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NSUGBE FORMATION (?): A CASE OF NON-COMPLIANCE WITH STRATIGRAPHIC NOMENCLATURAL PROCEDURES

B. N. NFOR

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ABSTRACT

The compliance level with the code of generally accepted stratigraphic nomenclature by authors who have introduced, used and disseminated the terminology "Nsugbe Formation" in both national and international geologic literature has been investigated using relevant articles of the American Commission on Stratigraphic Nomenclature (ACSN) and existing field observations/data on the lithologic unit. Results show that the said 'Nsugbe Formation (?) has never been officially proposed for consideration as a formal stratigraphic unit in any scientific journal (as required by the law) and should not be used as such. Results have further shown that this indiscriminate use of formal stratigraphic names without due diligence is not unconnected with the bizarre absence of neither any official Nigerian code on stratigraphic nomenclature nor any Compendia to record/guard Nigerian stratigraphic names. The case of the Nsugbe Formation (?) is not an isolated incident of non-compliance; it is believed to be one out of a multitude of non-compliant cases, if any stratigraphic watch dog committee were to beam its search light on existing stratigraphic units. The main objections to the acceptability of the formalization of the unit as 'Nsugbe Formation' (as has been introduced and used), borders on the non-compliance with legal stratigraphic nomenclatural requirements, viz; specifying a Type Section, Type Area, distinct lithologic characteristics, sedimentologic details and its mappability on scales of 1:25,000.

KEYWORDS: Nsugbe Formation, Anambra Basin, Type Section, International Code of Stratigraphic Nomenclature, Non-compliance.

INTRODUCTION

Between the years 1903 and 1904, Nigeria witnessed the inauguration of its pioneer geologic bodies – the Mineral Surveys of Southern and Northern Nigeria respectively. The two bodies were charged with the initial mineral survey/geological investigations of the country. The Geological Survey of Nigeria (GSN) was created in 1919, following the dissolution of the Mineral Survey units, and was charged with the responsibility of mapping the entire country. According to a Geological Survey of Nigeria (GSN) Report, (1987, p7.) the pioneer British expatriate geologists collected samples in Nigeria and took them to London for laboratory analyses/map production. It is thus logical to conclude that most important geologic works including the nation-wide geological survey and mapping that resulted in the drafting and production of all topographic and most geologic maps used in Nigeria today were guided by the British Geological Codes. Such codes including the Code on Stratigraphic Nomenclature, which possibly could have been either completely accepted (without amendments), or amended/adopted by Nigerian geologists is yet to be officially documented in the annals/archives of the GSN or any such related geological body, forty-seven years after Independence. The absence of such an important document is most probably responsible for the introduction and use (though not a common occurrence) of some stratigraphic names in the Nigerian stratigraphic record as though they had been formalized, as exemplified by the use of 'Nsugbe Formation'. If this scenario continues unabated, Nigerian stratigraphy could soon begin to witness a more chaotic state than that of the early European stratigraphy prior to its reorganization.

Well over thirty years ago, while investigating the sedimentologic and stratigraphic features of the Nanka Sands in Anambra State, Southeastern Nigeria, Nwajide, (1977) observed some remarkable lithologic changes extending from the northwestern part of Onitsha town to Nsugbe and environs. To him, the occurrence of a distinctly ferruginized and quite consolidated sandstone adjacent the Nanka Sand was a clear indication that he had reached the northwesterly boundary of the Nanka Sand. Nwajide, (1977) in his unpublished M.Phil Thesis, suggested 'Nsugbe Formation' status for the area. The extent of the formation according to Nwajide (1977) is presented in Figure 1. Such a binomial nomenclature in lithostratigraphic nomenclatural circles is indicative of a formally proposed, accepted and adopted lithostratigraphic unit whose geographic location (entity) is Nsugbe and its position in the lithostratigraphic ranking is of formational status. Since then, many authors including Umenweke (1996), Egboka (1993), Orajaka et al (1992) among others have embraced, taught and disseminated such literature in scientific journals (both local and international alike) and in classrooms.

