

The Gamaye pluton: a tectonic marker of the early Eburnean (Birimian) orogeny in the Kédougou-Kéniéba Inlier (West African Craton)

Aliou DEMBELE 1,2,4,*, Olivier BOLLE 1, Marc PUJOL 3, Moussa DABO 4, Mamadou Lamine BOUARÉ 5

1 Département de géologie, Université de Liège, Liège, Belgium 2 Département de géologie, FST-USTTB, Mali 3 Geosciences Rennes, Université Rennes 1, Rennes, France 4 Département de géologie, Université Cheikh Anta Diop, Dakar, Sénégal 5 Département de géologie, Ecole Nationale d'Ingénieurs Abderhamane Baba Touré, Bamako, Mali

The Gamaye pluton belongs to the Paleoproterozoic Kédougou-Kéniéba Inlier (KKI), in the West African Craton. It crops out as a N-S elongated body, with dimensions of ~24 x 9 km, east of a major crustal discontinuity, the sinistral, transcurrent Senegal-Mali Shear Zone (SMSZ). Also, as for other granitoids in the KKI, it displays spatio-temporal relationships with world-class gold mineralizations (Lawrence et al., 2013). The pluton is made of a dominant, fine- to medium-grained and locally porphyritic leucocratic biotite granite, associated with a subordinate, fine- to very-fine grained mesocratic granite. Apatite U-Pb geochronology yields, for the main leucocratic facies, a date with relatively large uncertainties (2160.0 ± 34.8), interpreted as the emplacement age of the pluton. An older apatite U-Pb age of 2294.6 ± 68.3 Ma, obtained for the mesocratic facies, is likely related to an inherited, early Paleoproterozoic component, as found in other granitoids of the KKI through zircon U-Pb geochronology (e.g. Lambert-Smith et al., 2016). The mesocratic and leucocratic facies are both mylonitized close to the western margin of the pluton, in a roughly N-S-trending, sinistral transcurrent strike-slip shear zone, possibly a satellite of the SMSZ. Outside this high-strain zone, microstructures show that the Gamaye pluton has also undergone solid-state deformation and dynamic recrystallization of variable, but weak intensity. Measurements of the anisotropy of magnetic susceptibility, conducted on 54 samples, reveal paramagnetic signatures with bulk susceptibilities lower than 0.5×10^{-3} SI and a variation of the magnetic fabric shape, from oblate to prolate, towards the western mylonitic zone. The magnetic lineations are gently-plunging and oriented quite regularly, with a weighted mean orientation of N195°E/3°S. The magnetic foliations (weighted mean orientation of N24°E/23°E) are organized around a zone axis parallel to the average magnetic lineation, a feature commonly observed in granitoids, especially in synfolding plutons (Bolle et al., 2018; and references therein). At a larger scale, S1 cleavages in the metasedimentary host-rocks of the pluton and related to the oldest Eburnean tectonic event recorded in the KKI (a contraction phase, D1) are also organized around an axis parallel to the average magnetic lineation. The fabric data demonstrate emplacement of the Gamaye pluton during a transpressive tectonic phase (D2), responsible for folding of the S1 cleavage in the country rocks, as previously proposed (Pons et al., 1992) and the U-Pb geochronology places therefore a time constraint on D2 which could be older than formerly thought (2080-2120 Ma according to Masurel et al., 2017).