

Structural constraints of the Birimian lithium pegmatites of Bougouni (Southern Mali, Leo-Man shield)

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OBJECTIVES AND METHODOLOGY

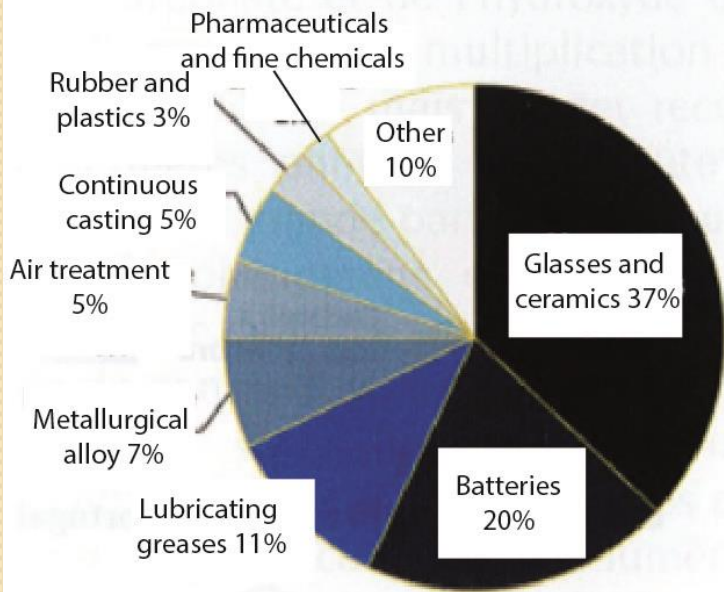
OBJECTIVES

- Make a review of the main regional structural features (Li-rich pegmatite dyke, schistosity-foliation, fault, lineation, etc.);
- integrate Bougouni's data into the discussion of regional deformation (Léo-Man ridge);
- define the structural control of the Li-rich pegmatite emplacement.

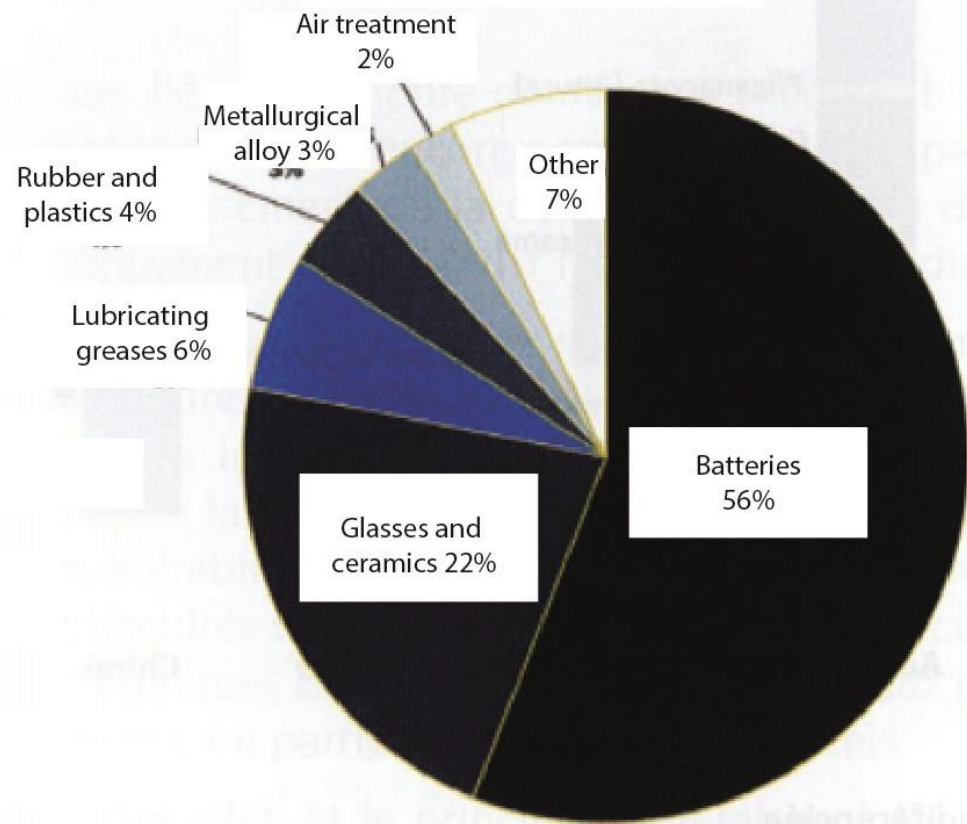
METHODOLOGY

- Collection of measurements of structural elements (Li-rich pegmatite dyke, schistosity-foliation, fault, lineation, etc.);
- data processing (realization of directional rosettes and pole density contours);
- transfer of measurements of structural elements (Li-rich pegmatite dyke, schistosity-foliation, fault, lineation, etc.).

