

地質学セミナー

Rewriting the tectonic evolution story of Nigerian metamorphic basement. A window to the evolution history of the trans-Saharan mobile belt.

発表者② Ugwuonah Emmanuel Nwahukwu (岩石学分野 D2)

The tectonic evolution story of the Nigerian metamorphic basement complex as currently held establishes among other things 1. That the eastern and western halves of Nigeria are two different continental domains joined approximately along longitude 8° with the eastern bloc possessing higher grade gneisses and migmatites and 2. That the sporadic distribution of the Precambrian calc-alkaline granite suits throughout the entire Nigerian basement areas (from east to west) is a single consequence of the closure and eastward-dipping subduction of the Goiás-pharussian Ocean plate which previously separated the west African craton to the west and the Dahomeyan-Nigerian orogen to the east. No study has however considered firstly, the possibility of the eastern Nigeria being a basement interior while the west was a passive margin deltaic to marine environment towards the Ocean to the west and secondly, the distances from the suture zone of the extinct Goiás-pharussian Ocean to the occurrences of the calc-alkaline granite suits within the Nigerian basement.

In the present study, four case study localities of the Nigerian metamorphic basement rocks were targeted for detailed study because they contained the three major Precambrian rock units of the Nigerian basement complex namely; the migmatite complex, the younger metasediments and the calc-alkaline granite suits. One locality was chosen in the east, one at the central Nigeria and two in the west. Approximately 20 rock samples covering all available rock types in each locality were collected and detailed laboratory analysis including petrographic description and EPMA mineral chemistry analysis have been carried out for the east, central and one west localities. Whole rock geochemistry has been done completely for the central Nigerian locality while rock U-Pb dating is part of the ongoing laboratory works.

For the central Nigerian locality (Keffi area), the mineral assemblage obtained from metapelites includes biotite, staurolite, garnet, quartz, ilmenite and secondary chlorite, giving a P-T range of 6.4-7.72 kbar and 610-629°C and a clockwise P-T path. These results plus field evidences including simple linear structural style, absence of rock types such as greenstones, ophiolites, meta-pelagic sediments including meta-cherts and metacarbonates points to a magmatic arc tectonic setting for this locality. For the eastern Nigerian locality (Obudu area), mineral assemblage obtained from the metapelites includes biotite, garnet, plagioclase, sillimanite, cordierite, spinel and quartz. This result is similar with the

result of the mineral assemblage of the far west locality (Akoko Ondo area) which includes garnet, biotite, quartz, plagioclase, sillimanite and spinel for the metapelites. These results do not suggest any lithologic or metamorphic differences between the east and the west. Furthermore, the results of the field observations on the second western locality (Igarra area) shows the rock types to include marbles, calc-silicate rocks, pelitic metasediments, ridges of quartzites, meta-conglomerates, greenish meta-mafics, metamorphosed chaotic sediments, meta-marine pyroclastics, calc-alkaline granitoids (hornblende granites, adamellites and aplites), migmatitic gneisses and charnockites along with structural signatures like high angled- isoclinal folds, zones of vertically dipped, mylonitized calc-silicate rocks and faults all strongly suggesting a subduction zone in Igarra area, southwest of Nigeria (ongoing geochemical analysis will be used to confirm the genetic characteristics of the granitoid rock suits)

The present study therefore goes to prove not only that Nigeria is not divided into higher grade east and a lower grade west but also the existence of model subduction zones within the Nigerian basement complex terrane and that most of the suits of Precambrian calc-alkaline granites are actually products of subduction of ancient micro-oceanic plates due to the collisions of ancient micro-continental plates making up the now stabilized metamorphic basement. The significance of the result of this research will be far reaching in proving first that the trans-Saharan belt is actually built out of the amalgamation of many micro-continental domains and secondly proffering a solution to the evolution of the sporadically distributed suits of Precambrian calc-alkaline granites throughout the basement complex areas from east to west of Nigeria in particular and the trans-Saharan mobile belt at large.

【次回予定】

日時: 11月30日(水) 17:00 -

場所: 自然系学系棟B114

発表者: ①町田 南海子 (生物圏変遷科学分野M1)
②山内 夏隆 (地球史解析科学分野M1)

連絡先: 池端 慶 (岩石学)
ikkei@geol.tsukuba.ac.jp
安里 開士 (地球史解析科学)
asato@geol.tsukuba.ac.jp