APPLIED CALCULATING WAY OF FACTOR ANALYSIS IN IRAN'S GEOLOGY AND TECTONIC STUDIES

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Abstract

Among different statistical methods factor analysis has been extensively used for analyzing the relationships between quantitative variables. In this research, the relationships between some geological and geophysical quantitative variables showing tectonic characteristics of Iran, was studied. for this purpose, the Iranian region was divided into 159 equal area quadrangles. Then, the value of 28 quantitative geological and geophysical varibles were calculated and recorded for each quadrangle. After that, the obtained multivariate data matrix was analyzed using factor analysis method. The results obtained show that factor analysis technique can reliably be used for identifying the structure of geological and geophysical variables, as well as grouping them, in particular, when variables are highly correlated with each other .

Introduction

Statistical method functions analysis, is one of the various variables statistical methods, which in worthyof attentional have used in different science branches .

Although, in recently decades using the method greatly have increased in geology data analysis, so then among researchers, in company about it, can without no failore, don't have use in geology data analysis .

In the other hand, many researchers thought use of the method. in geology study, because theorical complex must to be precautious, but use, it may be to go astray.

(Matalas & Reither, 1967; Temple, 1978).

the research such object study of Iran techtonic efficiency, functions analysis method in geology data description to assess and ability of data structore detectively .

Method theory

In the many of papers and seientific journals to be published in detail explained functions statistical method theory for this, variables definde such as linear components of imaginary compilations, name of functions .

In totally, we could be abstracted operate the functions analysis statistical method. The formula $y_{=}(y_1, y_{2,..}y_r)^2$ showen the study variables matrix $q_{=}(q_1, q_{2,}...q_{r)}$, matrix of functions coefficient, extracted functions, and are amount error introducer matrix.

For solve of the equation and determine functions coefficients firs, we must calculated correlations matrix amony variables, then, in base of vectors and certain numbers of the matrix, the equation is solved and eletermined factor loading, consider similarity, between factors and variables.

So in base of them, could be study between variable and finally classification .

Discuss and study method:

In the research for access a few variables data matrix first, Iran expanse divided 159 rectangle in 1*1.

Dimention longitude/latitode, than, 28 variables quantity geology and geophysical calculated and to record each (one).

These are includes; topography – litho graphy – cleft, crust condition and characteristies of geophiscal, such as, they are gravity abnormal, siesmentory, and magnetic.
After providing data matrix, have calculated pierson coefficent correlation matrix for primary connection.
The correlation greatly toward increasly and continue usage of foctor analysis by varilbale convergent by z-score standard, and finally, they are considering by factor analysis method.
Frist results showen in table 1.
In base of refrences the table, we can say, variance rate and certain quantities factors reduce between 1- 28, that in end factor = 28, it near to zero.
For explanation data, we need a little factor, authority suggestion, extracted, factors introduce significunt. hair et al 1998, joreskong et al, 1976. in base of 8 (frist factor) in analysis, coverd totally more than %73 of data varians. by important factor selected, so the study, from research to dispensewith, any factor cause less varians containing..
For classification of variables, calculation (factor loading) matrix, and base of coefficients, these are separated and have place individule group.
They different together, and this made, we could inter pereter it by techtonical index.
On the other hand, variable inplacement on the group, must be similar behaviour together, it is help we could descriptive unknown variables to equivalent variables. for example: in this research recognize, that, change intensity in area isostazy abnormaly with seismentory have near relation. this result with previous result study present (show) well equivalent. (Zamani 8 Hashemi 2000).
In addition, for that, compare extracted octed factor scores, in different section of IRAN, (factor scores) calculated for all of the search retangles in attention they are not co – scores itmeans factor (1) because have more quantity varians is more important, and over description.
on the other hand, extranction factor (no . 8) is less ability commentness.
after, calculated factor score, local distribution consider to from plans.
(fig 1) showen local distribution factor scores 4 first factor. we could say factor (1) in fig (a_1) is introducer seismentory and areal charactristic isostatical.
factor (2) fig (b_1) showen abnormal gravity and topography factor (3) fig (a) shown left intensivy area.
factor (4) fig (d_1) shown charactristic crust.
in the research the plans of other factor apart from less ability commentness.

conclution

the result of study are includes:
study of connection between relation variables with techtonic in iran expanse, use of factor analysis method , it seems they are related together.
the results, that refer, factor analysis method is very usefull and greatly depends to correlation variables in base of, sometimes doing..
in depense variables and show weak correlation together from this method, we couldnot use for data analysis in contrast, if, the variables have high correlative together, the method is very clear and durable by connection among geology variable and using classification, and the

resulte, sometimes maybe become indentify operate between unknown variables and known variables.

References

Basilevsky, A., 1994. Statistical Factor Analysis and Related Methods: Theory and Applications, pp. 737, John Wiley &Sons, New York.

Davis, J., 2002. Statistics and data analysis in geology, 3rd edn, pp. 638, John Wiley & Sons, New York.

Hair, Jr., J.F., Anderson, R.E., Tatham, R.L., Black, W.C., 1998. Multivariate Data Analysis. 5th edn, pp. 730, Prentice Hall, New Jersey.

Joreskog, K.G., Klovan, J.E. & Reyment, R.A., 1976. Geological Factor analysis, pp. 178, Elsevier Scientific Publishing Company, Amsterdam.

Matalas, N.C. & Reither, B.J., 1967. Some comments on the use of factor analysis, Water Resources Research, 3, 213-223.

Swan, A.R.H., & Sandilands, M., 1995. Introduction to geological data analysis, pp. 446, Blackwell Science Ltd., Oxford.

Temple, J.T., 1978. The use of factor analysis in geology, Mathematical Geology, 10(4), 379-387.

Wackernagel, H., 2003. Multivariate Geostatistics: An Introduction with Application, 3rd edn, pp. 387, Springer-Verlag, Berlin.

Zamani, A. & Hashemi, N., 2000. A comparison between seismicity, topographic relief, and gravity anomalies of the Iranian Plateau, Tectonophysics, 327, 25-36.