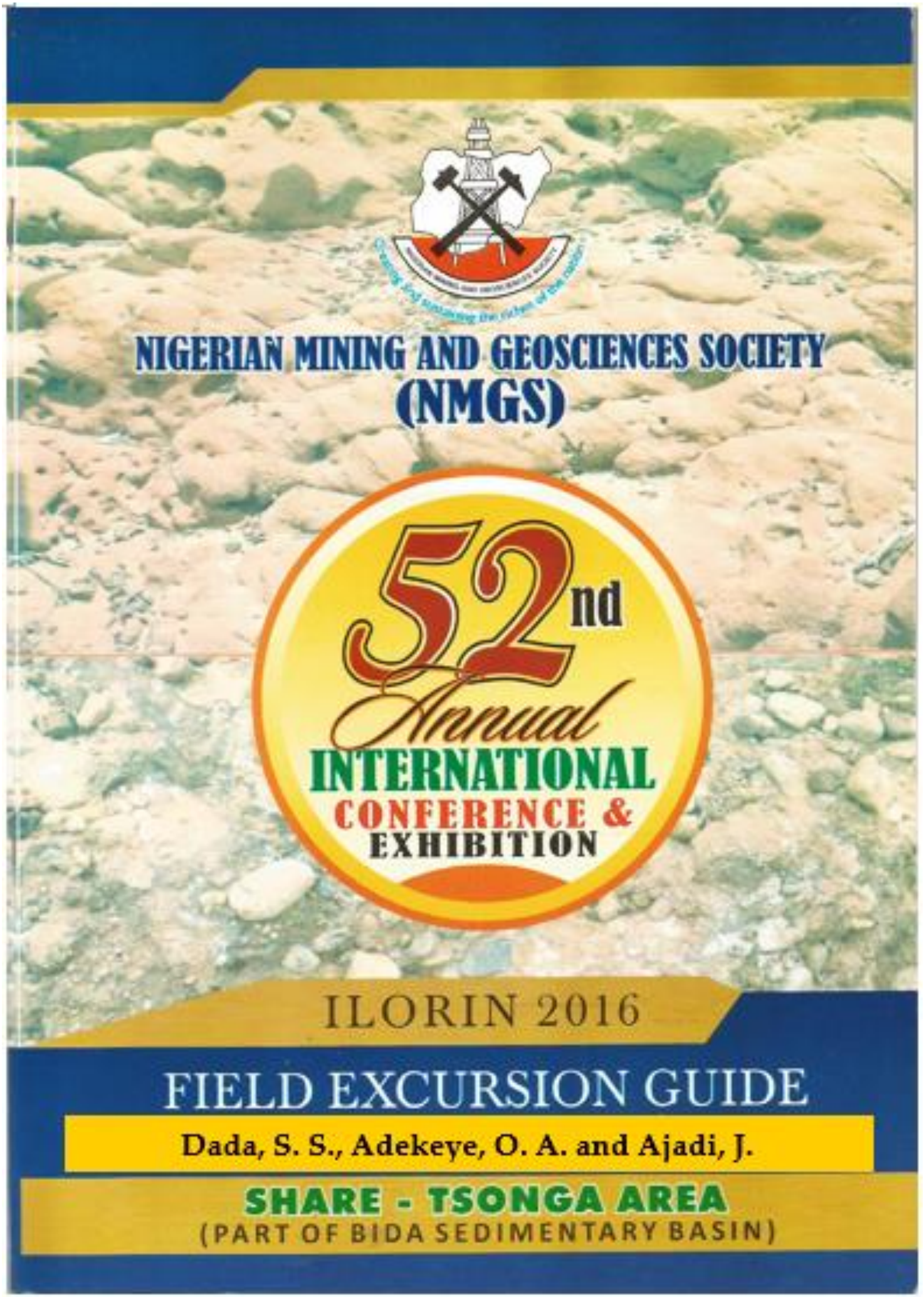


NIGERIAN MINING AND GEOSCIENCES SOCIETY
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FIELD EXCURSION GUIDE

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SHARE - TSONGA AREA
(PART OF BIDA SEDIMENTARY BASIN)