Li élément stratégique pour la transition énergétique



Consumption in 2008
21300t

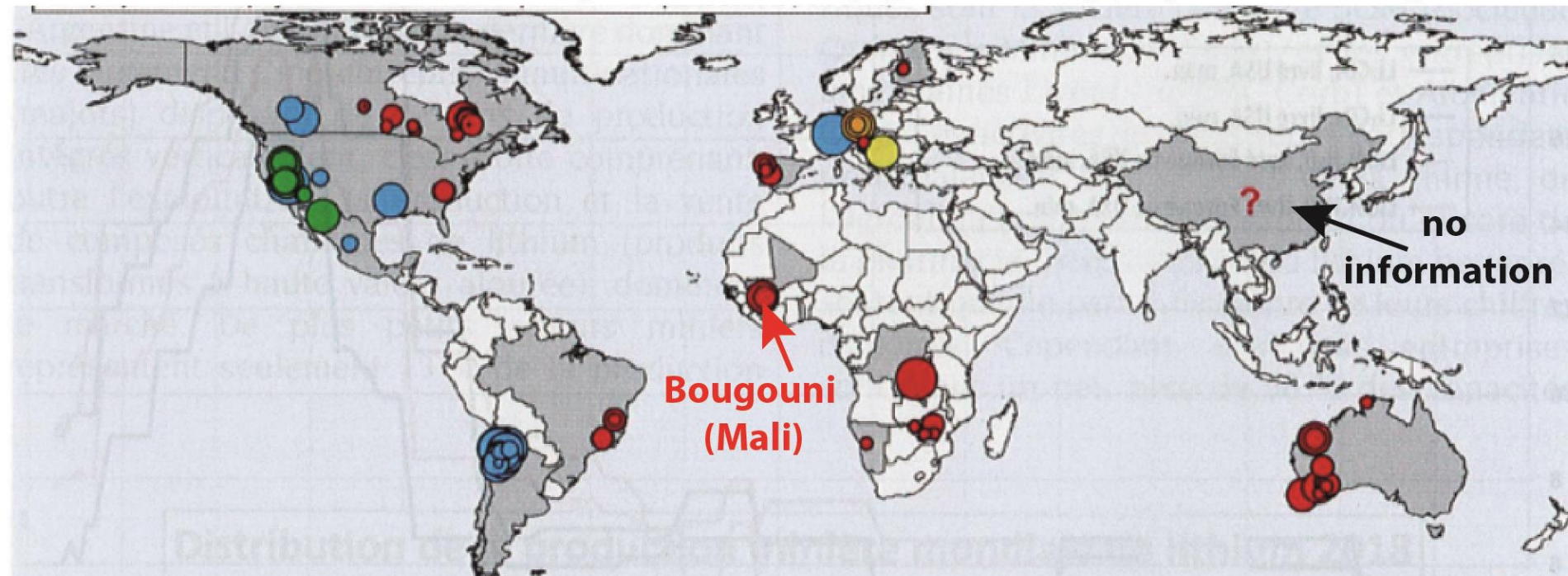


Consumption in 2019
58500t Li

Evolution of lithium use between 2008 and 2019 (Lefebwe and Tavignit, 2020)

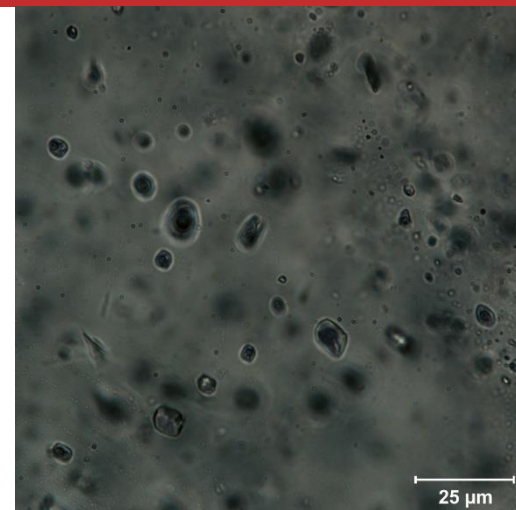
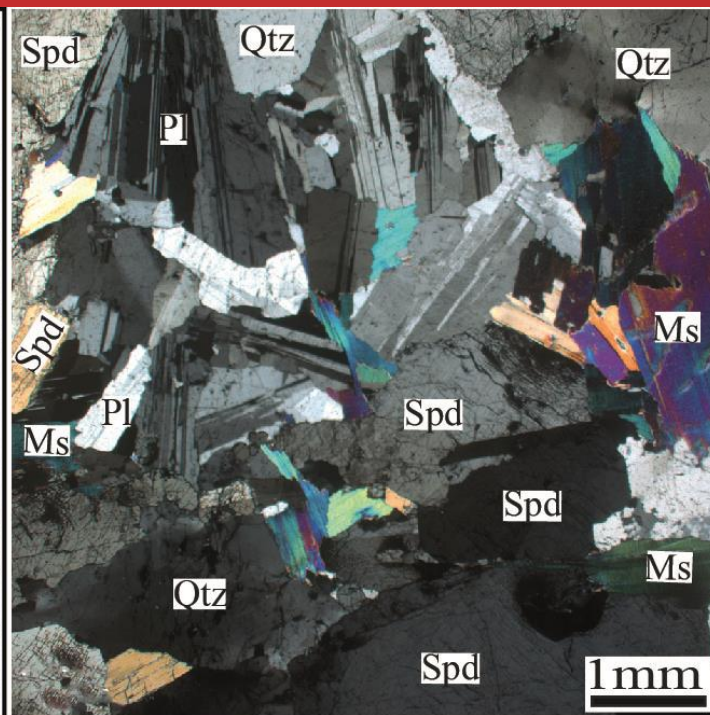
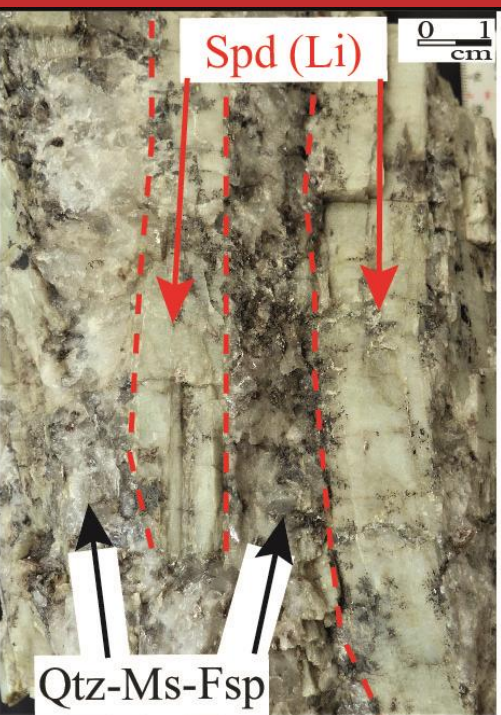
Li élément stratégique pour la transition énergétique

Global overview of advanced-stage lithium battery-grade mining projects (excluding China)



Source: BRGM

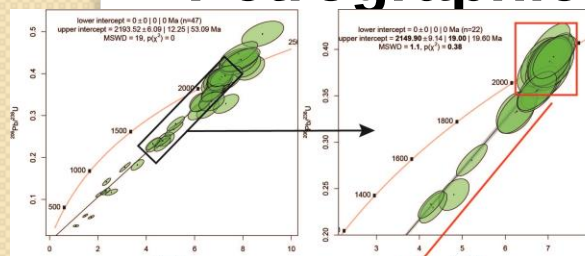
Study framework (Its is a part of our PhD work)



