Paper Number: 958

Spatially Weighted Principal Component Analysis to Identify Geochemical Anomalies Associated with Orogenic Gold Deposits in Northeast Jiangxi, South China

Wang, C.[1,2], Chen J.[1,2], Zhang J.[3] Fode T.[1,2]

[1]State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Wuhan 430074, China
[2] Faculty of Earth Resources, China University of Geosciences, Wuhan 430074, China
[3]902 party of Jiangxi Bureau of Geology and Mineral Exploration, Xinyu, 338000, China

_____

The Jiangnan Orogen, a continent collisional belt located between Yangtze and Cathaysia blocks in the South China, was generated by the assembly of two blocks during early to middle Neoproterozoic time. Jiangnan Orogen comprises early Neoproterozoic (970-825Ma) volcanic-sedimentary strata metamorphosed in greenschist facies, which are unconformable overlain by middle Neoproterozoic (825-815Ma) weakly metamorphosed strata and late Neoproterozoic (<750Ma) unmetamorphosed Sinian cover. It provides an ore-forming geological setting for orogenic gold deposits and are always considered as gold exploration target. Jinshan gold deposit, a world class orogenic gold deposit, and other gold deposits are distributed in Jiangnan Orogen.

In recently years, serval improved PCA methods were proposed on the basis of traditional PCA. Cheng (2006) proposed spatially weighted principle component analysis (SWPCA) for images processing by spatially weighted correlation coefficient matrix by incorporating a fuzzy mask defined on the basis of sample location [1]. In this paper, spatially weighted principal component analysis method was used to extract integrated anomalies associated with orogenic gold deposits from geochemical dataset surveyed serval decades ago. Firstly, the geochemical data from two sources were levelled based on normal distribution to reduce colour difference steps. Secondly, nine indictor elements selected by concentration coefficient were combined into first principal component using spatially weighted principal analysis method on the basis of distance spatial weighting factor estimated by buffering and *t*-test of weights of evidence.
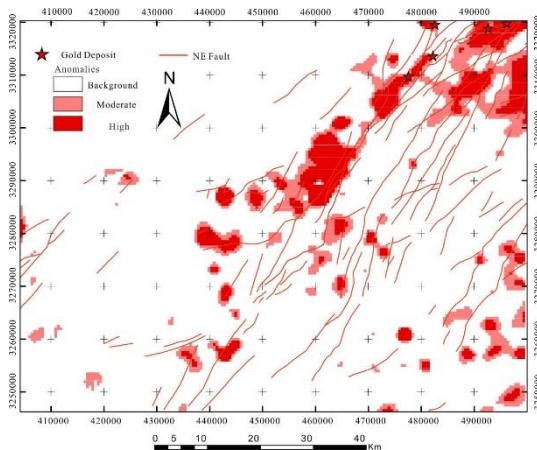

Fig.1 Raster mapping showing target areas for prospecting potential of gold deposits by SWPCA (cell size is 500×500m)

The integrated anomalies with NE orientation have a spatial correlation with Sinian strata. it is in accordance with gold deposits modelling that gold deposits are hosted in the boundary of Sinian low metamorphic turbidite with Proterozoic greenschist basement. Four of five gold deposits are located in the high anomalies and one is located in the moderate anomies. *t*-test also shows a significance of spatial correlation. It means that the integrated anomalies extracted by Spatially weighted principal component analysis give a favourable significance for gold deposits and

provide new clues to find gold deposits in the areas that are located in the high anomalies but no gold deposits.

References
Cheng, Q. (2006). Int Geosci Remote Se, 972-975.