



The Inata deposit, Belahouro District, northern Burkina Faso



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ABSTRACT

The Inata gold deposit is hosted in the Bouroum greenstone belt of northern Burkina Faso and contains ca. 5 Moz of gold resource. The greenstone belt is divided into 4 distinct domains: The Pali West, Pali-Minfo and Fété Kolé domains comprised of variable proportions of mafic to intermediated volcanic, volcanoclastic and sedimentary rocks, and the Sona Basin comprised of feldspathic sandstones and turbidites. Potential Tarkwaian-like conglomerates are rarely observed on the eastern margin of the basin. The stratigraphy is crosscut by a series of intrusions between 2172 ± 15 Ma and 2122 ± 4 Ma. A complex deformation sequence is recorded in the rocks and has been interpreted in a five stage scheme: early syn-depositional basin margin faults reactivated through time and partitioning all subsequent regional deformation (D_{eB}); N–S compression ($D_{1B} > 2172$ Ma); E–W compression (D_{2B} , $< ca 2122$ Ma); NW–SE compression (D_{3B}), and a late N–S compression (D_{4B}). D_{2B} – D_{4B} overprint all rocks, including those of the Sona Basin and Tarkwaian-like conglomerates. Peak metamorphism is mid- to upper-greenschist facies.

Mineralisation at Inata is hosted in black shales and volcanoclastic rocks of the Pali-Minfo domain and comprises shear-zone hosted quartz-tourmaline-ankerite veins with associated sulphides dominated by pyrite and arsenopyrite. Three generations of pyrite (py1, py2, py3) and one generation of arsenopyrite (apy2) have been identified. Py1 is parallel to bedding and early D_{1B} foliation and not associated with gold. Py2 and apy2 are coeval, contain up to 1 ppm gold and are spatially associated with auriferous quartz veins. Py3 locally overprints previous assemblages and is also associated with Au. Fluid inclusions in quartz indicate H_2O to H_2O – CO_2 –NaCl fluids in auriferous quartz veins.

Microscopic to macroscopic observation of fabric-mineral-vein crosscutting relationships indicate that mineralisation is syn- D_{2B} , disrupted and remobilised during D_{3B} . All observations and data are consistent with Inata representing an orogenic style of gold mineralisation formed relatively late in the evolution of the host terrane.

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1. Exploration history

The Inata deposit is located in the northernmost part of Burkina Faso, in the Belahouro District in the Bouroum greenstone belt (Fig. 1). It was initially discovered as outcropping quartz veins and was first explored by BHP. Artisanal mining along the Inata trend reached 10's of metres depth, chasing oxidised wallrock around quartz-tourmaline veining. Soil surveys confirmed the anomalies along the entire Inata trend, and drillout of the Inata trend as well as other prospects in the Belahouro District commenced. The project was sold to Resolute Mining in the late 1990's, who focussed drilling along the Inata deposit. The project was again sold to Goldbelt Resources in mid-2000's, which was bought out by Wega Mining and in turn by Avocet Resources. Mining

commenced in 2009. As of 2012, the Inata deposit was reported to contain 4.97Moz Au resource and 0.92Moz Au reserve at an average grade of 2.07 g/t Au.

2. Regional geological overview

The Belahouro tenements (Fig. 2) have reasonable outcrop in the south and east. In the west and north, outcrop is sparse, where low-lying hills are dominated by middle and lower glaci (laterite horizons), and variably covered by degraded stable sand dunes. The Belahouro region has been divided into four distinct domains based on structural, geophysical and stratigraphic grounds: the Pali West, Pali-Minfo, Sona Basin, and Fété Kolé domains (Fig. 2; McCuaig et al., 2002; McCuaig, 2006). The Fété Kolé, Pali-Minfo and Pali West domains have high magnetic contrast and consist of sequences including pillowed basalt, gabbroic intrusions, pyroclastic rocks, intermediate rocks and sedimentary