INTRODUCTION

This trip covers part of the E – W traverse (Share – Pategi Road), from the eastern margin of the central Bida Basin through part of the center to the western flank (Fig. 1). Typical sedimentary facies of the alluvial to fluvial and shallow marine sequences of the Campanian to Maastrichtian Bida and Enagi Formation are exposed here. These exposures will offer ample opportunities for students to recognise the unconformable contact between the Pre Cambrian crystalline basement and the Upper Cretaceous sequences and learn the peculiar features of the Enagi Formation will be examined. The massive clay deposit at the Ridge and the water bearing sandstone (spring) at Kange will be examined and this will provide a basis for discussions on the mineral and petroleum resources potential of the basin.

Safety Alert: *Dear participants, you are pleased enjoined to observe all rules that prevent any form of bodily harm. Note that most stops are along the major road in the area, therefore you are expected to cross or walk along carefully. Walking uphill section requires that you are well kitted with snickers or other shoes with good studded soles.*

Origin and evolution of the Bida Basin

King (1950) and Kennedy (1965) described the Bida Basin as a rift bounded tensional structure produced by faulting associated with the Benue Trough system and break-up of the Gondwana. Landsat imageries analysis by Kogbe et al. (1981) indicates that the southern Bida Basin is controlled by NW-SE trending faults which supports a rift model. The existence of a deep seated central positive anomaly flanked by negative anomalies typical of rift structure was

confirmed by the geophysical study of Ojo and Ajakaiye (1989). Whiteman (1982) proposed that the Bida Basin is post-Santonian shallow cratonic sag whilst Braide (1992) suggests the idea of pull-apart origin for the basin. Fig. 1 shows the geographical location of the Bida Basin.

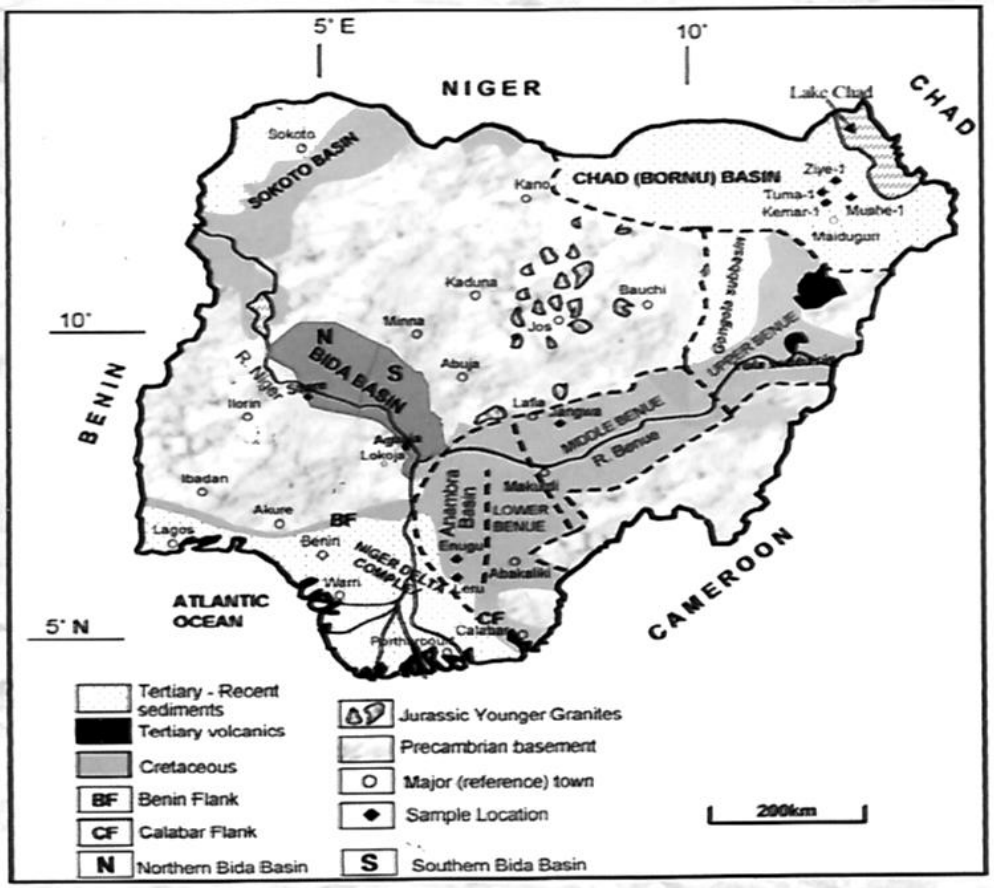


Fig. 1: Geological map of Nigeria and locations of the investigated samples (After Obaje *et al.*, 2004).