The objectives of the present research are multiple; firstly, to investigate whether Nwajide (1977) or any other person had ever formally proposed 'Nsugbe Formation' for consideration as a formal stratigraphic unit, and secondly to find out whether due process was observed (as required by stratigraphic nomenclatural norms) in that event and if not to find out why the term

B. N. Nfor, Department of Geology, Anambra State University, Uli P.M.B. 02 Uli, Nigeria.

has continuously been and is still being used in current scientific publications.

METHODOLOGY

The methodology adopted for this work is an in-depth analysis of the relevant articles of the American Commission on Stratigraphic Nomenclature (ACSN) and the reappraisal of existing field data on the Nanka Sands and the 'Nsugbe Formation' as muted by Nwajide (1977) in his M.Phil Thesis. The articles of the ACSN, are a set of guidelines for naming/renaming of stratigraphic units. This is one of the most widely accepted and handy legal stratigraphic document, itself adapted from the documents of the International Commission on Stratigraphy (ICS). The ASCN document is adopted here in the absence of any such customized document in the annals of neither, the present Geological Survey Agency, the (GSA), nor the Nigerian Mining and Geoscience Society (NMGS).

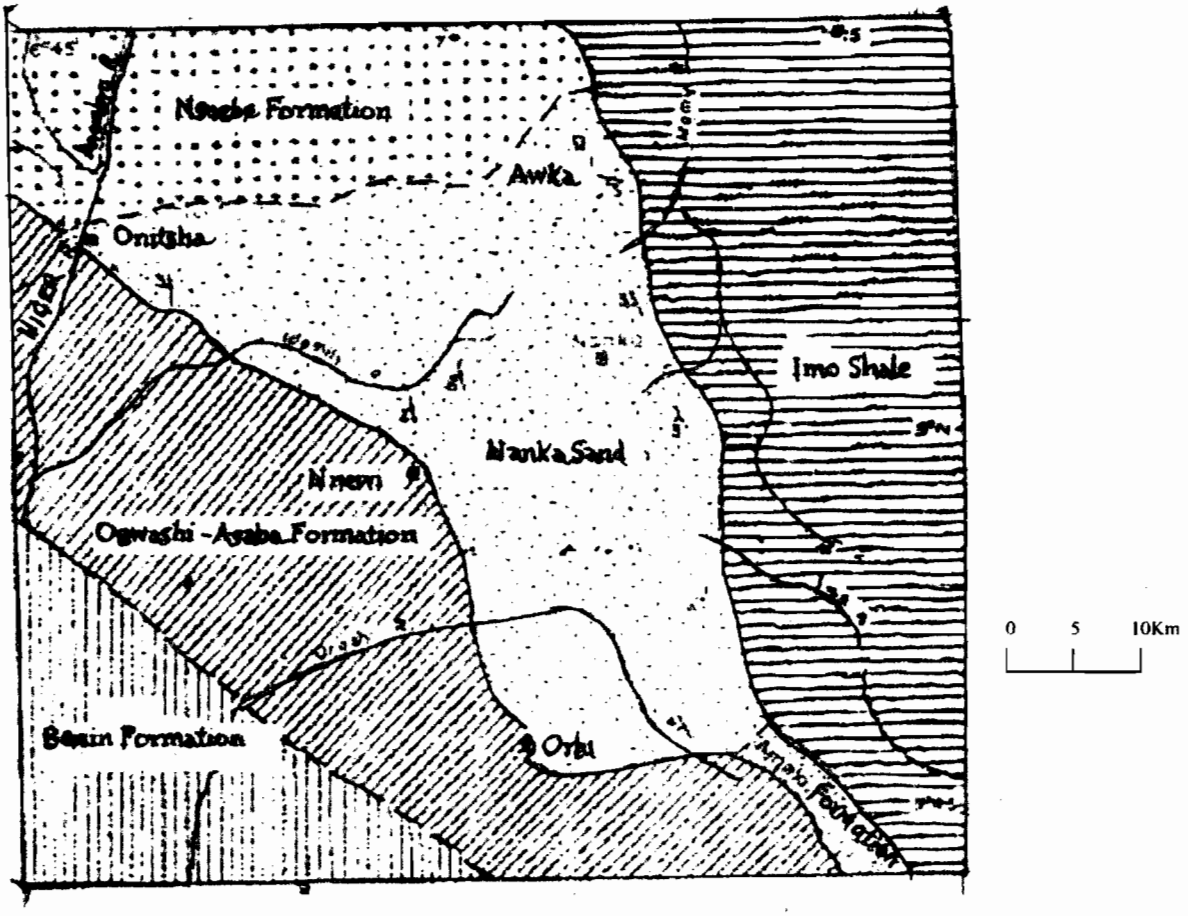

Fig. 1: The position of the Nsugbe Formation in Anambra State. (After Nwajide, 1977)

RESULTS

Outcrops of the Nsugbe Formation (?)

Egboka (1993) and Orajaka et al (1992) have identified and assigned some outcrops to the Nsugbe Formation, which include the outcrop located at Km 18, near Tempo Mill Factory, Umunya and that at the Onitsha Toll gate all along the Onitsha-Enugu express way; and the outcrop at Km 116 along the Onitsha – Adani-Nsukka road, near Nsugbe. The locations of these outcrops are presented in Figure 2.

The outcrop located at Km 18, Umunya is a focus of intense controversy since according to Nwajide and Reijers (1996) and Nwajide et al (2004), it is an outcrop of the Nanka Sand. In fact, Nwajide (personal communication) has even proposed the outcrop as a replacement to the original Nanka Sand Type Section because the original Type Section at Nanka is almost concealed and inaccessible due to unabated gully erosion activities. In order to give a fair and unbiased arbitration of two contrasting opinions about the Km 18 outcrop, this write-up briefly inspects the sedimentologic and stratigraphic variation between the Nanka Sand exemplified by its Type Section and those of the Nsugbe Formation. The Type Section of the Nanka Sand is presented in Figure 3.

The type locality of the Nanka Sand is a gully erosion site at Nanka (Reyment, 1965; Nwajide, 1977, Kogbe, 1989). At the type locality, the vertical lithologic section of the Nanka Sand is about 305m thick and is subdivided into seven subunits; I, III, V and VII. The sands are uncemented, loose, medium to coarse, often pebbly sandy beds, while units I and V consist of ferruginous sandstone bands. Subunits I, III and VII are

characterized by cross-beds, and occasionally flaser and burrowed beds or occasionally silt and clays/shales intercalations are observed, which are grey in colour and contain clots of carbonaceous matter as disseminated specks of pyrite, glauconite, gypsum nodules and muscovite flakes.

