ZIBELINE INTERNATIONAL PUBLISHING

ISSN: 2521-0890 (Print)
ISSN: 2521-0491 (Online)
CODEN: GBEEB6

Geological Behavior (GBR)

DOI: http://doi.org/10.26480/gbr.02.2025.77.82

CrossMark

RESEARCH ARTICLE

SEDIMENTOLOGICAL CONSIDERATIONS ON THE LITHOCHRONOSTRATIGRAPHIC DISCONTINUITY ESTABLISHED BETWEEN THE SANSIKWA SUB-GROUP AND THE MAYUMBIAN GROUP IN THE SECTOR BETWEEN MPETE AND NDWIZI (CENTRAL KONGO, DR CONGO)

Mukeba C.L[a], Makutu M.A.J[a], Cibambula C.M.E[a], Ongendangenda T.A[a], Bokakandani M.E[b], Tuema L.O[a], Kabamba B.J.R[a] and Muper S.C[a,c*]

[a]Department of Geosciences, Faculty of Science and Technology, University of Kinshasa, Democratic Republic of Congo.
[b]Center for Expertise, Evaluation and Certification, Kinshasa, Democratic Republic of Congo.
[c]Geological and Mining Research Center, Kinshasa, Democratic Republic of Congo
**Corresponding Author Email: christianmuper@gmail.com*

ARTICLE DETAILS

Article History:

Received 23 March 2025
Revised 15 April 2025
Accepted 20 April 2025
Available online 22 May 2025

ABSTRACT

East of the Matadi square degree, the transition from the metasedimentary protoliths of the Mayumbian Group to the clayey-sandy deposits of the Sansikwa Subgroup recalls a similar sedimentological history but distinct in their paleoenvironmental evolution, contrary to previous work establishing a discontinuity for these two lithostratigraphic units. Microscopic analysis coupled with field data interpretation revealed a depositional uniformity from the metasedimentary protoliths of the Mayumbian Group to the Sansikwa schists, a deformation synchronism and the absence of erosional unconformity at the base of the Sansikwa Subgroup, demonstrating a sedimentation singularity between the two units. This continuity places the Sansikwa Subgroup at the top of the Mayumbian Group and brings the Lower Diamictite to the base of the West Congolian Group.

KEYWORDS

Diamictite, Lithochronostratigraphy, Mayumbian, Metasediments, Protoliths, Sansikwa, Shales.

1. INTRODUCTION

The Mpete-Ndwizi sector lies between 13° 45‘41.2’’and 13° 55’ 8.9’’ east longitude, and between 5°44‘24.7’’and 5° 46’ 8.9’’ south latitude, in the central segment of the West Congo chain, more precisely in the Songololo territory, Central Kongo province, to the east of the square degree of Matadi (Figure 1).

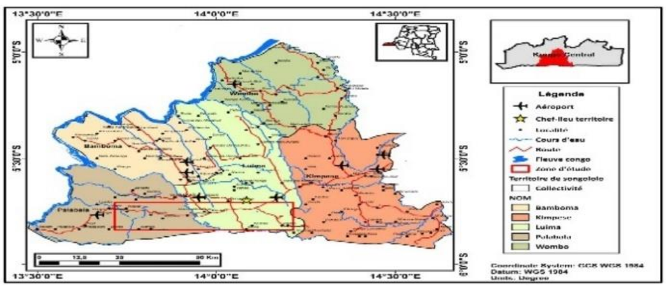

Figure 1: Location of the Mpete-Ndwizi sector in the Central Kongo province.

In the eastern part of the Matadi square degree (Figure 2), the West Congo Supergroup is represented by the Mayumbian Group with talcschists, chloritoschists, sericite-schists, phyllades, quartzophyllades and quartzites intruded by the Lufu and Yeza-Yeza granite massifs and draped by the schistified rhyolites of Inga-Sikila underlying the West Congo Group with doleritic sills intruding the quartzites and shales of the Sansikwa Subgroup and the polygenic tillite with a clay-sandstone matrix of the Lower Diamictite Formation underlying the sandstones, shales and calcareous shales of the small-Bembezi Formation of the Haut-Shiloango Subgroup (Tack, 1973 ; Tack et al. , 2001).

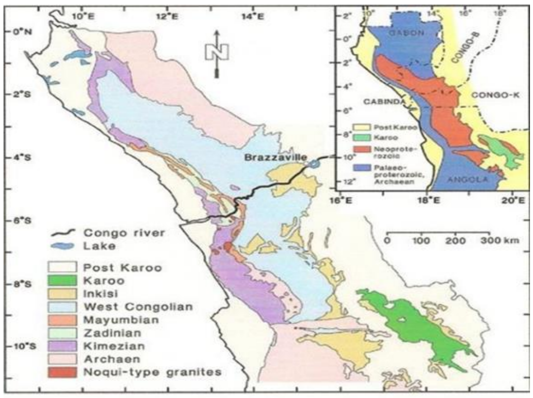

Figure 2: Geological framework of Central Kongo (extension of the West Congo chain) (Tack et al., 2001).

