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Application of Electrical Resistivity and Chargeability Data on a GIS Platform in Delineating Auriferous Structures in a Deeply Weathered Lateritic Terrain, Eastern Cameroon

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ABSTRACT

Exploration for primary gold in tropical settings is often problematic because of deep weathering and the development of a thick soil cover. In this paper we present the results of both chargeability and resistivity surveys carried out over the Belikombone hill gold prospect (14?00' - 14?25'E, 5?25' - 6?00'N) in the Betare Oya area (eastern Cameroon), where previous soil sampling had identified gold anomalies. The geophysical data were obtained using Syscal Junior 48 resistivity meter and the Schlumberger configuration array for both the vertical electrical soundings (VES) and horizontal profiling. These data were further built into a GIS framework and the continuity of favourable gold-bearing structures at depth modeled using WINSEV, RED2INV and SURFER extensions softwares. IP (Induced Polarization)-chargeability and resistivity data combined, have identified irregular anomalous zones trending NE-SW. This trend is consistent with the attitude of most auriferous quartz veins exposed in artisanal pits and parallel to the regional shear zone system and foliations. The high resistivity anomalies correspond to quartz veins while the relatively high IP anomalies correspond to low sulphide ± gold concentrations in the quartz veins. Modeling IP-chargeability and resistivity data prepared as contours and 3D maps, culminated to the development of an inferred, irregular and discontinuous mineralized body at depths of up to 95 m. The size and shape of this mineralized body can only later be tested by drilling to ascertain the resource.

KEYWORDS

Gold Exploration; Tropical Settings; Deep Weathering; IP-Chargeability and Resistivity; Betare Oya; 3D Maps; Cameroon

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References

[1] C. E. Suh, "Sulphide Microchemistry and Hydrothermal Fluid Evolution in Quartz Veins, Batouri Gold District (Southeast Cameroon)," Journal of the Cameroon Academy of Science, Vol. 8, 2008, pp. 19-30.

[2] P. E. J. Pitfield and S. D. G. Campbell, "Significance for Gold Exploration of Structural Styles of Auriferous Deposits in the Archaean Bulawayo-Bubi Greenstone Belt of Zimbabwe," Transactions of the Institution of Mining and Metallurgy. Section B Applied Earth Science, Vol. 105, 1996, pp. B41-B52.

[3] T. G. Blenkinsop, S. D. G. Campbell, P. E. J. Pitfield and T. Muzondo, "Contrasting Structural Controls on Gold Mineralization along the Eldorado Shear Zone, Zimbabwe," Transactions of the Institution of Mining and Metallurgy. Section B, Applied Earth Science, Vol. 105, 1996, pp. B53-B59.

[4] R. J. Bowell, E. O. Afreh, N. d ' A. Laffoley, E. Hanssen, S. Abe, R. K. Yao and D. Pohl, "Geochemical Exploration for Gold in Tropical Soils: Four Contrasting Case Studies from West Africa," Transactions of the Institution of Mining and Metallurgy. Section B: Applied Earth Science, Vol. 105, 1996, pp. B12-

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[5] H. Hase, T. Hashimto, S. Sakanaka, W. Kanda and Y. Tanaka, "Hydrothermal System Beneath Aso Volcano as Inferred from Self Potential Mapping and Resistivity Structure," Journal of Volcanology and Geothermal Research, Vol. 134, No. 4, 2005, pp. 259-278.doi:10.1016/j.jvolgeores.2004.12.005

[6] F. Cella, M. Fedi, G. Florio, M. Grimaldi and A. Rapolla, "Shallow Structure of the Somma-Vesuvuis Volcano from 3D Inversion of Gravity Data," Journal of Volcanology and Geothermal Research, Vol. 161, No. 4, 2007, pp. 303-317. doi:10.1016/j.jvolgeores.2006.12.013

[7] I. Caglar and T. Isseven, "Two Dimensional Geoelectrical Structure of the Goynok Geothermal Area Northwest Anotolia, Turkey," Journal of Volcanology and Geothermal Research, Vol. 134, No. 3, 2004, pp. 183-198.doi:10.1016/j.jvolgeores.2004.01.003

[8] V. Ngako, P. Affaton, J. M. Nnange and Th. Njanko, "Pan African Tectonic Evolution on Central and Southern Cameroon: Transpression and Transtension during Sinistral Shear Movements," Journal of African Earth Sciences, Vol. 36, No. 3, 2003, pp. 207-214.doi:10.1016/S0899-5362(03)00023-X

[9] S. F. Toteu, W. R. Van Schmus, J. Penaye and A. Mich- ard, "New U-Pb and Sm-Nd Data from North-Central Cameroon and Its Bearing on the Pre-Pan-African History of Central Africa," Precambrian Research, Vol. 108, No. 1-2, 2001, pp. 45-73.doi:10.1016/S0301-9268(00)00149-2

[10] S. F. Toteu, J. Penaye, E. Deloule, W. R. Van Schmus and R. Tchameni, "Diachronous Evolution of Volcano- Sedimentary Basins North of the Congo Craton: Insights from U-Pb Ion Microprobe Dating of Zircons from the Poli, Lom and Yaoundé Groups (Cameroon)," Journal of African Earth Sciences, Vol. 44, 2006, pp. 428-442.doi:10.1016/j.jafrearsci.2005.11.011

[11] B. Kankeu, O. Greiling and Z. J. P. Nzenti, "Pan African Strike Slip Tectonic in Eastern Cameroon Magnetic Fab- rics (AMS) and Structures in the Lom Basin and Its Gneissic Basement," Precambrian Research, Vol. 174, 2009, pp. 258-272. doi:10.1016/j.precamres.2009.08.001

[12] B. Kankeu, R. O. Greiling, J. P. Nzenti, J. Bassahak and J. V. Hell, "Strain Partitioning along the Neoproterozoic Central African Shear Zone System: Structures and Magnetic Fabrics (AMS) from the Meiganga Area, Cameroon," Neues Jarbuch für Geologie und Pal?ontologie Abhandlungen, Vol. 265, 2012, pp. 27-47.

[13] A. Dane, "Lom River Property: Geological Report," Bridge Consulting, 1998, p. 86.

[14] D. Soba, "La Série de Lom: étude Géologique et Géochronologique du Bassin Vocano-Sédimentaire de la Chaine Panafrica?ne à l'Est du Cameroun," Thèse de doctoral d'Etat, Université Pierre et Marie Curie, Paris, 1989.

[15] C. Schlumberger, "étude Sur la Prospection électrique du Sous-Sol," Gauthier, Villars, 1920.

[16] J. S. Sumner, "Principle of Induced Polarization for Geophysical Exploration," Elsevier Scientific, Amsterdam, 1978.

[17] W. A. Teikeu, T. Ndougsa-Mbarga, P. N. Njandjock, T. C. Tabod, "Geoelectric Investigation for Groundwater Ex- ploration in Yaounde Area, Cameroon," International Journal of Geosciences, Vol. 3, No. 3, 2012, pp. 640-649.doi:10.4236/ijg.2012.33064

[18] A. S. Al Dulaymi, E. A. R. Al-Heety and B. M. Hussien, "Geo-Electrical Investigation of Mullusi Aquifer,