Regional Stratigraphy of the Bida Basin

Previous reports on the lithostratigraphic differentiations are controversial. In his pioneer work, Falconer (1911) described the Upper Cretaceous strata in the entire Bida Basin as the Lokoja Series, whereas Russ (1930) referred to them as the Nupe Group. Jones (1958) subdivided the sediments into northern and

southern Bida Basins. Those in the northern Bida Basin comprise of the Bida Formation, Sakpe Ironstone, Enagi Siltstone, and Batati Ironstone (Fig. 2) in the northern part of the basin.

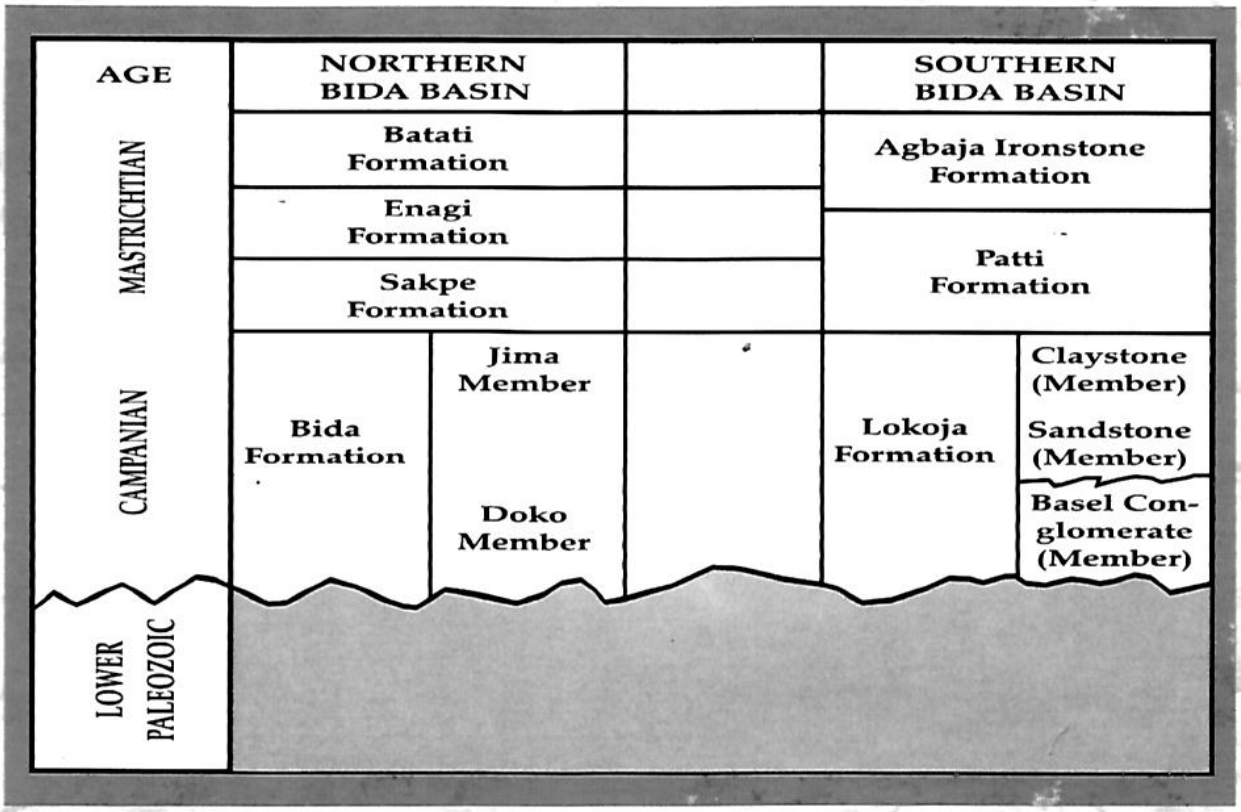


Fig. 2.: Stratigraphic succession of mid-Niger Basin (adapted from Akande et al., 2005)