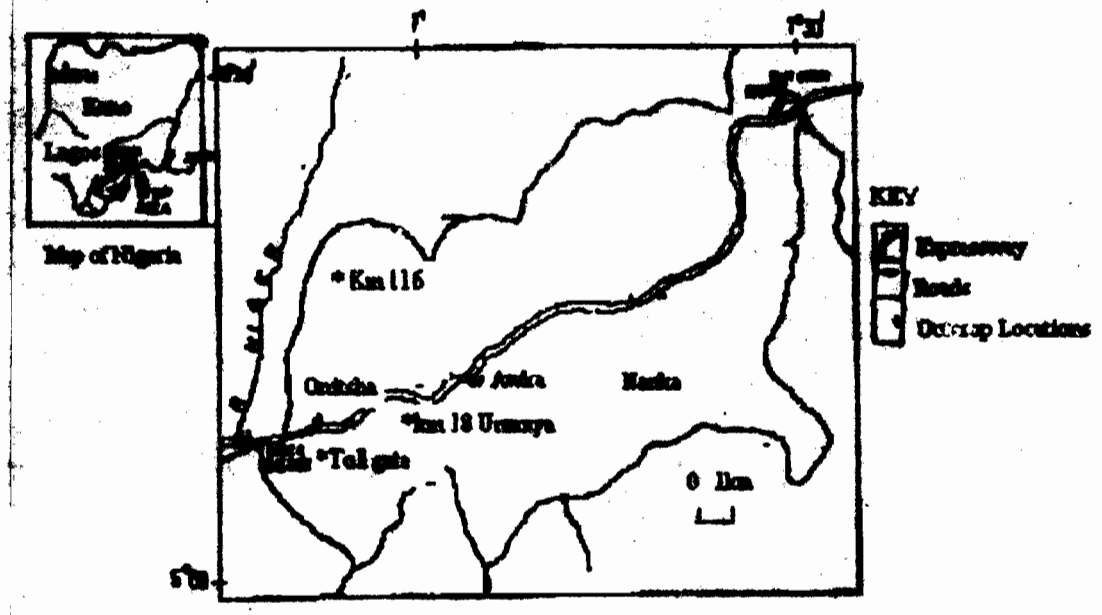

Fig. 2: Sketched road map showing outcrop locations ascribed to Nsugbe Formation (adapted from Egboka, 1993)

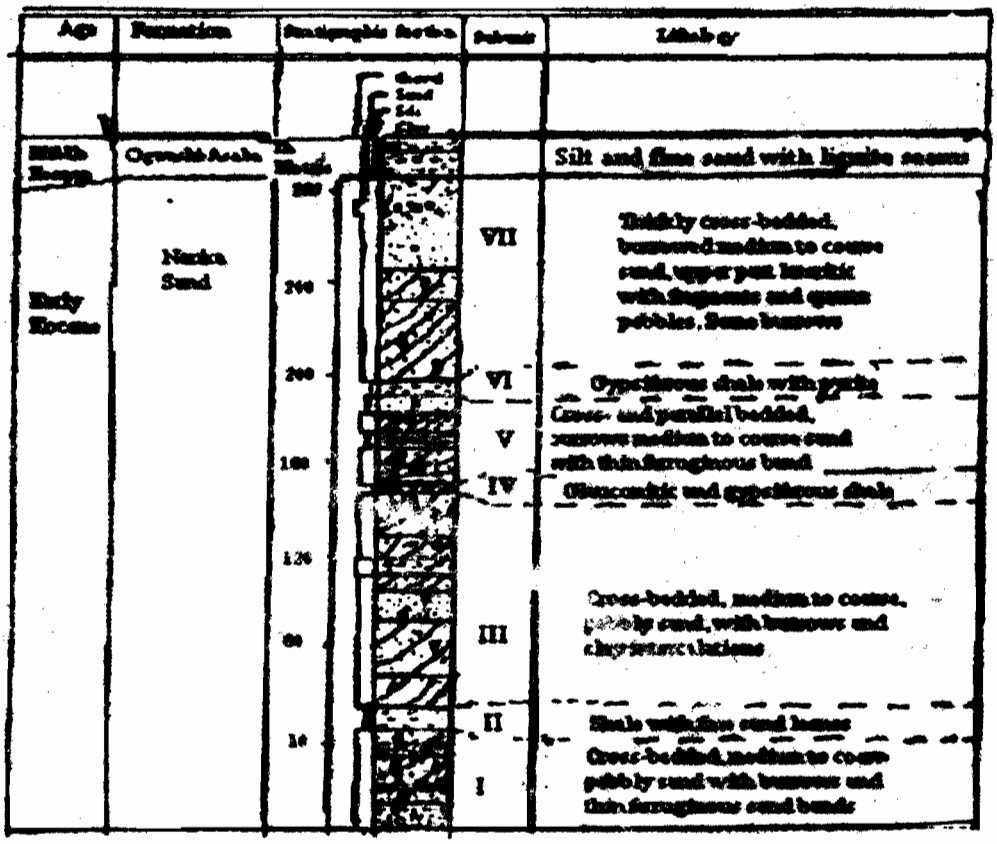

Fig. 3: Stratigraphic and lithologic summary of the Type Section of the Nanka Sand at Nanka Town (after Nwajide 1980)