Quick Response Code	Access this article online	
	Website: www.geologicalbehavior.com	**DOI:** 10.26480/gbr.02.2025.77.82

Cite The Article: Mukeba C.L, Makutu M.A.J, Cibambula C.M.E, Ongendangenda T.A, Bokakandani M.E, Tuema L.O, Kabamba B.J.R and Muper S.C (2025). Sedimentological Considerations On The Lithochronostratigraphic Discontinuity Established Between The Sansikwa Sub-Group And The Mayumbian Group In The Sector Between Mpete And Ndwizi (Central Kongo, Dr Congo). *Geological Behaviour 9(2): 77-82.*

In this chain, the Sturtian Lower Diamictite Formation provides a good lithochronostratigraphic reference between the Tonian and Cryogenian-Terrenevian groups, represented respectively by the Zadinian, Mayumbian, Sansikwa Subgroup and the Haut-Shiloango Subgroup, Upper Diamictite Formation, Schisto-calcareous Subgroup (Hoffman et al., 1996, Tack et al., 2001; Cibambula, 2016). These rocks outcrop in both the Mayumbe and Lower Sangha trenches (Figure. 3) (Lepersonne, 1977; Daly et al., 1992). These rocks outcrop in both the Mayumbe and Lower Sangha troughs (Figure.3), in which sedimentary deposits form an evolutionary sequence ranging from continental facies in intracratonic subsidence through continental rifts to marine facies on the passive continental margin (Wernick, 1985; Keen et al. 1987; Wilson, 1996; Allen and Allen, 2005; Lepersonne, 1977; Daly et al., 1992).

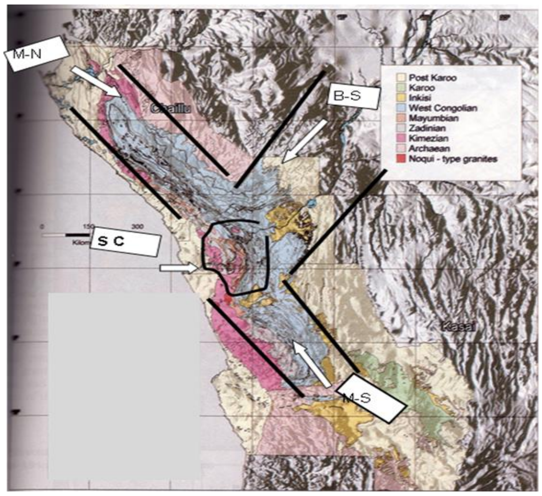

Figure 3: Simulated tectonic subdivision of the West Congo Range into a triple ditch (Tack et al., 2001).

The transition from the metasedimentary protoliths of the Mayumbian Group to the sandy-clay deposits of the Sansikwa Subgroup observed between the villages of Mpete and Ndwizi suggests the existence of a specific lithochronostratigraphic and palaeoenvironmental discontinuity between these two Tonian-age lithological units belonging to the West Congo chain.

In view of the above, the aim of this article is to provide answers to the problems of lithochronostratigraphic discontinuities previously established between the Mayumbian Group and the Sansikwa Subgroup with a view to improving knowledge of the lithostratigraphy of the West Congo Supergroup (Tack et al., 2001, Cibambula, 2016).

2. Methodology

This article is the series of studies based on careful field observations during the geological survey and petrographic analyses in the laboratory.

2.1 Field data collection

The geological survey consisted of macro-petrography, identification of the various lithofacies and collection of samples labelled with an order number preceded by the initials MC derived from the names MUKEBA CIKALA. This field campaign also enabled strict monitoring of the sedimentary figures, the limits of the layers and their geometry, the thicknesses of the layers (benches, beds, laminations and laminae), the rock factories, the lithological limits between different geological formations as well as measurements of direction and dip made on the planes of stratification, schistosity and faults acquired along 7 variously oriented sections between the villages Mpete and Ndwizi (Figure 4.).

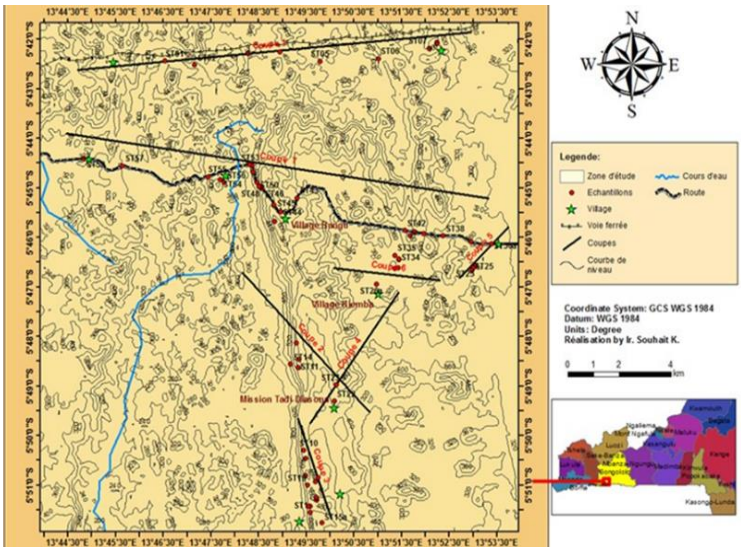

Figure 4: Map showing sampling points based on geological sections taken in the field.