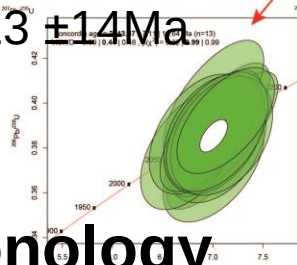
Fluid inclusion

Spd=spodumene; Qtz=quartz; Ms=muscovite; Fsp=feldspar

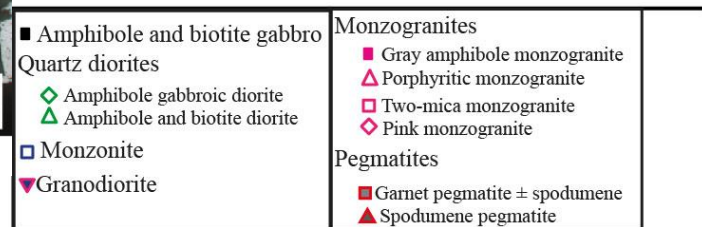
Petrographic



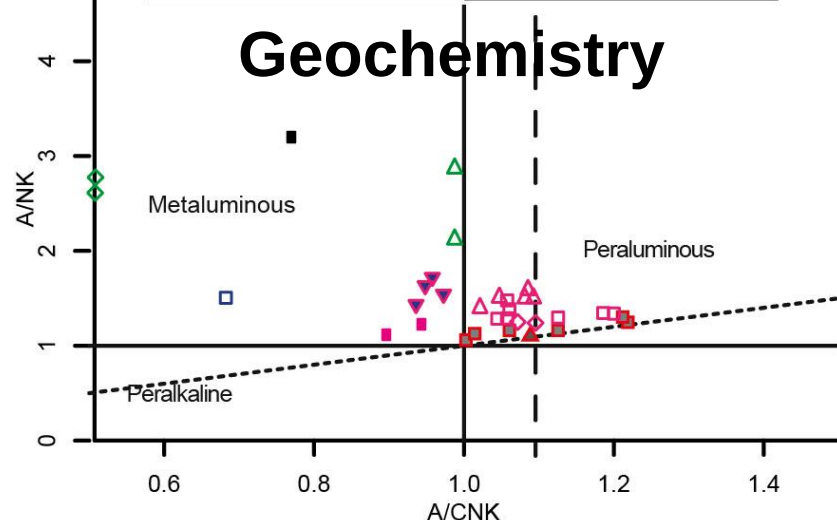
2113 ± 14 Ma



Geochronology



Geochemistry



Study framework (Its is a part of our PhD work)



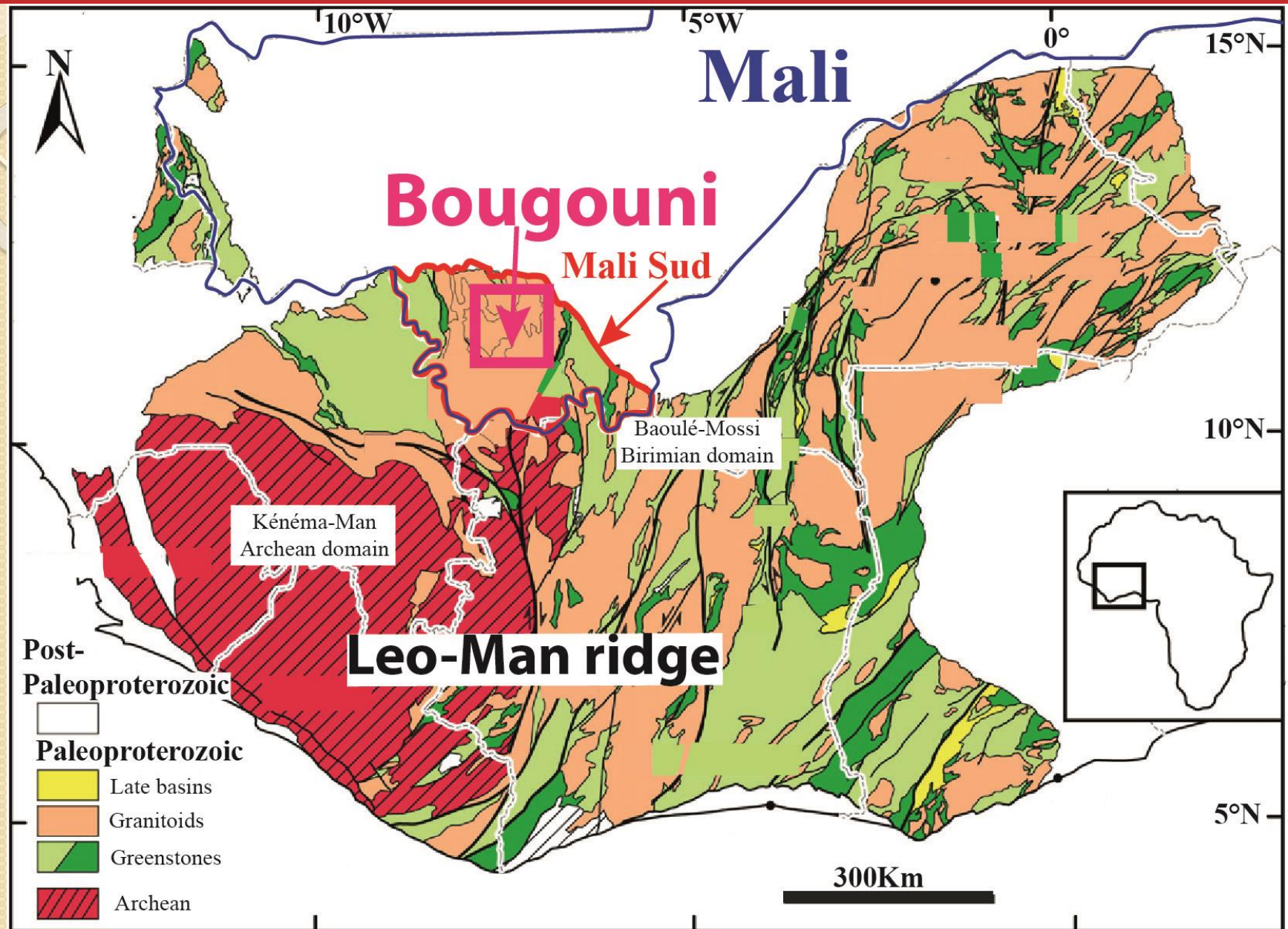
This study is "petrology and geochemistry of granitoids and associated Li-rich pegmatites of Paleoproterozoic age (Bougouni, Mali): geodynamic significance and metallogenic implications".

The Bougouni region is renowned for its lithiniferous potential and also for its gold potential (gold panning sites).

There is no doubt that lithium is causing a stir right now. It is difficult to take an interest in raw materials in relation to the energy transition without hearing about lithium. This strategic position of lithium has raised awareness of the need to lease geo-resources in lithium. Indeed, the definition of lithium resources in Bougouni will benefit the Malian government, which can use it as a lever for the growth of the national economy.