At Km 18, the outcrop consists essentially of three subunits based on lithology and lithologic associations, gross appearance and parasequence stacking patterns; a lower unit of poorly sorted, medium grained, quartzose, friable sandstone with clay matrix; a mid-section consisting of laminated, slightly fissile mudrocks and sandstone and an upper section of regular alternation of decimeter-thick beds of fine, clayey, ripple laminated, sandstone and grey clays. The sandstone is predominantly cross-stratified, ripple laminated and contains horizontal burrows. This description seems to correlate more closely with the outcrop type section of the Nanka Sand shown in Figure 4 whose type locality has been interpreted as tidal deposits formed by neap-spring tidal cycles (Nwajide, 1996).

The description of the Nanka Sand here greatly contrast with an adjoining unit, which exhibits high level of ferruginization, coarse to pebbly cement and thus highly consolidated sands. The outcrops at Km 116 along the Onitsha – Adani – Nsukka road and at the Onitsha Toll gate were compared with those described above by Nwajide (1977). At these two locations, the outcrops sections consist of ferruginized, indurated coarse grained sandstone, grading into gravels. By virtue of their stronger resistance to erosion (in contrast to the friable and gully-prone areas underlain by the Nanka Sands), areas underlain by the Nsugbe Formation ? exhibit isolated rounded hills, which have been occasionally exposed at stream channels and by local miners who quarry the rocks into gravelly aggregates for construction works. Abandoned quarry sites would thus be the most ideal sites to study the Nsugbe Formation? and could constitute excellent sites for its type section.