2.2 Laboratory data

The samples collected and prepared were subjected to in-depth petrographic interpretation. After preparation of the samples in the thin section workshop of the Geological and Mining Research Center, supplemented by that of the Geosciences Department at the University of Kinshasa, a microscopic description using an OPTIKA VIEW polarising microscope (transmitted and reflected light) at X10 magnification enabled the mineral phases, textures and metamorphic mineral parageneses present in these rocks to be identified.

3. Results

Analyses carried out in the field and in the laboratory have revealed 7

Cite The Article: Mukeba C.L, Makutu M.A.J, Cibambula C.M.E, Ongendangenda T.A, Bokakandani M.E, Tuema L.O, Kabamba B.J.R and Muper S.C (2025). Sedimentological Considerations On The Lithochronostratigraphic Discontinuity Established Between The Sansikwa Sub -Group And The Mayumbian Group In The Sector Between Mpete And Ndwizi (Central Kongo, Dr Congo). Geological Behaviour 9(2): 77-82.

lithofacies, namely:

- *The conglomerate lithofacies grouped into two sub-lithofacies:*
    - Lateritic matrix conglomerate (MC24A). - this is a conglomerate with breccias and pebbles of quartzite and quartz debris enveloped in a porous and cellular lateritic matrix of a very friable ferruginous nature, reddish to yellowish in colour.
    - Clay-sandstone matrix conglomerate (MC24B). - contains rounded, sub-rounded, angular clasts of migmatite, quartzite and limestone in a strongly consolidated greyish clay-sandstone matrix. Microscopically, the rock shows cracked, rounded, subrounded, angular and automorphic quartz clasts; lithic fragments of various rocks and plagioclase debris in subautomorphic sections recognisable by their more or less dispersed polysynthetic macles in a dark grey silt-clay matrix (Photo 1). The rock is a polygenic paraconglomerate according to the classification of (Prothero and Schwab, 1996).

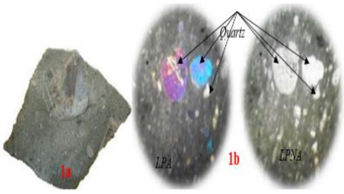

Photo 1: Macroscopic view of the polished section of the clay-sandstone matrix conglomerate (a) and its microscopy (b) in XPL and PPL.

- *Quartzite lithofacies divided into two sub-lithofacies:*
    - Lited quartzite (MC03C, ST08, MC03A, MC23A et MC26). - Recognisable by a planar to slightly sub-planar bedding noted by the alternation of light grey beds with dark grey beds, under the microscope, this sub-lithofacies shows an alternation of beds composed of elongated and imbricated quartz grains with beds composed of sub-rounded, sub-automorphic, indented and engrained quartz grains with beds composed of xenomorphic quartz grains (Photo 2). The rock is a quartz arenite according to the classification of (Dott, 1996).

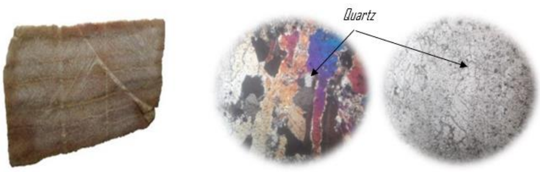

Photo 2: Macroscopic view of the polished section of a lite quartzite (a) and its microscopy (b) in XPL and PPL.

- Massive quartzite (MC10A, MC18, MC11, MC23C, MC13, MC22, MC25, MC10D, MC14 et MC10C). - can be distinguished from the above by the average size of the variously coloured grains. Microscopically, the rock shows coarse grains of quartz that are cracked and sometimes indented, rounded, angular, elongated and xenomorphic, imbricated, dispersed and sometimes joined in a cement of small quartz crystals with fine-grained beds of xenomorphic quartz. According to the classification of, the rock is a quartz arenite (Photo 3) (Dott, 1996).

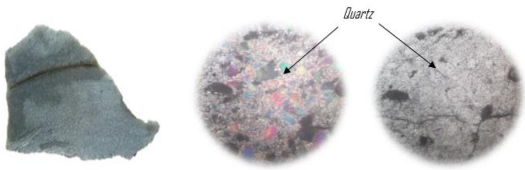

Photo 3: Macroscopic view of the polished section of a massive quartzite (a) and its microscopy (b) in XPL and PPL.

- Shale lithofacies (MC07). - Microscopically identifiable by fine mauve-coloured grains, the rock has a rough lenticular bedding with alternating silt-clay beds encompassing rounded and sometimes elongated quartz siltstones and scattered clusters of iron oxides with very fine clay beds (Photo 4). According to the work, the rock is a shale (Lundegard and Samuels, 1980).