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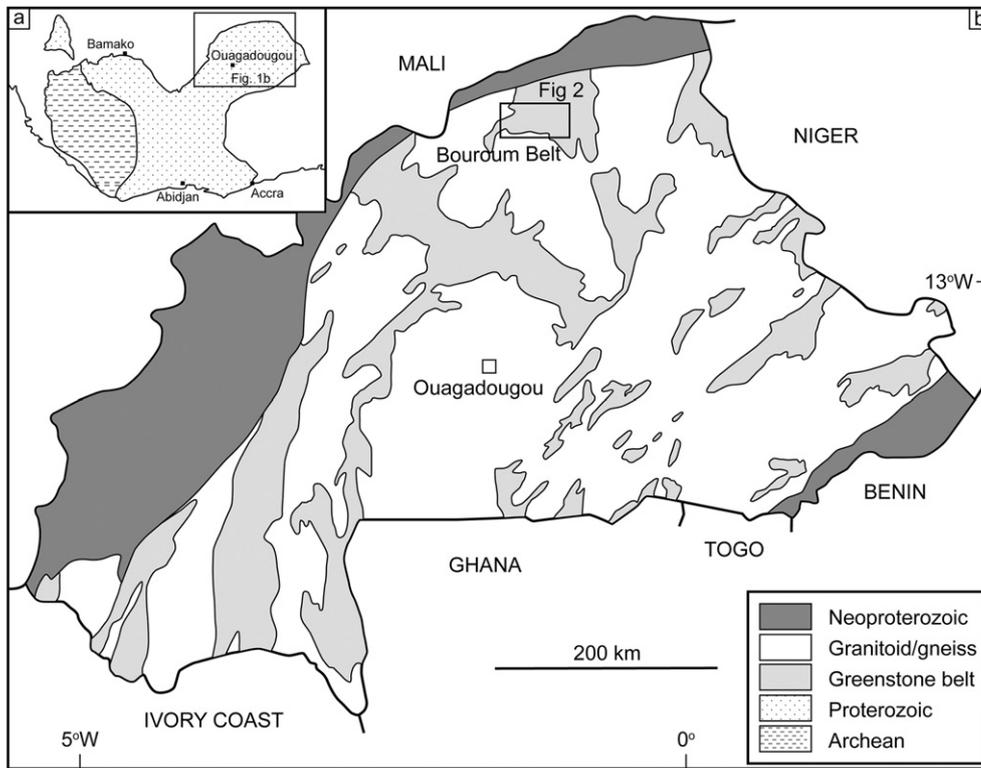


Fig. 1. a) Schematic geological map of the West African Craton; b) Simplified geological map of Burkina Faso. Redrawn from Béziat et al. (2008).

rocks ranging from conglomerates through sandstones to shales. In this sense they resemble greenstone sequences from other Birimian volcanic belts in Burkina Faso (Baratoux et al., 2011). The Sona Basin is a sedimentary basin of low magnetic contrast comprising feldspathic sandstones. All of the above rock types are deformed, metamorphosed to greenschist facies and intruded by multiple granitoid and gabbroic

bodies. A consistent sequence of events ($D1_B$ to $D4_B$) is recorded in fabrics observed across the Belahouro tenements (McCuaig, 2006), with the subscript 'B' indicating that this is a local deformation sequence. These geological events, and the relative timing of mineralisation are summarised in Fig. 3, and correlated to regional deformation schemes (AMIRA, 2013; Hein, 2010; Baratoux et al., 2011).

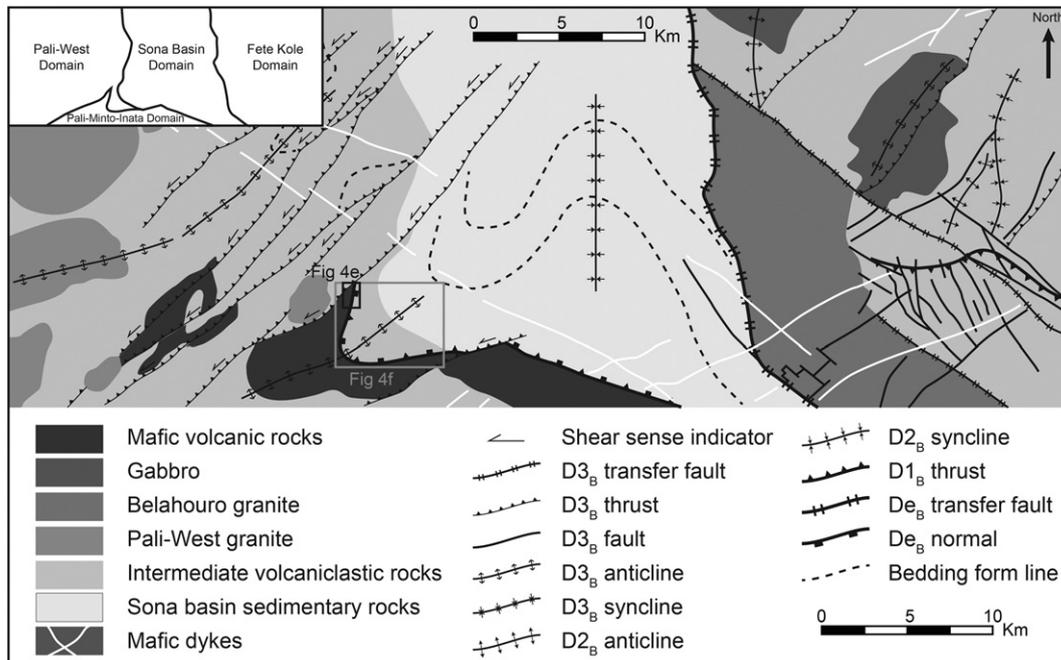


Fig. 2. Belahouro tenements with structures, main stratigraphic domains and location of Inata deposit. Insert shows main domains delineated on basis of structure, geophysics and stratigraphy. The location of Fig. 4e and f are indicated.

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