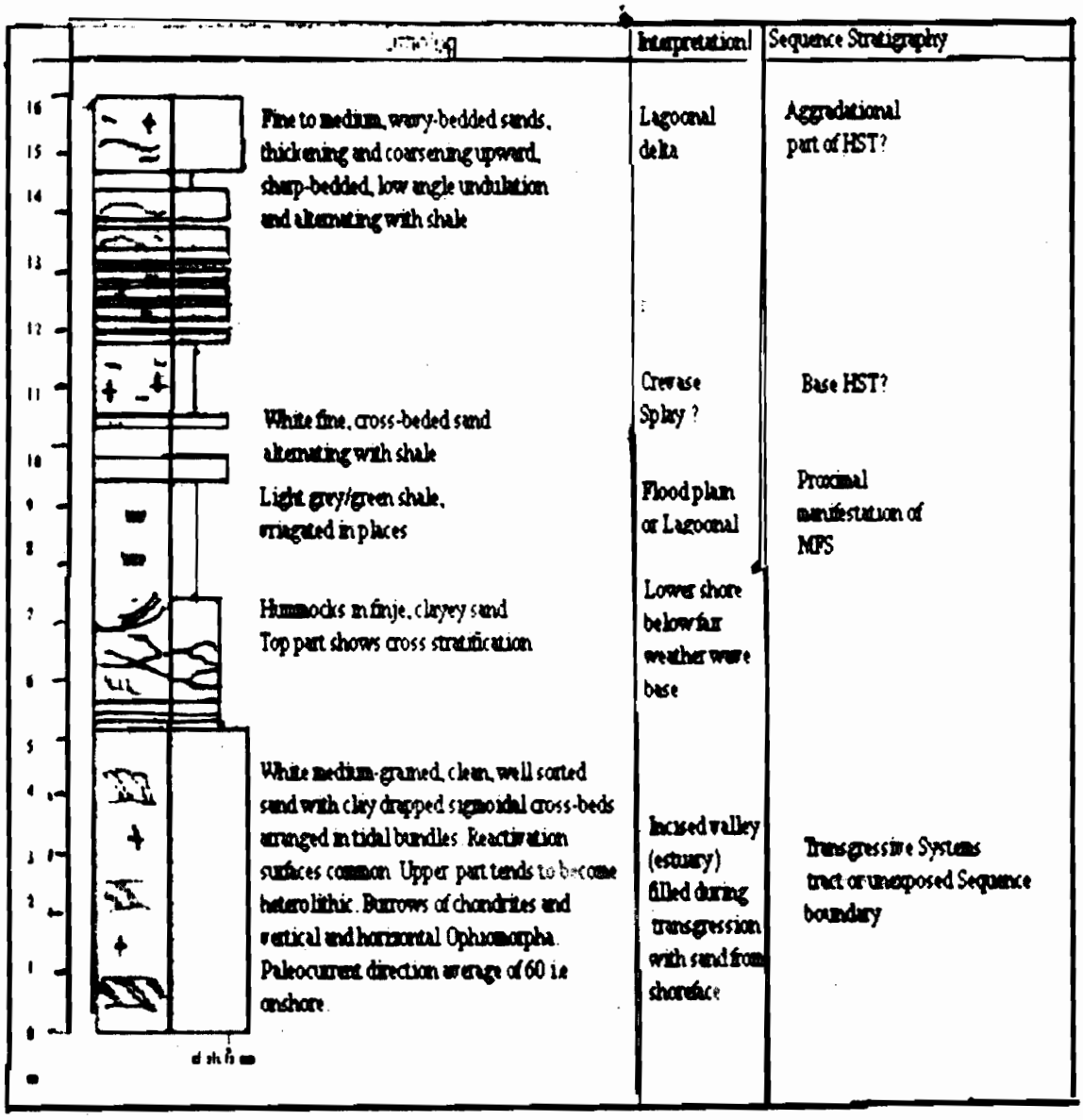

Fig. 4: Lithologic section of Nanka Sand at Umunya exposed at Km 18 Onitsha along the Enugu-Onitsha expressway

DISCUSSIONS

The articles of the American Commission on Stratigraphic Nomenclature.

The Preamble of the ACSN among other things states that "*The articles of this code are recommendations that cannot be generally mandatory, but geological organizations may adopt these articles as their rules of nomenclatural procedures...*" Article 3 of the ACSN dwells on *formal* and *informal* names and units. The article is a systematic collection of rules of formal stratigraphic classification and nomenclature. Articles 4 to 13 of the same ACSN dwell generally on lithostratigraphic units and more specifically on the nature of the nature of the rock-stratigraphic units. The salient points of Article 4 are as follows;

1. A rock stratigraphic unit is distinguished and delineated on the basis of the lithologic characteristics, recognized and defined by observable physical features, with boundaries placed at sharp contacts, or drawn arbitrarily within the zone of gradation.
2. For the purposes of nomenclatural stability, a type section should be designated, with a clear description of the lateral and vertical variations.

The highlights in article 3 of the ACSN are better appreciated when applied in consonance with article 13. Article 13 deals with the procedures for establishing *formal* stratigraphic units. According to article 3, a stratigraphic unit is formal if it has been proposed in publication in conformance with article 13, and has met other requirements specified in the code. On the other hand, a stratigraphic unit and its name are classified as *informal* if they have not been formally proposed. The connotation of the nomenclature "Nsugbe Formation" in stratigraphic circles is that, it is a formal lithostratigraphic unit of formational rank status, whose geographic location/entity is Nsugbe. The