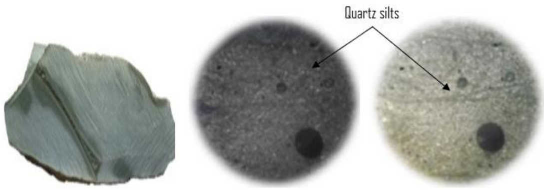

Photo 4: Macroscopic view of the polished section of a shale (a) and its microscopy (b) in XPL and PPL.

- Chloritoschist lithofacies (ST02). - Macroscopically recognisable by the fine greenish to pale yellow flakey sheets under the microscope, the rock has a foliation highlighted by the alternation of sheets made up of elongated and rounded quartz silts with sericite sheets (Photos 5). The rock is a chloritoschist according to the classification of (Beaux et al., 2001).

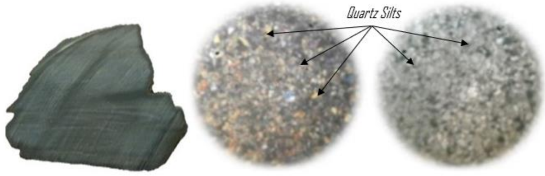

Photo 4: Macroscopic view of the polished section of a chloritoschist (a) and its microscopy (b) in XPL and PPL.

- Dolerite lithofacies divided into two sub-lithofacies:
    - Dolerite with hyalo-porphyritic texture (MC20A). - Identifiable by large, clear, prismatic feldspar crystals aligned in a preferential direction within a glassy mass. Microscopically, the rock shows plagioclase phenocrysts with polysynthetic macles on a microlithic background with pyroxene, olivine in the process of alteration, plagioclases occur in the form of stretched cubic. According to studies, the rock is a dolerite with a hyalo-porphyritic structure (Photo 6) (Beaux et al., 2011).

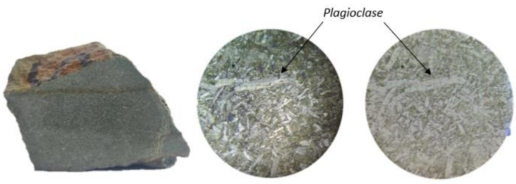

Photo 6: Macroscopic view of the polished section of a dolerite with hyalo-porphyritic texture (a) and its microscopy (b) in XPL and PPL.

- Dolerite with hyalo-microlithic texture (MC20B). - Distinguished from its predecessor by a dark green mesostasis enclosing a variety of fine-grained minerals. Microscopically, the rock shows self-morphing plagioclase crystals in the form of prismatic rods with polysynthetic macles, ghosts of olivine in elongated section in the process of alteration embedded in a very finely crystallised mesostasis, pyroxene minerals in basal section with a faint green tint and a relatively strong relief. The rock is a dolerite with a hyalo-microlithic structure, according to the work of (Beaux et al., 2011) (Photo 7).

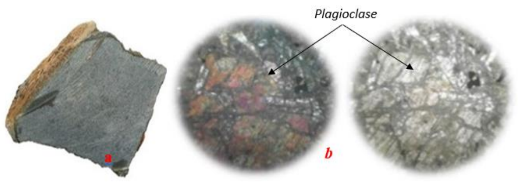

Photo 7: Macroscopic view of the polished section of a hyalo-microlithic dolerite (a) and its microscopy (b) in XPL and PPL.

4. Discussion And Interpretation

The interpretation of the macro- and micro-petrography obtained from the rock descriptions, sedimentological models can be translated on the basis of the principle of uniformatism, with a view to reconstructing palaeomilieux and identifying their stratigraphic implications.

4.1 Petrogenetic considerations

We are attempting to reconstruct the conditions under which the various lithofacies encountered in the field were emplaced and to justify the lithochronostratigraphic discontinuity established between the Mayumbian Group and the Sansikwa Subgroup in the area between the villages of Mpete and Ndwizi.

4.1.1 For conglomerates

The monogenic nature of the conglomerate (MC43) suggests that the quartzite bedrock debris was agglomerated in situ by ferruginous solutions of pedogenetic origin, concentrating at the bottom of the valleys. The induration process is reminiscent of an environment with poor drainage in depressions, and iron precipitation occurs during the dry season (Michel, 1969). On the other hand, the polygenic and breccia-pudding nature of the Lower Diamictite justifies the diversified lithofacies planed by the glacier along its course (Lepersonne, 1975). Its mixed breccia-pudding character is reflected by a mixture of clasts ranging in size from 2 cm to 20 cm, which are well rounded, although some are pentagonal in cross-section, while those smaller than 2 cm are angular. These clasts include boulders, pebbles, gravels and chippings embedded in a clay-sandstone matrix. They correspond to unstratified englacial deposits covered directly by the ice at the bottom, known as ground moraines. In addition, the presence of pebbles with planed and striated facets, scattered and poorly classified in a clay matrix, is reminiscent of a fluvioglacial depositional environment for the Lower Diamictite of Central Kongo (Lepersonne, 1951).

