extracted and by cluster analysis and coalition method was clustered. Then, a representative of the widespread precipitation days from station dataset was selected, investigated and analyzed accordingly. The results state that within all patterns there exists a high pressure on the upper side of the Caspian Sea, or a margin of high pressure is extended on to the sea itself. These high pressure regions have relatively cold nature that can cause currents in the northern direction while intersecting with the relatively warm water during the summer. These currents can absorb moisture during their motion towards south which can lead to their instability. In addition, one should not forget the fact that in each three investigated patterns, dynamic factors at high levels have intensified the abovementioned phenomenon and enhanced the instability, which as a result brought about widespread precipitation. Continuously, the abovementioned Remote bond indices were extracted on a daily basis and their relation to north coast widespread rainfalls was studied, which came to a meaningful relationship between these index sets and fall index sets. The relationship is direct with NCPI or surveyed stations, and it's an inverse relationship with CACO. On the other hand, the study of indexes anomalies on the days without rainfall and with rainfall was done by One Way ANOVA and Tukey test. The result was a meaningful index anomaly on the days with and without rainfall.

**Keywords**: Caspian Sea widespread precipitation, widespread precipitation patterns, Telecanection indices, NCPI, CACO

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# Effects of Global Warming on Iran's Temperature Changes under Dynamic Model EH5OM

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## Abstract

The aim of this study was to investigate the effects of global warming on where the slope changes when the monthly temperature in Iranian territory over the coming decades (2050-2015). The simulated temperature dynamic model EH5OM subset Hybrid Models atmospheric circulations (GCM) selection and data model of the Center for Theoretical Physics Salam (Italy) were derived from emission scenarios A1B scenario was chosen given the scenario of 2100 -2001 found that from 2050 to 2015 were used in this study data is then output the data in the fourth edition of the regional climate model (RegCM4) Linux environment was fine scale output data Downscaling model with dimensions of 27/0 * 27 / Degrees latitude is where the dimensions of 30 x 30 km area of approximately cover the average temperature of the matrix deals 13140 2140 * was extracted. Finally, the slope of the average monthly temperature during the period under study by Mann-Kendall slope age and matrix computation in MATLAB software 13140 * 12 respectively. Results show rising temperatures in March and April to June, more than 90% of the country, that it will be spring's warmer. Increasing the temperature in the winter months and spring mountainous parts of the western half of the country is warming the cold regions of Iran. Temperature negative trend in October and November in the northern part of the eastern half of the region's countries could be indicative of colder temperatures in the northern West.

**Keywords:** temperature, process, Mann Kendall, regional climate models, Iran

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# Analysis of the Spell of Rainy Days in Lake Uremia Basin using Markov Chain Model

(Manuscript received: August 23, 2016, in final form: January 9, 2017)

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## Abstract

In this study, the Frequency and the spell of rainy days was analyzed in Lake Uremia Basin using Markov chain model. For this purpose, the daily precipitation data of 7 synoptic stations in Lake Uremia basin were used for the period 1995- 2014. The daily precipitation data at each station were classified into the wet and dry state and the fitness of first order Markov chain on data series was examined using Chi-square test at a significance level of 0.01 and was approved. After computing transition probability matrix, the persistent probability, average spell of dry days and rainy days and weather cycle was calculated. By calculating the frequency of 1-10 rainy, the spell of this periods and 2-5-days return period were calculated. The results show that in this study period the average of rainy days is 25% and the probability of $P_{dd}$ is more than other states ($P_{ww}$ ، $P_{dw}$ و $P_{wd}$). The average spell of rainy days in the study area was estimated at about two days. Generally, in all stations the persistent probability of wet state is more than rainy state. Estimation of frequency and spell of rainy days and 2-5-days return period show that with increasing duration, the frequency of rainy days decreases. Also with increasing duration of rainy days, their spell is reduces and return period increases.

**Keywords**: Rainy days, probability of occurrence, Markov Chain Model, Lake Urmia Basin

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# The scrutiny of geomorphologic effects of Armaghankhane and Taham faults

(Manuscript received: June 2, 2014, in final form: January 17, 2017)

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## Abstract

One of the unique properties of northern landforms of zanjanrood catchment is having smooth surfaces that have been interrupted by deep valleys. Rivers that don't have a wide catchment upper their front mount are running in parallel deep valleys that the topographical situations don't let them to receive around surface runoffs. This situation has made them to move in parallel form and not to join with each other. In some parts of sub basins, the water dividing line had been incorporated with the beach of main river valley (Sohrein River). The extent of catchments upper the mount front is not in a situation that let to dig valleys that sometimes exceeded to hundreds meters deep. These valleys had kept their primary height differences than it's around. According to these properties, the style of formation and their evolution was considered as a geomorphological point. To get the answer, topographic and geologic maps and satellite images was made, and traced the geomorphologic effects of faults and corrected in different field works. Evaluation of tectonic activity in area, have been estimated by using Morphtectonics indicators of asymmetric factor (Af), integral hypsometric curve (Hi), valley floor width-to-height ratio (Vf) and transverse topographic (T). Relative Active Tectonics Index (LAT) showed the whole basin high activity (class2). Based on the Af index uplift have been attributed to the right bank in Sohrin and Sarmsaqlv basins and in Qracharian sub-basin to the left bank. Which states that the center of Neotectonic power center located in the place between the three sub-basins?

