Accepted Manuscript

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PII: S1464-343X(17)30029-8

DOI: 10.1016/j.jafrearsci.2017.01.020

Reference: AES 2786

To appear in: *Journal of African Earth Sciences*

Received Date: 1 May 2016

Revised Date: 12 December 2016

Accepted Date: 16 January 2017

Please cite this article as: Ilboudo, H., Lompo, M., Wenmenga, U., Napon, S., Naba, S., Ngom, P.M., Evidence of a Volcanogenic Massive Sulfide (Zn–Pb–Cu–Ag) district within the Tiébélé Birimian (Paleoproterozoic) Greenstone Belts, Southern Burkina Faso (West – Africa), *Journal of African Earth Sciences* (2017), doi: 10.1016/j.jafrearsci.2017.01.020.

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ACCEPTED MANUSCRIPT

Evidence of a Volcanogenic Massive Sulfide (Zn-Pb-Cu-Ag) District within the Tiébélé Birimian (Paleoproterozoic) Greenstone Belts, Southern Burkina Faso (West – Africa)

Hermann Ilboudo[1*], Martin Lompo [1], Urbain Wenmenga[1], Salif Napon[2], Seta Naba [1] , Papa Malick Ngom[3]

[1]Département des Sciences de la Terre, Université Ouaga I Pr Joseph Ki-ZERBO, Burkina Faso

[2]Benzu Resources Limited, PO Box 100, Sydney Vane House, Admiral Park, St Peter Port, Guernsey, GY1 3EL,

[3]Département de Géologie, Faculté des Sciences & Technique, Université Cheik Anta Diop, Sénégal

[*]Corresponding author; Email : hermannilboudo@gmail.com, +2267 0691 858

Abstract

Twenty years after the discovery of the Perkoa Zn-Ag deposit, another type of Zn-Cu-Pb±Ag Volcanogenic Massive Sulfide (VMS) subgroup of occurrences forming a district has been highlighted within the Paleoproterozoic Birimian Greenstone Belts of the West African Craton in Burkina Faso. The geology of the area is characterized by a series of dominantly mafic volcanic rocks with intercalated black shales which increase in proportion upwards in the stratigraphy. This stratigraphic package is overlain by a felsic volcanic sequence comprising reworked tuff and rhyolite. Although mineralization is locally associated with sedimentary rocks, it is more commonly found in rhyolites. The metamorphic grade is dominantly grennschist facies. The main lithologies in the mafic sequence range from basalt to andesite with associated gabbro. The felsic sequence consists of dacite to rhyolite with associated granitoids (granite-granodiorite-tonalite). The volcanic rocks are commonly tholeiitic (Zr/Y=2-4.5) with relatively high Zr and Y content, although a limited number of samples plot in transitional (Zr/Y=4.5-7) or calc-alkaline (Zr/Y=7-25) fields. Rhyolites, which constitute the main mineralized rocks at Tiébélé, have similar key trace element signatures to other rhyolites- related known VMS systems worldwide. Both have low Zr/Y (<7) and low La_N/Yb_N (<6), which suggests low crustal residence times of magmas in extensional settings. Detailed investigations identified at least four VMS targets notably at Koubongo, Nabenia, Loubel and AVV (Aménagement de la Vallée des Voltas) extending over an area of 332 km^2. Typical mineral assemblages defining VMS occurrences

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