Geophysical Research Abstracts
Vol. 12, EGU2010-7267, 2010
EGU General Assembly 2010

Late-Eburnean tectonic emplacement of Wayen syenite (Burkina Faso)

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The alkali plutonism of the Palaeoproterozoic domain of the West African craton remains very poorly studied. The rare data available are those from the Ninakri syenite and the alkali granites of central Côte d'Ivoire (Bonhomme, 1962; Morel and Alinat, 1993 ; Doumbia et al, 1998) and those of the alkali granites of central Burkina Faso (Wenmenga, 1986). All these studies focused on the petrographical characterization and the determination of the radiometric ages of these plutons. All ages were determined by the Rb/Sr and they vary between 1.8 Ga and 2.1 Ga. The span of emplacement ages suggests that the alkali plutonism of the Palaeoproterozoic of West Africa continued throughout the tectono-magmatic history of the craton. The purpose of the present study is to characterize the late eburnean tectonic processes using the structural data of the Wayen syenite which was dated at 2.1 Ga by Rb/Sr isochron by Vachette and Ouédraogo (1978)
Map view and field relationships show that the Wayen syenite intrudes the metavolcanic and early plutonic rocks (tonalites, trondhjemites and granodiorites). The geochemical data show that the syenite has a peraluminous character (Peccerrilo and Taylor, 1976) and belongs to the S-type granitoids (Chappell and White, 1992).
The structural data have been obtained by magnetic susceptibility (Km) measurements on 190 samples from 47 sampling stations. The values of susceptibility range between 253 μSI and 595,314 μSI. This means that we have both samples with ferromagnetic character (Km > 500 μSI) and paramagnetic character (Km $\leq$ 500 μSI). In the case of paramagnetism, the minerals bearing the magnetic susceptibility are ferriferous silicates (amphiboles and pyroxenes) whereas the in the ferromagnetic samples, it is magnetite.
The microstructures of the syenite are mostly magmatic and very locally they show both high temperature solid state deformation features and relatively low temperature solid state conditions along narrow shear bands. At the map scale the regular orientation of lineations and foliations strongly suggests that the eburnean tectonic event was active during emplacement, which contradicts the widespread idea that the syenites represent post-orogenic granitoids.