4.1.2 For dolerites

The hyalo-microlithic (MC20B) and hyalo-porphyric (MC20A) textures associated with these rocks suggest a gradation of magma cooling according to the depth of emplacement from a hypoabyssal to a hypovolcanic environment. The dolerites of Tadi Dia Sona, which are the semi-deep equivalent of the Mukimbungu basalt and reflect the asthenospheric rise during the distension initiated since the emplacement of doleritic silts intruding the metasediments of the Palabala Formation and the Gangila Greenstone Formation. These are continental tholeites from the aborted Mayumbe rift.

4.1.3 For shales

The transition from silty to clayey beds in shale beds constitutes a form of bottom-up grading and would be generated in deep fluvio-lacustrine waters by turbidity or traction currents, if we refer to the work of Kuenen (1950). This grading would represent the common product of normal sedimentation of muds interrupted during storms at the origin of turbidity currents. These would deposit sands and silts. The deposition of muds takes place during periods of calm water, just before and after rough water conditions when there is still a weak flow current as suggested, elsewhere, by Kuenen and Migliorini (1950) and Hayes (1967). Pettijohn (1957) considers other agents such as deposition in the last stages of a heavy flood, periodic silting of the distributaries of lake deltas or sedimentation from either the gradual decrease in the velocity and competence of the current, or from the suspension in which grains of all sizes are transported and out of which they are deposited in shallow waters.

4.1.4 Concerning the alternation of shale beds and sandstone and shale beds

It would occur as a result of the periodic repetition of hydrodynamic changes, the most appropriate mechanism for producing alternations of beds and banks of different lithological types. Admittedly, these changes from coarser to finer materials are not the result of short-term changes, but rather of long-term changes in hydrodynamic conditions in the basin or in the fluvial systems feeding the depositional basin.

4.1.5 For the metasediments of the Mayumbian Group

The sericite and quartz paragenesis in the chloritoschists underlying the phyllades, which pass laterally to the shales of the Sansikwa Subgroup, results from epizonal metamorphism of diagenetic clays via their anchizone polymorphs (Figure 5). In the sericite schists, sericite, which begins to appear at 400°C in the epizone, is the detrital legacy of shales (ST04). In addition, the orientation of the sericite and chlorite pebbles highlights the recrystallisation layering acquired perpendicular to the maximum stress during NNW-SSE folding of the Lower Neoproterozoic-Paleozoic West Congo orogenic cycle (Cibambula, 2016).

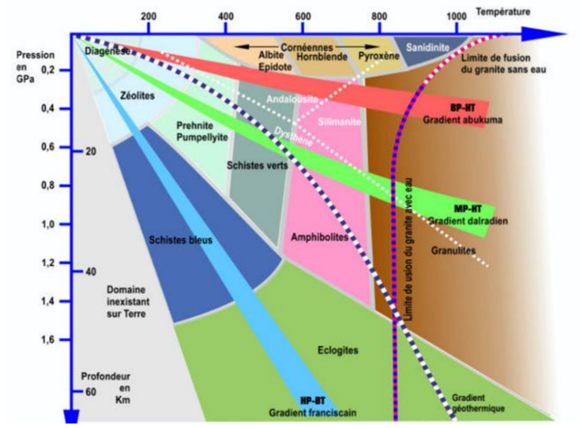

Figure 5: Pressure-temperature diagram illustrating the metamorphic domain (Chevalier, 2007).

4.2 Lithochronostratigraphic discontinuity between the Mayumbian Group and the Sansikwa Subgroup

In the region between Mpete and Ndwizi, the transition from the protoliths of the Mayumbian metasediments to the sandy-clay deposits of the Sansikwa Subgroup recalls a sedimentological history that is similar but distinct in its evolution.

However, the sedimentary pile of the Sansikwa Subgroup (Table 1), composed of alternating clay and sand, is similar to the protoliths of the phyllades, chloritoschists, sericite-schists and metaquartzites of the Koromazo, Sikila, Mont Lungu and Ndwizi Formations that make up the Mayumbian Group (Lepersonne, 1974). The work maintains that these rocks result from the metamorphism of finely bedded shales, the bedding of which can be seen in the alternation of dark clay beds and light sandstone/silt beds (Beaux et al., 2011). The polymorphic changes in the clays and the metamorphic recrystallisation of chlorite and sericite indicate the transition from diagenesis (the Mpete, Bangu and Nganga shales) to typical anchizone and epizone metamorphism (Figure.5), represented respectively by the phyllades of the Tadi-di-Mosi village and the chloritoschists and sericite-schists of the Nduizi, Koromazo, Sikila and Mont Lungu Formations.

Table 1: Lithostratigraphic subdivision of the West Congo Range (Tack. 1976; Cahen 1978; Cahen and Lepersonne, 1981) and revised by (Tack et al., 2001).

