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Tectonic evolution of the Gaoua region, Burkina Faso: Implications for Mineralization

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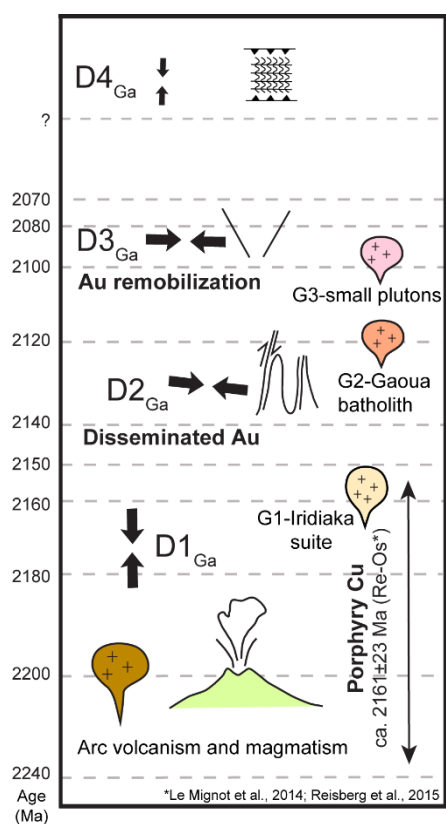
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The interpretation of high-resolution airborne geophysical data integrated with field structural and lithological observations were employed in the creation of a litho-structural framework for the Gaoua region, Burkina Faso. The granite-greenstone domain of Paleoproterozoic age was affected by multiple deformation and mineralization events [1]. The early tectonic phase is characterized by the emplacement of voluminous tholeiitic and calc-alkaline lavas, probably in a volcanic arc setting. The copper mineralization in Gongondy, Dienemera and Mt Biri is concentrated in a diorite/andesite breccia, and is interpreted as porphyry-copper style formed at an early stage of the evolution of the area. Evidence for the first deformation event D1_{Ga} corresponding to N-S shortening was only found in the E-W trending mafic unit bordering the Gaoua batholith to the south. A second deformation phase D2_{Ga} occurred under greenschist facies conditions and led to a development of more or less penetrative metamorphic foliation and its subsequent folding under overall E-W compression. At later stages, the D2_{Ga} switched to a transcurrent regime characterized by intense N-S to NW-trending steeply dipping shear zones. The first significant gold mineralization event is related to this transcurrent tectonic phase. During subsequent D3_{Ga}, intense network of brittle to brittle-ductile NW and NE faults developed. Economic gold concentrations are attributed to the D3_{Ga} event and are associated with the remobilization of early disseminated low grade gold concentrations. Significant deposits in the area are Nassara, Gomblora, Batié West and Kampti. The last deformation event D4_{Ga} resulted in E-W trending thrust faults and crenulation cleavage planes, under overall N-S compression. No mineralization events related to this stage have been seen.



References:

[1] Baratoux et al., (2015) J Afr Earth Sci; doi: 10.1016/j.jafrearsci.2015.10.004

[2] Le Mignot (2014) Les gisements d'or comme temoins de l'histoire geologique du Craton ouest-africain e Apports de la datation. Unpublished PhD thesis. Lorraine University, Nancy, p. 335.

[3] Reisberg et al. (2015) Proceedings of the 13th SGA Biennial Meeting, Nancy, 24-27 August 2015, 4, pp. 1655-1658.

Figure 1: Summary diagram of the deformation and mineralization phases in the Gaoua area. Re-Os ages are from [2] and [3].