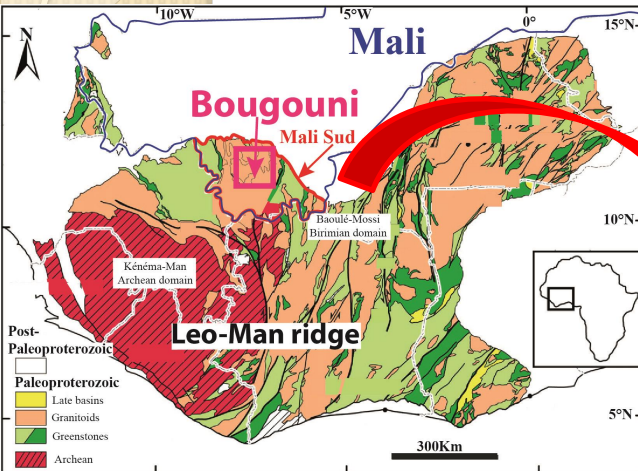


Geological context



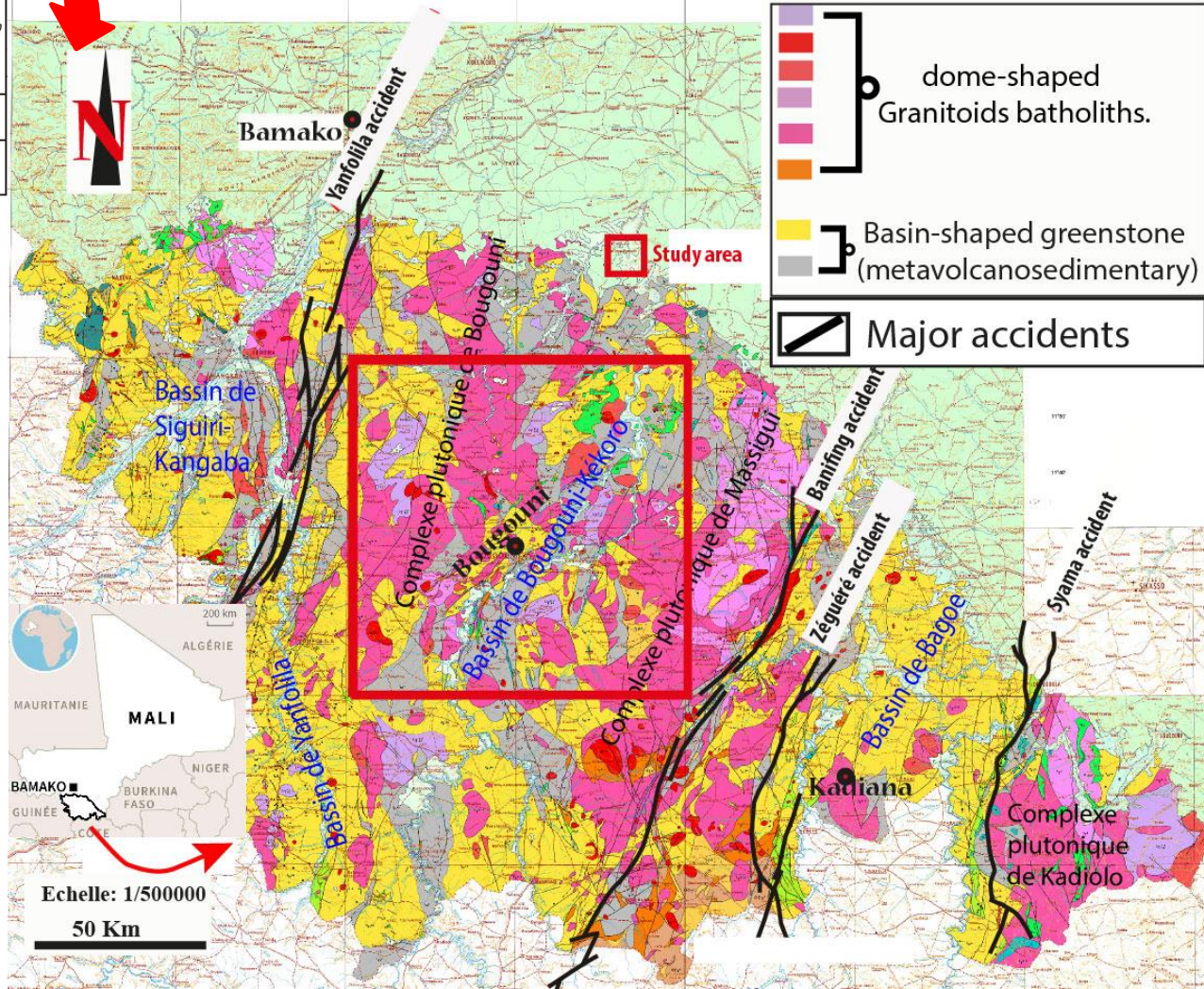
Leo-Man rise (Milési et al (2004))

Geological context



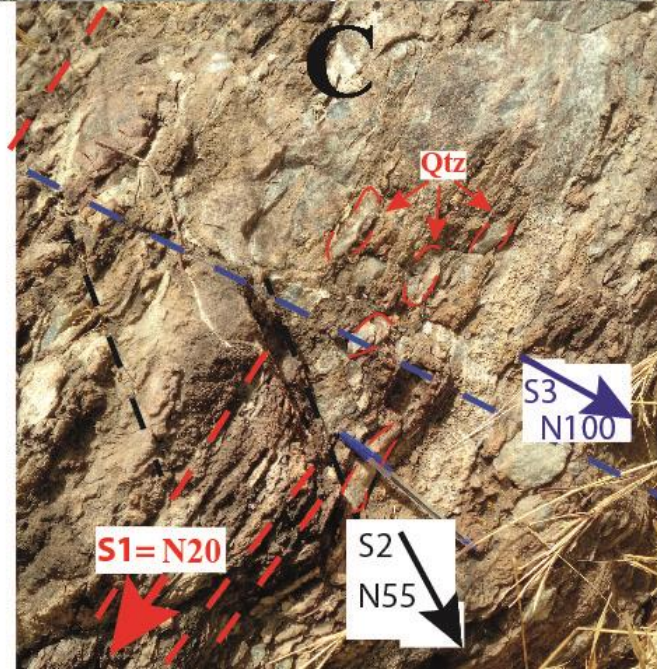
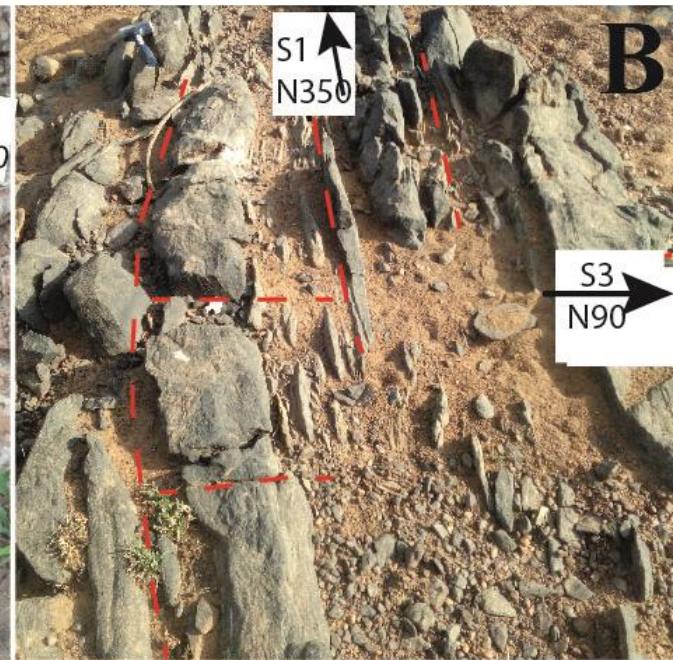
Leo-Man rise (Milési et al (2004))

Southern Mali (Feybesse et al. 2006)