Lithostratigraphic units	Lithofacies	Protoliths
Sansikwa sub-group	- Zonal shales ; - Alternating shales and quartzites ; Quartzites ; - dolerite sills.	
Mayumbian Group	Ndwizi Formation	Shales, sandstone.
Table 1(Cont.): Lithostratigraphic subdivision of the West Congo Range (Tack. 1976; Cahen 1978; Cahen and Lepersonne, 1981) and revised by (Tack et al., 2001).		
	Mount Koromazo Formation : sericitoschists, metaquartzites and phyllades.	Shales, sandstone.
	Mount Lungu Formation : sericitoschists, chloritoschists and sericite quartzites.	Shales, sandstone.

	Sikila Formation : intercalations of sericitoschists, chloritoschists and micaceous quartzites.	Shales, sandstone
	Intrusion of Lufu and Yoyo Granites	

The alternation of sandstone and clay beds in the metasedimentary protoliths of the Mayumbian Group (Table 1) suggests that the sedimentary input remained unchanged during the Tonian of the West Congo Range and that the palaeomilieu of deposition remained continental, more precisely fluvio-lacustrine, as evidenced by the presence of ripple-marks in the Sansikwa Subgroup. This continental palaeomilieu of deposition is further confirmed, according to the study, by the intercalation of the Gangila continental tholeites, the Palabala-d'Inga rhyolitic nappes and the Tadi dia Sona, Kimuaka and Isangila dolerite sills (Dewey, 1982). In addition, the lithospheric stretching affecting the Congo-Sao Francisco craton surrounded by the transmazonian-Kimezian supra-crustal in the Rodinia Supercontinent gave rise to the Mayumbe trough, where the Zadinian schist protoliths were deposited, Mayumbian schists and Sansikwa sediments confirms an evolutionary sequence from fluvio-lacustrine sedimentary basins suitable for intracratonic subsidence to continental rifts for Zadinian-Mayumbian schists and Sansikwa sediments. These characteristics suggest that the Tonian sedimentary deposits (Table 2) of the West Congo Range were marked by alternating sandy/silty and clayey levels and by cyclical increases in the thickness of the sandy levels: the large sandstone beds of the Matadi Formation at the top of the Zadinian Group and thick quartzite beds at the top of the Sansikwa Subgroup overlying the Mayumbian Group.

Table 2: Ideal sedimentary sequence illustrating cyclic clay-sand interstratification in the Tonian deposits of the West Congo Supergroup.

Unités lithostratigraphiques		Log	Description des protolithes
Groupes	Sous-groupe/ Formations		
Groupe Ouest-Congolien	Sous-groupe de la Sansikwa		Alternance des lits argileux et greseux/silteux avec des bancs de grès.
Groupe Mayumbien	Formation de Koromazo		Alterance des lits argileux et gréseux/silteux
	Formation de Sikila		Alterance des lits argileux et gréseux/silteux
	Formation du Mont Lungu		Alterance des lits argileux et gréseux/silteux

On the Mpete-Ndwizi geological section, taking into account the East-West lateral transition from shales to shales via phyllades, the non-existence of the Mayumbian clast conglomerate at the base of the Sansikwa Subgroup and the erosional unconformity between these two lithological units, there are sedimentological grounds for, invalidate the lithochronostratigraphic discontinuity established between the Mayumbian Group and the Sansikwa Subgroup, the existence of two orogenic cycles and the posteriority of the sedimentary deposition constituting the rocks of the Sansikwa Subgroup to the West Congo synkinematic metamorphism affecting the protoliths of the metasediments of the Mayumbian Group. On the basis of the above arguments, it can be argued that there is lithochronostratigraphic continuity between the Mayumbian Group and the Sansikwa Subgroup.

This continuity is similar to the studies on the Sibiti square step belonging to the same Range in the Republic of Congo (J. Cosson and P. Nicolini, 1959). These authors group the Moussouva (Mbeia) Series with that of Mvouti (Banza) in the Bamba Mountain System, the lithostratigraphic equivalent of the West Congolian Group, because of the similarity of their sediments and the tectogenic unit they form. And they consider that the Lower Tillite Series forms the base of the Western Congo System.

The hypothesis of discontinuity insinuated by lithological change, apart from magmatic intrusions and outpourings, from the base of the Zadinian to the summit surface of the Sansikwa Subgroup, does not conform to the criterion of lithostratigraphic subdivision as defined by the Subcommission on Stratigraphic Classification of the International Union of Geological Societies (Tack et al., 2001). This is reinforced by the change in depositional environments during the Sturtian period, when the Lower Diamictite Formation was deposited. In other words, the boundary between the Tonian and Sturtian periods in the West Congo-Kongo Central chain is marked by a change in the environments to which specific sedimentations are attributed: the shale-sandstone alternation in the fluvio-lacustrine environment during the Tonian and the glacial conglomerate (Lower Diamictite) during the Sturtian.