present research however has identified very serious legal stratigraphic flaws in the use of such a designation, in defiance of article 13 of the ACSN. Firstly, there has never been a statement of intention to designate the unit as formal. Furthermore, for such a proposal to be accepted (if it were ever made at all), the following vital requirements must be provided; specific type section, specific type locality, one or more of representative sections near the geographic feature and more especially, map of the section, whose practical mappability should be at scales of the order of 1:25,000. As far as this researcher is concerned the only information provided by Nwajide (1977) included a partial and provisional Nanka Sand/Nsugbe Formation ? boundary, lithology of the unit, its stratigraphic position relative to the Nanka Sand and its age – Eocene. When this information is weighted against the requirements for formalizing a lithostratigraphic unit, it becomes evident that it is too little to be accepted if proposed without providing further information as demanded by the code of the ACSN. Furthermore, such observations and suggestions by Nwajide (1977), were simply highlighted in his M.Phil Thesis and not in any *recognized scientific medium* as stipulated by article 13 of the ACSN. The phrase *recognized scientific medium* according to article 13 means '*a form of publication, available to the scientific public, regardless of size of edition or form of publication but it clearly excludes restricted media such as letters, company reports, theses, dissertations, newsletters and commercial/trade journals*'. Article 13 further emphasizes that "*...to be valid, a new name should be duly proposed as outlined above*'. The provisions of the last two paragraphs of Article 13 have provided very strong evidence against the continual use of the terminology 'Nsugbe Formation' since Nwajide's (1977) medium of communication was his M.Phil thesis.