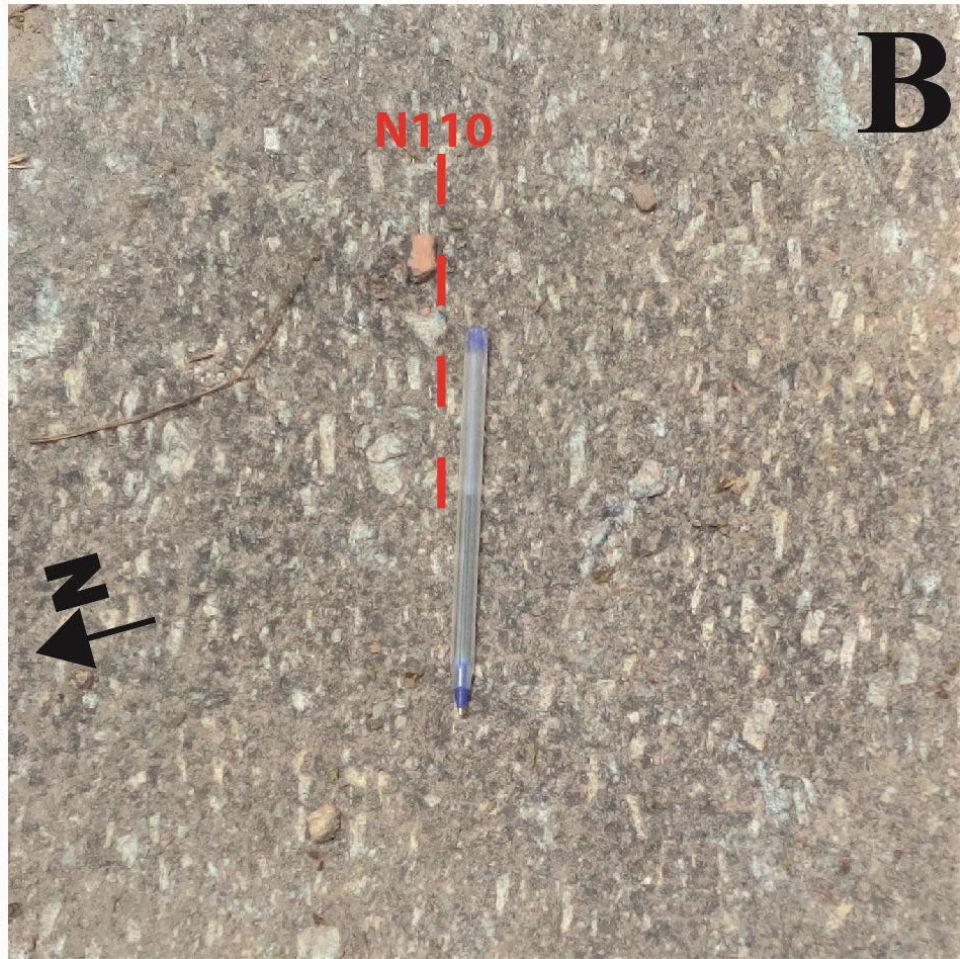
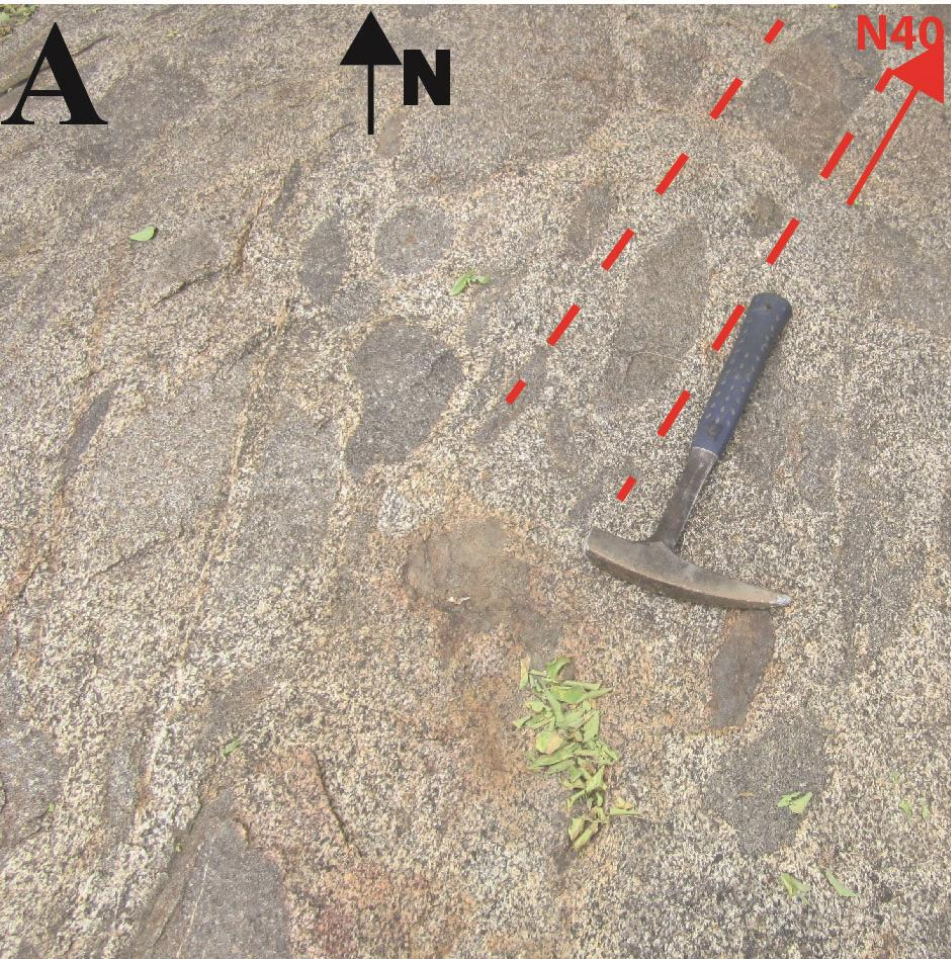
- ❑ The tectono-metamorphic event (green shale) = "Eburnean cycle" (Baratoux et al. 2011; Chardon et al. 2020 and references)
- ❑ Three deformation phases (D1, D2 and D3)

Outcrops and measurements

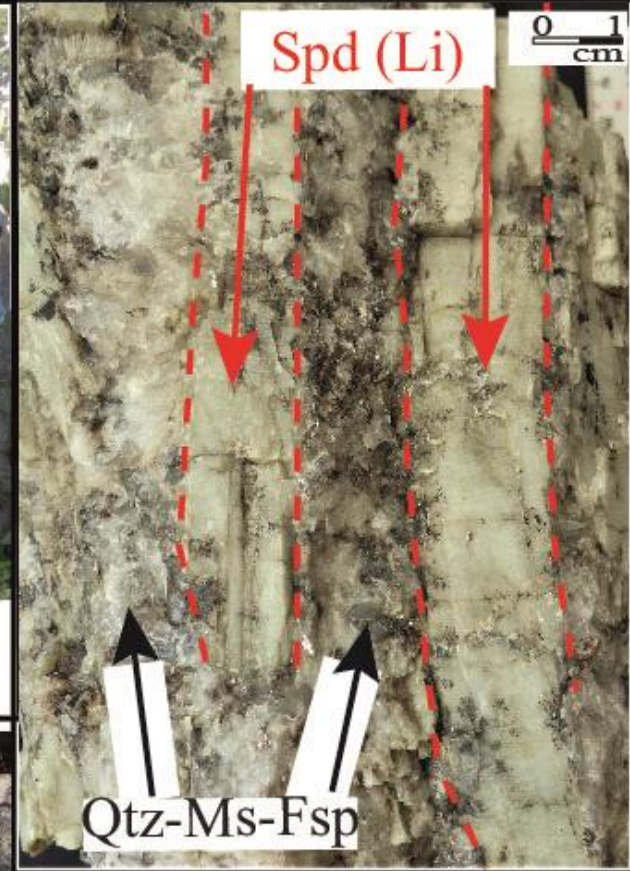
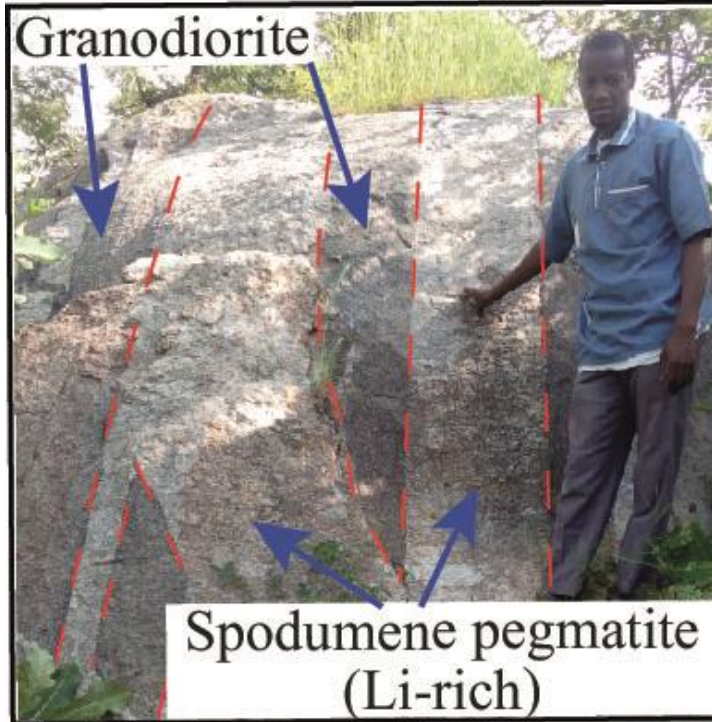


- ✓ A-metapelite;
- ✓ B-metagrauwacke;
- ✓ C-metaconglomerate with struts
(alignment of quartz crystals)

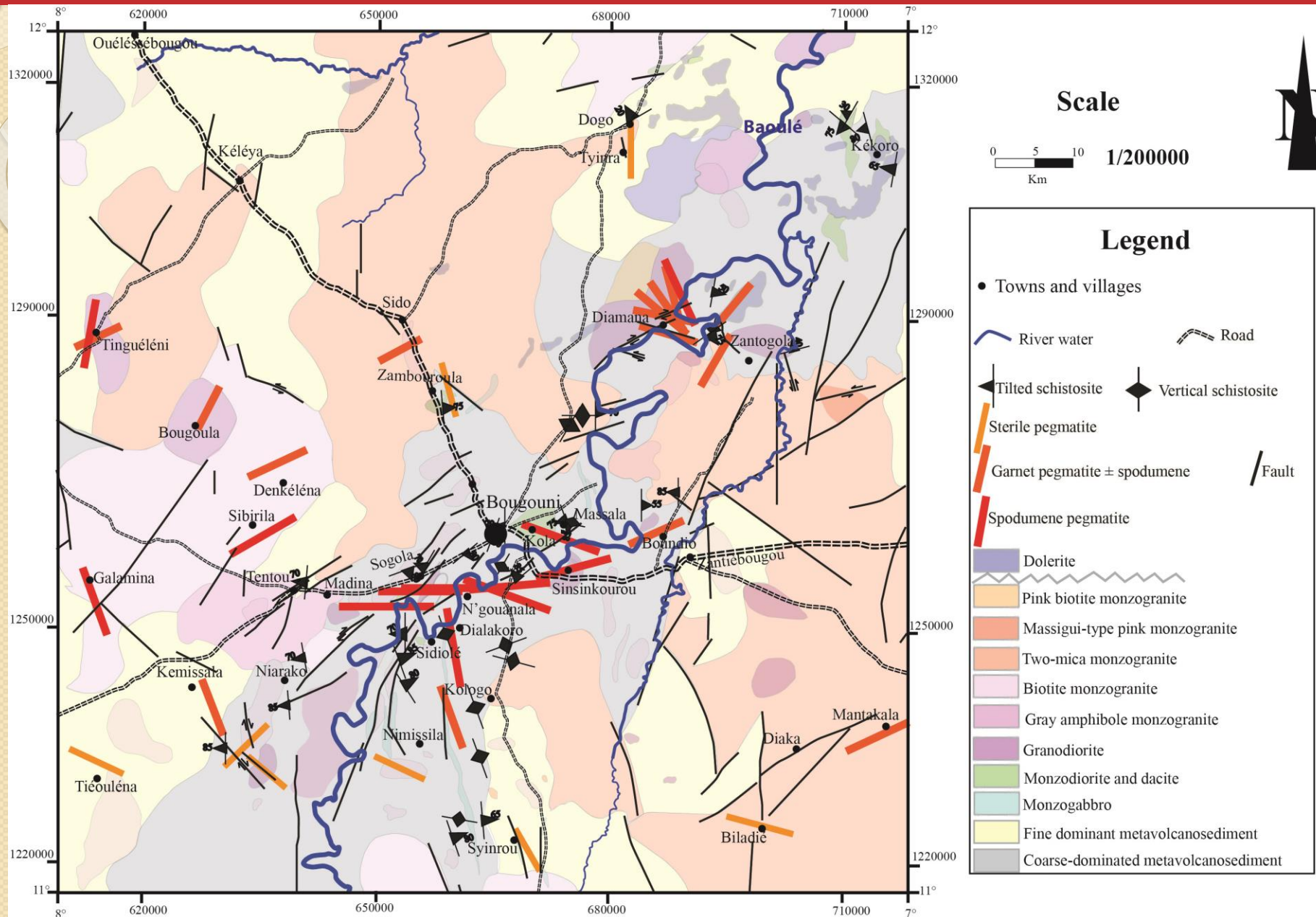
Outcrops and measurements



Outcrops and measurements



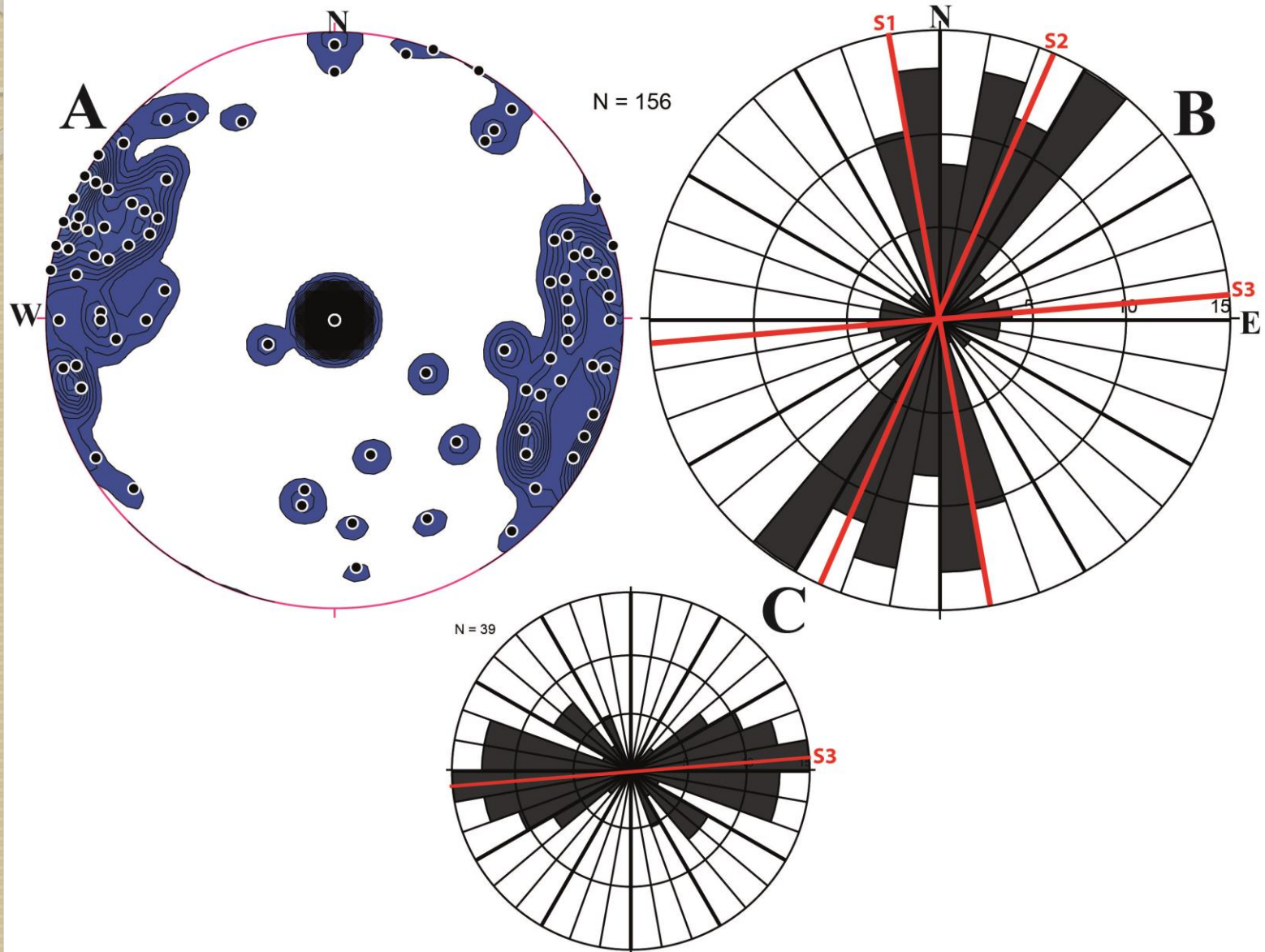
Data processing



Structural synthesis map of Bougouni (modified from Feybesse et al. 2006)

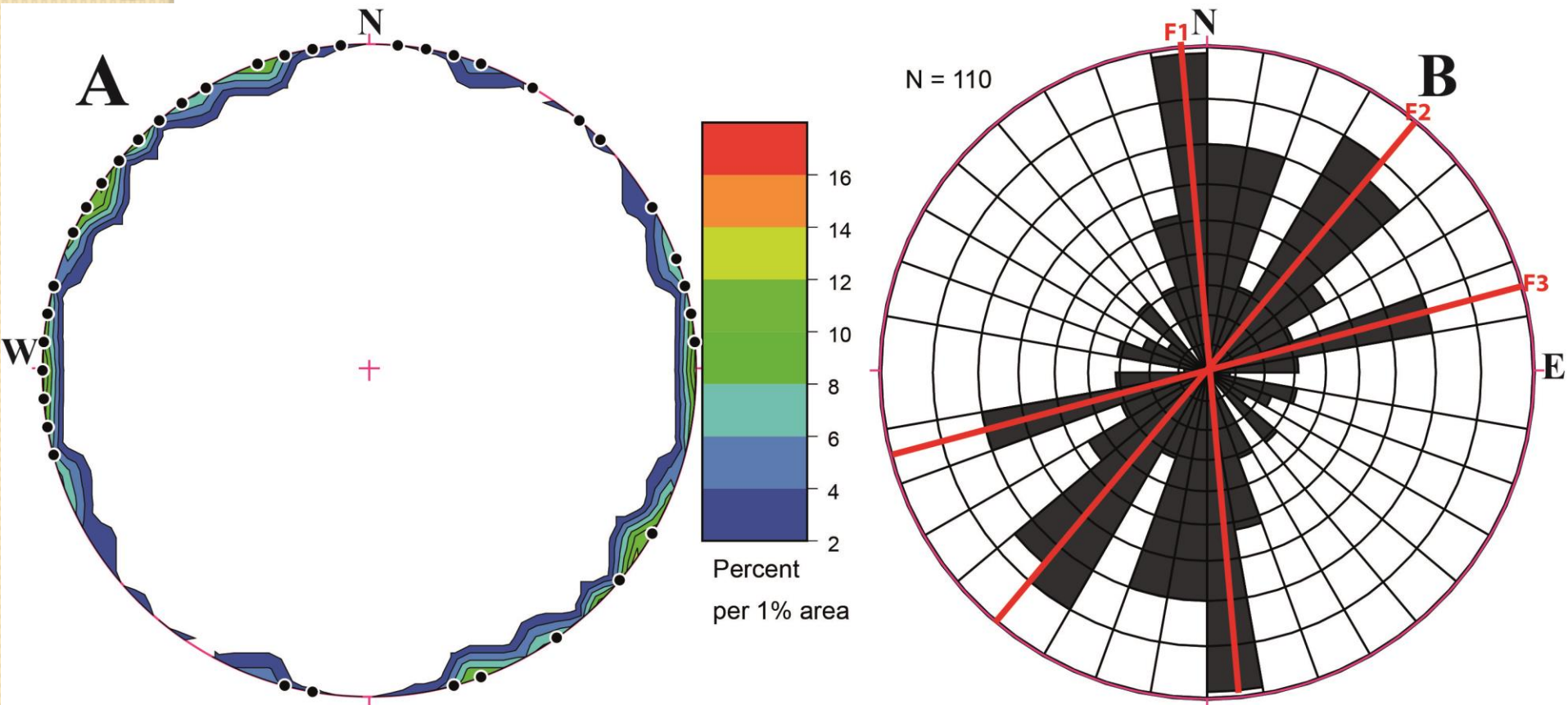
Data processing

Foliations / schistosity



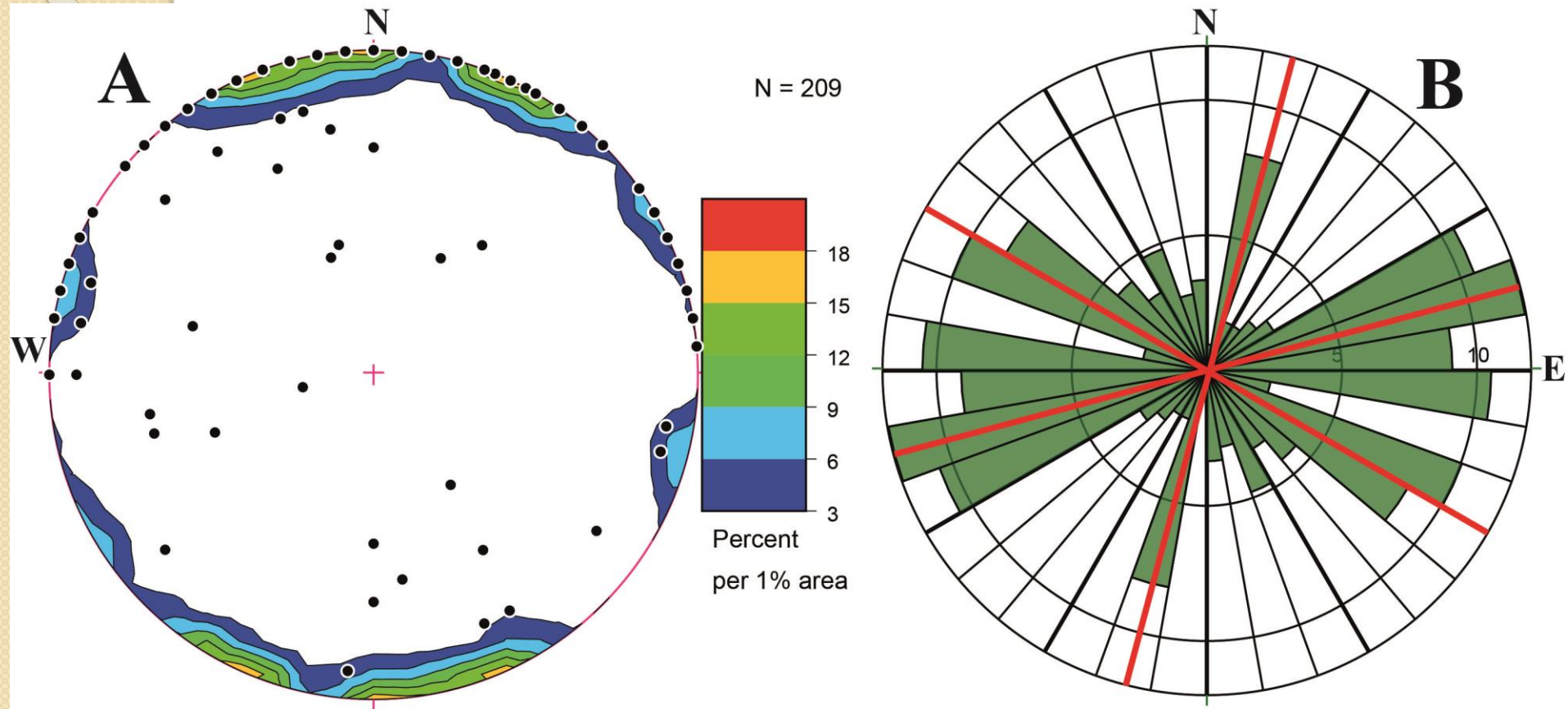
Data processing

Faults (extracted from Feybesse et al. 2006)



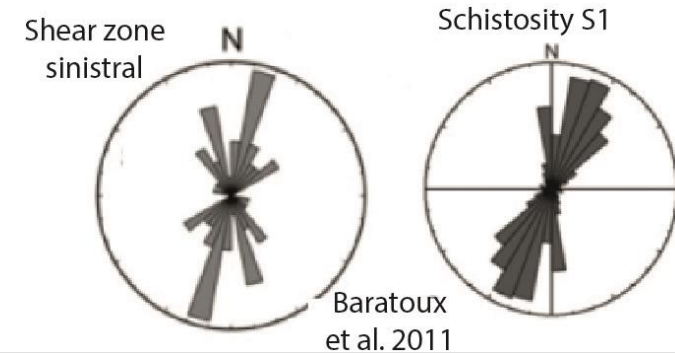
Data processing

Li - rich pegmatites

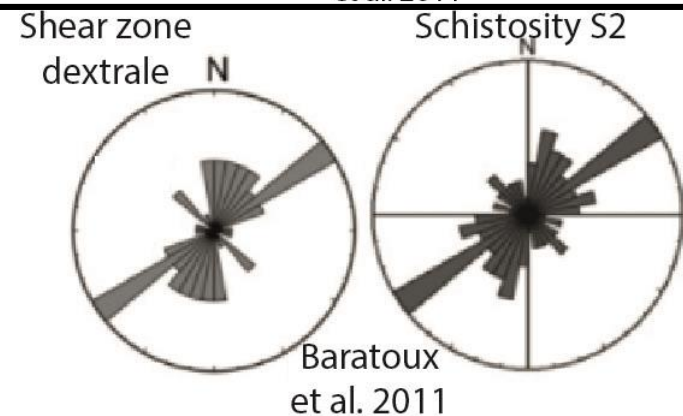


Discussion and conclusion

D1: NNW-SSE to N-S; ductile; low grade regional metamorphism (Baratoux et al., 2011 and references); crustal thickening of the volcano-sedimentary rocks (Wane et al., 2018 et and references).



D2: NNE-SSW to SE-NW; ductile-brittle; transpressive deformation; contemporaneous with the most birimian granitoids (Baratoux et al., 2011; Wane et al., 2018 and references); responsible for the gold mineralization (McFarlane et al., 2011 and references).



D3: E-W to SE-NW; brittle-ductile

- ✓ D1= S1+F1; ductile
- ✓ D2=S2+F2; ductile-brittle
- ✓ D3= S3+ F3+ Li-rich pegmatites; ductile-brittle ; so, placement of Li-rich pegmatites would be linked to the D3.