The similarity between the fault networks affecting the Sansikwa Subgroup and those observed in the Mayumbian Group in the Mayumbe Graben may also support lithostratigraphic uniqueness, given that these faults are responsible for subsidence from the deposition of the Zadinian through the Mayumbian Group to the deposition of the Sansikwa Subgroup. This implies that the similarity in the development of the mobile material and the depositional environments can be explained by the near equality between the rejection of the faults that created the space available in the Sansikwa Subgroup and that of the faults in the Zadinian-Mayumbian fluvio-lacustrine environment prior to the establishment of the carbonate deposits of the passive margin of Sekelolo black limestone of the Haut-Shiloango Subgroup.

5. Conclusion

The lithochronostratigraphic breaks previously established between the Mayumbian Group and the Sansikwa Subgroup are rather minor discontinuities based on the lithological difference linked to the decrease in West Congo orogenic pressure with an easterly vergence noted by the progressive passage from the shales of the Sansikwa Subgroup located to the east to the sericite and chlorite schists passing through the phyllades of the Mayumbian Group on the right bank of the Bembezi River. Sansikwa Group in the east to the sericite and chlorite shales, passing through the phyllades of the Mayumbian Group on the right bank of the Bembezi River (Matete) with a sub-meridian flow in the west. Sedimentological characterisation reveals a uniformity of deposits and sedimentary environments from the protoliths of the Mayumbian schists to the Sansikwa shales and the absence of an erosional palaeosurface at the base of the Sansikwa Subgroup.

References

Allen, J.R.L., 1968. Current ripples. Their relation to patterns of water and sediment motion. Amsterdam: North-Holland Publ. Comp, 433p.

Allen, J.R. and Allen, P.A., 2005. Basin analysis. Principles and applications, 2th edition, Blackwell publishing, 549 p.

Alkimim, F.F., Marshak, S., Pedrosa-Soares, A.C., Peres, G.G. and Cruz, S.C.P. and Whittington, A., 2006. Kinematic evolution of the Araçuai-West Congo orogen in Brazil and Africa: Nutcracker tectonics during the Neoproterozoic assembly of Gondwana, Prec. Res. 149, 43-64.

Alvarez, P.H. and Maurin, J.-C., 1990. Le Supergroupe Ouest-Congolien au Congo (Protérozoïque supérieur-Paléozoïque): évolution sédimentologique, stratigraphie séquentielle du Cycle Schisto-calcaire. Implications en Afrique centrale. Etudes récentes sur la géologie de l'Afrique, 15ème Colloque Géologie Africaine, Publication CIFEG 22, 255-258.

Alvarez, P.H., 1995. Les facteurs de contrôle de la sédimentation du Supergroupe Ouest-Congolien (Sud-Congo). Rampe carbonatée et activité biologique au Protérozoïque Supérieur. Implications en Afrique Centrale (Congo, Zaïre, Gabon, Angola, Cameroun, Guinée Equatoriale, Centrafrique), Doc. BRGM 239, Ed. BRGM, 272p.

Alvarez, P.H., Maurin, J.C. and Vicat, J.P., 1995. La Formation de l'Inkisi (Supergroupe Ouest-congolien) en Afrique centrale (Congo et Bas-Zaïre) : un delta d'âge Paléozoïque comblant un bassin en extension, Journ. Afric. Earth Sci., Vol.20, N°2, 119-131.

Anderson, M.E., 1951. The dynamics of faulting, Oliver and Boyd, Edinburg, 241p.

Aubouin, J., Brousse, R. and Lehman, J.P., 1979. Précis de géologie, tome 3 : Tectonique, tectonophysique, morphologie, Dunod, Paris, France, 759p.

Byamungu, B.R., Louis, P. and Caby, R., 1987. Reconnaissance gravimétrique de la chaîne Ouest-Congolienne, Congo-Bas-Zaïre, Journ. Of African Earth Sciences, Vol.6, n°5, 767-772.

Cahen, L., 1954. Géologie du Congo Belge. H.Vaillant-Carmanne, Liège, Belgique, 576p.

Cahen, L. (1978) : La stratigraphie et la tectonique du Supergroupe Ouest-Congolien dans les zones médiane et externe de l'orogenèse Ouest-Congolien (Pan Africain) au Bas-Zaïre et dans les régions voisines, Ann. Soc. Géol. Belg. 99, 189-203.

Cibambula, C.M.E., 2013. La Formation du conglomérat de Bangu-Niari sur le massif de Bangu (degré de Ngungu), une diamictite périglaciaire, témoins de la fragmentation de Rodinia dans le fossé de la Basse-Sangha, Mém. D.E.A., Inédit, Dép. Sces de la Terre, Univ. Kinshasa, 97p.

Cibambula, C.M.E., 2016. Le Sous-groupe de la Mpioka : un flysh de la chaîne panafricaine West Congo dans le Kongo Central (R.D. Congo), Thèse de Doctorat en Science géologique, Facultés des Sciences, Dép. Géosc., Université de Kinshasa, République Démocratique du Congo, Pp. 158.

Cosson, J., 1955. Notice explicative sur les feuilles Pointe-Noire et Brazzaville, Carte géologique de reconnaissance, Publ. Direction des Mines et Géol. A.E.F. et Serv. Mines Cameroun, 56 p.