**Key words**: Homayoon fault, Pressure phase, Tensional phase. Zanjan, Sohrein.

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# Spatial analysis of annual precipitation of Khuzestan province; An approach of spatial regressions analysis

(Manuscript received: October 25, 2014, in final form: December 10, 2016)

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## Abstract

Knowing of precipitation values in different regions is always of main and strategic issues of human which has important role in short- term and long-term decisions. In order to determine of precipitation model and forecasting it, there are different models, but given that the precipitation data have a spatial autocorrelation, the spatial statistic is a powerful tool to recognition of spatial behaviors. In this research, for determine of precipitation model and predicting of it with geographical factors e.g. altitude, slope and view shade and latitude- longitude by using spatial regressions analysis such as ordinary least squares (OLS) and geographical weighted regressions(GWR), 13 synoptic stations of Khuzestan province from establishment to 2010 were used. Results showed a powerful correlation between precipitations with geographical factors. Also results of modeling through OLS and GWR representative that forecasting of GWR is close to reality, so that in GWR, the sum of errors of residuals is less, the $R^2$ is more and there aren't any spatial autocorrelation in residuals and the residuals are normal. The $R^2$of OLS can only justify 75 percent of precipitation variations with spatial factors while in GWR this quantity is 82- 97 percent. Accordingly, it was found that, in east, northeast and north of province the altitudes, in east and northeast and Zagros Mountains the view shade and slope are the most important spatial factors, respectively.

**Keywords**: Spatial autocorrelation, OLS, GWR, Khuzestan precipitation.

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# Evaluation of the influences of housing quality in rural settlements vitality Khawmirabad county, Mariwan township

(Manuscript received: May 8, 2015, in final form: December 23, 2016)

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## Abstract

Research goall is survey in the situation of quality of housing and rural vitality and survey of relationship of housing quality and vitality of rural settlements. The population of research is Khawmirabad county (Kurdestan Province, Mariwan Township) with 2737 households. Research method is analytical –description based on questionnaire and it is applicable research . In order to gathering the data we used documentary and field method and interviews and questionnaire based on Likert scale(five – range opinion)has been used. In order to sampling we used random sampling and by using of Cochran formula that sample size is equal to 290 households. In order to analysis of data's from questionnaire, we used both of Descriptive (mean and deviation) and Inferential(One sample T, Linear regression, Chi- square) Statistics. The results of this study indicate a low level of economic dimensions (2.34) and political (2.97), vitality and quality of housing than the average (2.74). This difference is statistically significant at the alpha level 0.01 numerical difference utility as evaluation and assessment is negative. The results also show that the greatest impact of the quality of housing is on the social dimension with a beta coefficient of 0/570 and the lowest on the economic dimension with 0/077 beta coefficient.

**Key words:** Rural Housing, Housing Quality, Rural Vvitality, Rrural Development.

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# The Effect of Rural Guide Plan on Objective Quality of Life among Rural Communities in Fariman County

(Manuscript received: April 11, 2016, in final form: November 17, 2016)

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## Abstract

The rural guide plan is the most important tool in the management of rural development in Iran. The final purpose of the plan, improvement of life quality and providing a safe and attractive environment to live in rural areas. The aim of this study is to emphasize the characteristics rural guide plans, which include: Improve the quality of housing, street network, land use and access to services, environmental rural its effects on the objective quality of life of the villagers tested. The research method in present study was functional in terms of purpose, and analytical-descriptive and solidarity methodologically. The study population was selected from 22 villages in which guide plan had been implemented, among them 8 villages with a population of 3835 households was selected by using sampling method. From the selected villages by using sampling method (Cochran), 249 randomly selected rural households were interviewed. Data collected from the questionnaires, were analyzed using the statistical analysis methods in SPSS, and Fitness model search EQS software. According to the results of Pearson's correlation tests, the findings of present study showed a significant and strong correlation between implementation of rural guide plan and the mental facet of life quality by a 0.75 correlation coefficient, so that rural guide plan explained 57% of the variation of dependent variable, and among guide plan dimensions the changing environmental rural affected the objective improvement of life quality of villagers by 29 percent. There is a direct and complete correlation in spatial distribution of relationship between the implementation of guide plan and the objective quality of life in 8 study villages.

