A synkinematic pluton emplacement along a major shear zone revealed by AMS study, northern Burkina Faso (West Africa)

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Anisotropy of magnetic susceptibility (AMS) study were successfully applied on the granitic pluton of Bousse (GPB), located in the north of Burkina Faso, within Djibo greenstone belt. AMS study were combined with microstructure analyses, airborne geophysics, geochemistry and field observations in order to ensure the complete cartography of the pluton and its host rocks. The main goal of the study is the understanding of the granitic pluton emplacement mechanisms in relationship with the major shear zone of Djibo-Arbinda (DASZ).

The study allows the following results:

(i) The GPB is a small elliptical body elongate N-S with 10 km length and 4 km width for an area of 35 km^2. It is an I-type granite of syn-collisional granite geodynamic context. It is hosted by amphibolite on its western side and by a biotite bearing gneiss on its other borders. The whole pluton is surrounded by the Djibo-Arbinda regional shear zone (Fig. 1a).

(ii) Spatial distributions of the magnetic scalar data show zonings in magnetic susceptibilities (K_m), shape parameters (T) and anisotropy degrees (P%) (Fig. 1b,c,d).

(iii) Magnetic foliations and lineations are well organized alongside the DASZ (Fig. 1a,e,f).

(iv) Microstructures are mainly of submagmatic state and high temperature microstructures. The contacts with the DASZ are characterized by mylonitic microstructures.

A 3D model resulting from the whole interpretation allows us to conclude that the GPB had a synkinematic emplacement, following a “pull apart” system with the sinistral DASZ.

Keywords: Bousse, magnetic susceptibility, microstructures, shear zone

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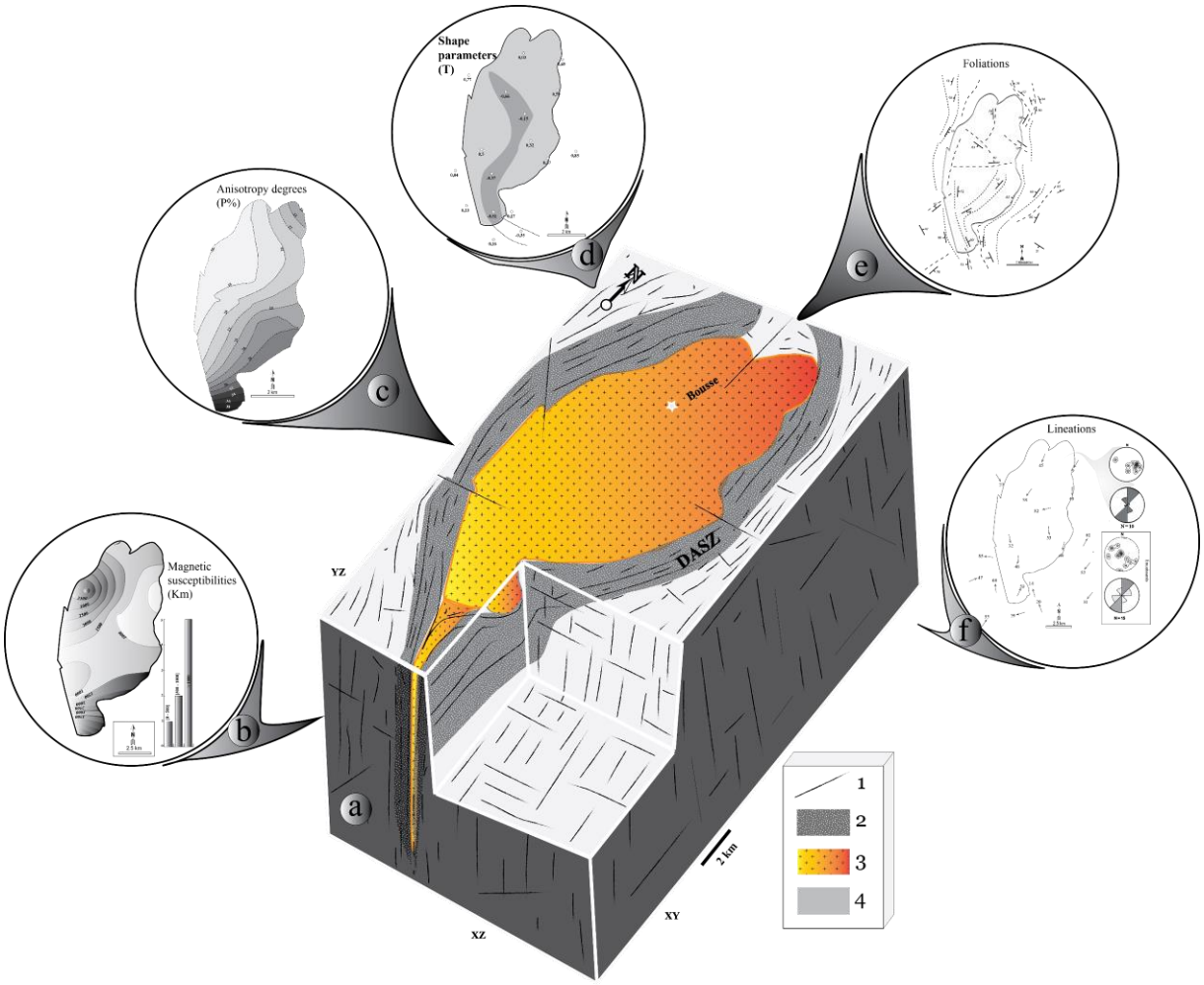

Figure 1 : 3D model of the granitic pluton of Bousse and its host rocks showing relations with Djibo-Arbinda shear zone (DASZ). 1: macrostructures; 2: DASZ ; 3 : granite ; 4: host rocks. (a) 3D block model; (b) magnetic susceptibilities (K_m); (c) anisotropy degrees (P%); (d) shape parameters (T); (e) magnetic foliations and macrostructures; (f) magnetic lineations.