CONCLUSIONS AND RECOMMENDATIONS

Based on available field data relating to the muted Nsugbe Formation (?)there exist some remarkable differences between it and an adjacent formation – Nanka Sand, which is its lateral equivalent. The data has further shown that, the major lithologic .differences between the two is the highly ferruginized nature of the Nsugbe Formation (?) in contrast to the friable, unconsolidated Nanka Sands. The only work in the unit was done by Nwajide (1977) and other existing minor reports have not provided enough evidence/data to enable it attain formal lithostratigraphic nomenclatural status, as required by the rules guiding lithostratigraphic nomenclature. It is thus logical that the terminology 'Nsugbe Formation' is unlawfully used since its introduction and use are not in compliance with the rules/procedures guiding stratigraphic nomenclature. It is also hereby advocated that relevant geological bodies like the Geological Survey Agency (GSA), Geological Survey of Nigeria (GSN), Council of Nigerian Mining Engineers and Geoscientists (COMEG) and the Nigerian Mining and Geosciences Society (NMGS) etc should establish a Compendia, maintained by a proposed Geologic/Stratigraphic Committee of Nigeria (in the likes of ACSN), where names and nomenclatural procedures and history of formal units will be recorded and preserved. These, it is believed will go a long way in enthroning high compliance levels with stratigraphic norms and also easy referencing.

REFERENCES

Egboka, B.C.E. (ed). 1993. The Raging War: Erosion, Gullies, and Landslides, Ravage Anambra State. Publ. The Government of Anambra State, Nigeria. 223pp.

Kogbe, C. A., 1976. The Cretaceous and Paleocene Sediment of Southern Nigeria, In Geology of Nigeria. Elizabethan Publ. Co., Lagos, Nigeria. 215pp.

Krumbein, W. C. and Sloss, L.L., 1963. Stratigraphy and Sedimentology. 2nd Ed. W.H. Freeman and Company. San Francisco. 660pp.

Nehikhare, J.I. (ed) 1987. Mineral and Industry in Nigeria with notes on the history of the Geological Survey of Nigeria. Publ. Geological Survey of Nigeria. 60pp.

Nwajide, C..S., 1977. Sedimentology and Stratigraphy of the Nanka Sands. Unpublished M.Phil Thesis, Department of Geology, University of Nigeria, Nsukka. 114pp.

Nwajide, C.S. and Reijers, T. J. A., 1996. Field Guide In Selected Chapters on Geology. Shell Petroleum Development Company Nigeria. 97pp.

Nwajide, C.S. and Nwaozor, L.A.U., 2004. Guide for Geological Field Trip to the Anambra Basin, Nigeria. The Shell Petroleum Development Company of Nigeria Limited. 37pp.

Orajaka, I.P., Egboka, B.C.E., Umenweke, M.O., and Obi, G.C., 1992. Report on the first phase of outcrop studies in Southereatern Nigeria. Unpublished Report sponsored by Shell Petroleum Development Company Nigeria. 48pp.

Reyment, R. A., 1965. Aspects of Geology of Nigeria. Ibadan University Press, Ibadan. 145pp.

Umenweke, M.O., 1996. Geotechnical and Hydrogeological Characteistics of an Eocene Multi-chambered Caves, S.E. Nigeria. Journal of the Sydney Speleological Society. 40(7): 107-114.