Accepted Manuscript

Comparing compositional multivariate outliers with autoencoder networks in anomaly detection at Hamich exploration area, east of Iran

Hamid Moeini, Farhad Mohammad Torab

PII: S0375-6742(16)30470-8
DOI: doi:10.1016/j.gexplo.2017.05.008
Reference: GEXPLO 5925

To appear in: Journal of Geochemical Exploration

Received date: 19 January 2017
Revised date: 27 May 2017
Accepted date: 28 May 2017

Please cite this article as: Moeini, Hamid, Torab, Farhad Mohammad, Comparing compositional multivariate outliers with autoencoder networks in anomaly detection at Hamich exploration area, east of Iran, Journal of Geochemical Exploration (2017), doi:10.1016/j.gexplo.2017.05.008

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.
Comparing compositional multivariate outliers with autoencoder networks in anomaly detection at Hamich exploration area, east of Iran

Hamid Moeini¹, Farhad Mohammad Torab²*
¹PhD student, Department of Mining and Metallurgical Engineering, Yazd University, Yazd, Iran.
²Assistant professor, Department of Mining and Metallurgical Engineering, Yazd University, Yazd, Iran; fmtorab@yazd.ac.ir

Abstract

Newly presented machine learning methods based on deep belief networks like autoencoders have opened a new window on anomaly identification in different fields of the science. They reconstruct the normal probability distribution pattern of the input data using stacks of Continuous Restricted Boltzmann Machines (CRBM) and thus determining the outliers. Therefore using this machine on geochemical samples taken in regional exploration scale, might be an acceptable way to delineate the multivariate anomalies and propose the next targets for detailed exploration. On the other hand, due to compositional nature of geochemical data, compositional data analysis (CoDa) has been developed to identify multivariate outliers or anomalies in recent years.

A comparison between both methods has been made applying them on lithogeochemical samples of Hamich area in Southern Khorasan, East of Iran. The area was explored in details some years ago and veinlets of galena-sphalerite-pyrite at depth, based on the outcrops of Cu-Pb, were verified by additional core drillings. We used its final report to validate the results of both methods. They showed that the two completely different methods could get the same acceptable targets. However the CoDa approach needs less parameters and shows which elements are responsible for the anomalies.

Keywords: Lithogeochemical exploration, autoencoder, compositional data, Hamich, CRBM

*Corresponding author
دریافت فوری متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات