Geophysical Research Abstracts
Vol. 12, EGU2010-7260, 2010
EGU General Assembly 2010

Magnetic properties of Paleoproterozoic granitoids from the Liptako area (eastern Burkina Faso - western Niger)

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The Liptako area consists of narrow greenstone belts bordered by tonalite, trondhjemite and granodiorite (TTGs) batholithes. These TTGs have been dated at 2.21 Ga (Castaing et al., 2003). Both greenstone belts and TTGs contain biotite granites emplaced around 2.1 Ga (Castaing et al., 2003). In the field, the TTGs are regularly foliated while the structures of biotite granites are less evident. The aim of this study is to determine the mechanisms of emplacement of biotite granite plutons, using the method of magnetic susceptibility to determine the magnetic fabrics (magnetic foliations and magnetic lineations).
Preliminary results show that magnetic susceptibility (Km) values range between 26 and 25,584 μSI. These ranges of values suggest that the main carrier of magnetic susceptibility is biotite alone (Km $\leq$ 500 μSI) or biotite and magnetite (Km > 500 μSI). Total anisotropy values range between 0.4% and 86%. The shape factor (T) is oblate in most sampling stations (70%), which indicates significant flattening. Magnetic foliations are steeply dipping with a mean strike of NE-SW. Magnetic lineations are also steeply plunging.
Combined magnetic fabrics and microstructure studies allow us to reconstruct the emplacement context which indicates an interplay between the ascension force of the magma and the regional stress.