Dadet, P., 1969. Notice explicative de la carte géologique de la République du Congo-Brazzaville au 1/500.000 (zone comprise entre les parallèles 2° et 5°Sud), Mém. du BRGM (70), 99 p.

Daly, M.C., Lawrence, S.R., Diemu-Tshiband, K. and Matouana, B., 1992. Tectonic evolution of the Cuvette centrale, Zaire, Journ. Geol. Soc., London, 149, 539-546.

Delhal, J. and Ledent, D., 1976. Age et évolution comparée des gneiss migmatitiques prézadiniens des régions de Boma et de Mpozo-Tombagadio (Bas-Zaïre), Ann. Soc. Géol. belg. 99, 165-187.

Dévigne, J.P., 1965. Avant-propos sur la chaîne ouest-congolienne (Précambrien de l'Afrique centrale), C.R. Soc. Géol. Fr., 1965, 6, 195p.

Franssen, L. and André, L., 1987. The Zadinian Group (Late Proterozoic, Zaire) and its bearing on the origin of the West Congo orogenic belt, Prec. Res. 38, 215-234.

Frimmel, H.E., Tack, L., Basei, M.S., Nutman, A.P., Boven, A., 2006. Provenance and chemiostratigraphy of the Neoproterozoic West Congolian Group in the Democratic Republic of Congo, Journ. African Earth Sciences 46, 221-239.

Hoffman, P.F., 1991. Did the breakout of Laurentia turn Gondwanaland inside out?, Science 252, 1409-1412.

Kuenen, Ph.H. and Migliorini, C.I., 1950. Turbidity currents as a cause of graded bedding, J. Geol. 58, 91-127.

Kuenen, Ph.H., 1966. Experimental turbidite lamination in a circular flume, J. Geol. 74, 523-545.

Lepersonne, J., 1974. Notice explicative de la carte géologique du Zaïre au 1/2000.000, Direction des Mines de la République du Zaïre, 67p.

Lepersonne, J., 1977. Structure géologique du bassin intérieur du Zaïre, Bull. Acad. Roy. Belg., Classe des Sciences, 5è série, LXIII, 941-965.

Nicolaï, J., 1954. Observations sur les series sédimentaires du Niari (Moyen-Congo A.E.F.), Congr. Géol. Int. XIXè Sess. Alger (1952), Fasc. XX. Ass. Serv. Géol. Afr., I, 163-173.

Nicolini, P., 1959. Le syndicat de la Nyanga (zone de la boucle du Niari). Contribution à l'étude des minéralisations stratiformes du moyen-Congo, Bull. Dir. Gén Mines et Géol. A.E.F., 178p.

Pedro-Soares, A.C., Noce, C.M., Vidal, P., Monteiro, R.L.B.P. and Leonardo, O.H., 1992. Toward a new tectonic model for the Late Proterzoic Araçuai (SE Brazil)-West Congolian (SW Africa) belt, J. South Am. Earth Sci.6,33-47.

Pedro-Soares, A.C., Noce, Vidal, P., Leonardo, O.H. and Brito-Neves, B.B., 1998. Neoproterozoic oceanic remnants in eastern Brazil: Further evidence and refutation of an exclusively ensialic evolution for the Araçuai-West Congo orogen, Geology 26, 519-522.

Pedrosa-Soares, A.C, Noce, C.M., Wiedemann, C. and Pinto, C.P. (2001): The Araçuai – West-Congo Orogen in Brazil: An overview of a confined orogen formed during Gondwanaland assembly, Prec. Res., 110, 307-323.

Pettijohn, F.J., Potter, P.E. and Siever, R., 1987. Sand and sandstone, Spring-Verlag, Berlin, 543p.

Porada, H., 1989. Pan African rifting and orogenesis in Southern to Equatorial Africa and Eastern Brazil, Prec. Res., 44, 103-136.

Reineck, H. E. and Wunderlich, F., 1968. Classification and origin of flaser and lenticular bedding, Sediment. 11, 99-104.

Reineck, H.E. and Singh, I.B., 1973. Depositional sedimentary environment, Spring-Verlag, 939p.

Rogers, J. J. W., Unrug, R. and Sultan, M., 1995. Tectonic assembly of Gondwana, J. Geodynamics, Vol. 19, n° 1, 1-34.

Tack, L., 1983. Extension du Mayumbien au Bas-Zaïre : Le problème de sa délimitation cartographique et implication sur les concepts du cadre géologique général du Précambrien du Bas-Zaïre, Rapport Annuel 1981-1982 du Département de Géologie et Minéralogie, Mus. R. Afr. Centr., Tervuren (Belg.), pp. 127-133.

Tack, L., Wingate, M.T.D., Liégeois, J.P., Fernandez-Alonso, M. and Deblond, A., 2001. Early Neoproterozoic magmatism (1000-910 Ma) of the Zadinian and Mayumbian Groups (Bas-Congo): onset of Rodinia rifting at the western edge of the Congo craton, Prec. Res., 110, 277-306.