DESCRIPTION OF FIELD STOPS

Stop 1 (Km 80, Share – Pategi Road) Eastern End of the Basin

The purpose of the stop is to enable students recognise and learn the field characteristics of one the prominent basement rocks (Fig. 3) adjacent to the basin and the overlying Upper Cretaceous sediments. The NNE trending, highly foliated mica schist dip westerly (Fig. 4) and contains cross cutting pegmatites and quartzofeldsparthic veins. It extends from the middle of the River Oyi channel to the eastern flank where it makes contact with granodiorites.



Fig. 3: Crystalline basement complex rock (Granodiorite) exposed at the River Oyi bridge.



Fig. 4: Highly foliated mica schist dip westerly and contains cross cutting pegmatite and quartzo-feldsparthic veins

Stop 2 (Yikpata – Share – Pategi Road)

A non –conformable stratigraphic contact exist between the matrix supported conglomerate facies of the Bida Formation (lateral equivalent of the Lokoja Formation in the Southern Bida Basin) and the pre-Cambrian crystalline mica schist. The proximal alluvial, matrix supported conglomerate (Fig. 5) passes upward into series of stacked braided channel sandstones (Fig. 6). Typical sedimentary structures here are massive bedding and erosional surface.



Fig. 5: Field photograph showing proximal alluvial, matrix supported conglomerate.



Fig. 6: Field photograph showing stacked braided channel sandstones.

Stop 3 (Agbona Ridge, Share/Tsaragi boundary)

At Agbona Hill, the 45m thick section of the Maastrichtian Enagi Formation consists of many coarsening upward cyclic sequences. Each of the cycle begins at the base with massive claystone and grading upward through parallel and cross stratified medium to coarse grained sandstone into a massive conglomeratic sandstone. The claystones are kaolinitic and have been mined locally at various intervals, creating artificial cave towards the middle part of the section (Fig. 7). The sandstones are moderately sorted, relatively quartz rich and in places contains clay clasts and burrows (Fig. 8). Sedimentary structures and textures preserved in the sandstones and facies association in this location are indicative of fluvial braided channels and over bank deposits. However, the occurrence of shallow marine trace fossils and maturity of the sands suggest possible marine reworking in the Maastrichtian time.



Fig. 7: Field photograph showing flood plain kaolinitic claystone about the middle of Abiku Hill section, Share. Note cave feature developed from long period of local mining of the clay.



Fig. 8: Field photograph showing moderately sorted, relatively quartz rich and in places contains clay clasts and burrows.

Stop 4 (Kange – Share Road)

At this location, students will be able to observe the Bida Formation exposed along a road cut showing a coarsening upward trend. There is sandy claystone at the base which grades upward into massive, pebbly sandstone and matrix supported conglomerate at the top (Fig. 9). At this location, the sandstone is water bearing (aquifer) forming a spring that serves the community throughout the year round. The porous sandstone with inter connected pores is confined at the base by the sealing clayey unit. The sediments are interpreted as alluvial to braided channel deposits.



Fig. 9: Field photograph showing massive, pebbly sandstone and matrix supported conglomerate at the top.

Stop 5 (Share Junction, Iyana - Bode Sadu Road)

The sandstone of the Enagi Formation overly non-conformation a - crystalline quartzite. The sandstones which show a vertical upward increase in size, are moderately sorted and mineralogically mature. Sedimentary structure ranges

from massive bedding to small scale cross bedding. Pebbly clasts of kaolinitic clays and bioturbations are common (Fig. 10). The braided channel sandstone might have been reworked by shallow sea during Maastrichtian. Another observation at this location is the absence of the proximal conglomerate facies on top of the crystalline rock which is typical at various part of the margin of the Basin. A possible event is erosion of this depositional phase during uplift.



Fig. 10: Field photograph showing moderately sorted and mineralogically mature sandstones. Pebbly clasts of kaolinitic clays and bioturbations are common. Due to long period of exposure, it is now partly lateritised.

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