**Keywords:** Life quality, objective indicators, rural plan, path analysis, Fariman County

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# Landfill site selection by emphasizing on Hydro geomorphological - ecological parameters in Shahroud-Bastam watershed

(Manuscript received: March 4, 2014, in final form: January 15, 2017)

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## Abstract

Municipal solid waste (MSW) is the natural result of human activities. If an appropriate management system do not use to this problem, it may lead to environmental pollution and jeopardize the human health. Landfill site selection in urban areas is a critical issue due to its huge impact on the economy, ecology, and the environmental health. Therefore, numerous criteria must be considered and the selection process is a complicated since it has to integrate social, environmental and technical parameters. In this study, the most suitable candidate sites for locating landfill in Shahrood-Bastam watershed, as a case study area are determined by using an integration of the Geographical Information System (GIS) and Multi Criteria Decision Making (MCDM) methods. For this purpose, 12 data layers including Elevation, Stream density, Fault density, Habituate density, distance to road, plan curvature, lithology, slope, Temperature, soil, land use and distance to protected area extracted with Arc GIS 10.1 are prepared and one of MCDM methods which is Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) is implemented. For determination of criteria weight, analytic hierarchy process was used. Lithology, land use and slope criteria with the highest score (0.24, 0.18, and 0.14) had the greatest impact on landfilling. The results showed that, zone 2 for the reason of low fault and drainage density, suitable distance of Urban areas, appropriate slope, topography and lithology has obtained the lowest Euclidean distance from ideal positive (0.026), the highest Euclidean distance from ideal negative (0.228), and the lowest relative distance from the ideal solution (0.894), as a result, The greatest weight and highest priority is allocated for landfill. The results of this research will be fruitful in systemic management approach of urban regions.

**Keyword:** TOPSIS, Shahrood-Bastam watershed, AHP, Site Selection, solid waste.

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# The role of topography on the simulation of Sistan wind structure in the east of Iranian Plateau using RegCM4

(Manuscript received: July 2, 2016, in final form: January 7, 2017)

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**Bohloul Alijani**: professor in climatology, faculty of geographical science, Khawrizmi University, Tehran, Iran

## Abstract

In this study, the interaction between atmosphere and earth surface and its effect on the simulation of Sistan wind structure in the East of Iranian plateau is investigated. For this purpose, four experiments have been carried out with RegCM4, with horizontal resolution of 20 km. In non-topography experiments, the model was implemented in three different conditions. The results indicated that the Sistan wind is a multi-scale climate phenomenon which will be affected by topography both in wind intensity and in wind direction in the lower troposphere. In the synoptic scale, the pressure gradient which dominates between Pakistan heat low and the Turkmenistan anticyclone (Caspian Sea high pressure) can create a large scale background northerly flow in the lower troposphere which will be passing through the whole area in the east of Iranian Plateau. Furthermore, in meso to regional scales, the topography of the area would be responsible for creation and maintenance of a Low Level Jet (LLJ) through a mechanical and thermal forcing. the mechanical forcing of mountains are responsible for appearance of two LLJ cores across eastern borders of Iran which their preference locations would be around Atishan Desert in the north and upstream of Hamon Lake in the south. As a general result, by eliminating the topography in all non-topography experiments, the LLJ core will disappear on upstream of Hamon Lake as the most important mechanical forcing of the mountains. However, eliminating only the southern Khorasan Mountains will accelerate the north LLJ core in the Atishan Desert, while the LLJ core on the upstream of Hamon Lake will disappear over the Iran Borders at the same time. To evaluate the influence of thermal forcing of the mountains on Sistan wind structure, the total heating, as a residual term of thermodynamic equation, is calculated. The results indicate that mountains have a significant role to building a local low level circulation in the east of Iranian Plateau.

**Key Words:** Sistan Wind, Multi-scale phenomenon, Background flow, Topography, RegCM4

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# Modeling feasibility and prediction of minimum and maximum temperature in Iran by bettitt and Holt-Winters methods

(Manuscript received: September 7, 2014, in final form: December 24, 2016)

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## Abstract

Air temperature is one of the most frequently used parameters in the assessment of climate change at global and regional scale. So researchers have tried to modeling and predicting it with different models. This study also aims to model and predict the country's monthly minimum and maximum temperature. Investigates of temporal temperature changes is done by Sen's estimator and Pettit method and predicting made by Holt-Winters model. The results indicated that the minimum temperature during 1961 to 2010 increased by 2.9º C . This rate is more in stations located in the warm and dry regions (3.1°C) than any other stations (1.8°C). While the maximum temperature gradient changes are lower and is about 2.1°C. The results also confirmed the performance of Holt-Winter's forecasting model. Beside a few exceptions, the minimum and maximum temperature will be increased until 2020. The highest increase of temperature will occur in Khoy, so that the minimum and maximum temperature will be increased about 0.6°C and 0.28°C, respectively.

**Key Words**: Temperature Predicting, Minimum and maximum temperature, Sen's estimator, Pettitte, Halt- Winters model

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