

Geostatistical and GIS analysis of the spatial variability of alluvial gold content in Ngoura-Colomines area, Eastern Cameroon: Implications for the exploration of primary gold deposit

Jonas Didero Takodjou Wambo^{1,*}, Sylvestre Ganno^{1*}, Yannick Sthopira Djonthu Lahe^{1,2}, Gus Djibril Kouankap Nono³, Hermann Fossi¹, Jean Paul Nzenti¹

¹*Department of Earth Sciences, University of Yaoundé I, P.O. Box 812 Yaounde, Cameroon*

²*Institute for Geological and Mining Research, P.O.Box 333, Garoua, Cameroon.*

³*Department of Geology, HTTC, University of Bamenda, P.O. Box: 39 Bambili, Bamenda, Cameroon*

*E-mail: jonasdidero@gmail.com

Nonlinear geostatistics is commonly used in ore grade estimation and seldom used in Geographical Information System (GIS) technology. In this study, we suggest an approach based on geostatistic nonlinear ordinary kriging (OK) and Geographical Information System (GIS) techniques to investigate the spatial distribution of alluvial gold content, mineralized and gangue layers thicknesses from 73 pits at the Ngoura-Colomines area with the aim to delineate the most prospective area for primary gold mineralization. Gold grade varies between 0.1 and 4.6 g/m³ and has been broadly grouped into three statistical classes. These classes have been spatially subdivided into nine zones using ordinary kriging model based on physical and topographical characteristics. Both mineralized and barren layer thicknesses show randomly spatial distribution, and there is no correlation between these parameters and the gold content. The combined OK model and GIS analyses have led to the delineation of Colomines, Madubal and Boutou villages as the most prospective areas for the exploration of primary gold deposit in the study area.

Keywords: Geostatistic; Ordinary kriging; GIS; Alluvial gold; Mineral exploration; Ngoura-Colomines