Study of the Haut-Sassandra granitoids (Midwest of Ivory Coast): towards a geodynamical evolution model

A.Gh. Dago[1, 2,*], Y. Coulibaly[1], J. Barbarand[2], C. Pallares[2]
[1]*Laboratoire de Géologie du Socle et de Métallogénie, UFR-STRM (Univ. F.H.B, Abidjan, Côte d'Ivoire ;*
[2]*Géosciences Paris-Sud (GEOPS), Université Paris-Sud, Bâtiment 504, 91405 Orsay Cedex, France*
[*]E-mails : dagoaristide@outlook.fr ; aristide.dago@u-psud.fr

The oldest parts of the African continent, the so-called West African Craton (WAC), are the focus of worldwide research not only because they represent primary constraints for our understanding of the early evolution of the Earth, but also because of their significant potential. This work contributes to the understanding of the geological and geodynamical evolution of the WAC, by an integrated analysis of airborne geophysical and petrology data constrained by field structural, lithological, geophysical, and geomorphological observations acquired around the region named Haut-Sassandra in the west of Ivory Coast. Magnetic Airborne data aided in the mapping because the region is densly covered allowed to define the geometry of the different massifs. Three rock types can be distinguished: migmatite, granodiorite and megacrystic or porphyritic two micas leucogranite. The petrological results of this study suggest that the granitoid domains are formed by peraluminous and metaluminous rocks. The general geochemistry of the granitoids evolves from Na-rich calc-alkaline to K-rich alkaline. The penetrative structures (mineral lineation, and sinistral shear) were overprinted by extensive SSW to NNE (N20° to N40°) shear zones which are well visible in the magnetic data. These granites have caused contact metamorphism, and are also at the origin of important pegmatitic, pneumatolytic and hydrothermal processes, that are the origin of rich metallogenic nature of this region. The northern part of this region is migmatized.

The granitic panels are cross-cut by a NE-SW to ENE-WSW oriented fracture system, which favors numerous vein-like fractures, including aplites, pegmatites, tourmalinites, greisens and quartz.

The basement of this region represent the Birimian part of the WAC and appears then structured by several geological events. The nature of the protoliths might be tracked using geochemical data. The potential source of the former Birimian sediments will be discussed.

In addition, U-Pb datings and low-temperature thermochronology data on apatite minerals will be carried out to constrain the formation age of different massifs and to trace the thermal history of rocks and evaluate their rate of denudation. This will allow to quantify the rate of uplift or vertical tectonics (isostasy or simple denudation) and the rate of erosion that has contributed to create the present-day flat topography. This part will make it possible to model the paleorelief and to help understand the current geomorphology of the WAC.

Keywords: West African Craton, Ivory Coast, magnetic airborne data, granite, low-temperature thermochronology

.