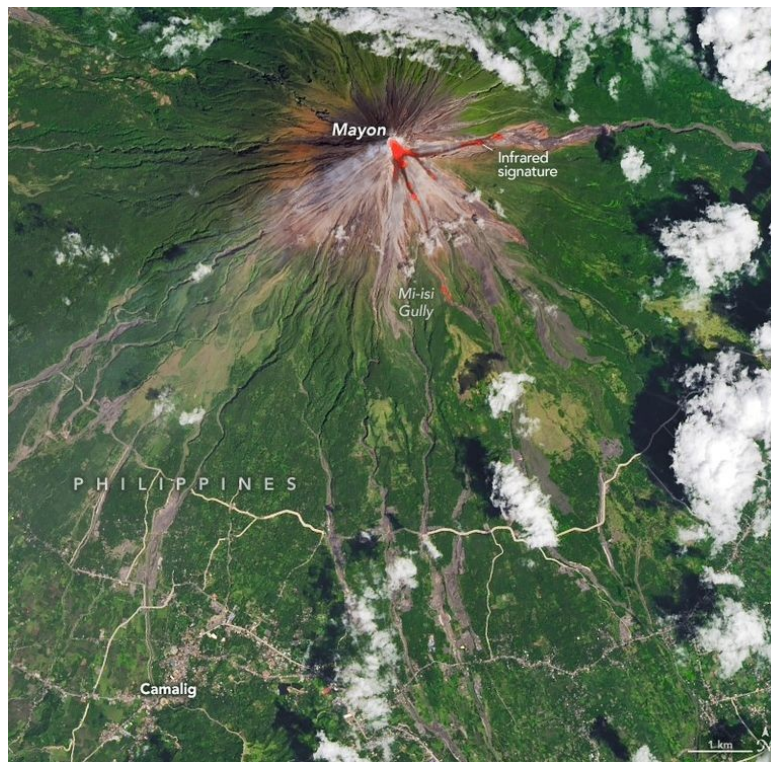


March 16, 2026

News and notes



Eruption at [Mayon Volcano, Philippines](#)
Credit: [NASA Earth Observatory](#), public domain

This week, before going on to discuss the geology and mineral resources of Nigeria, we will first look at some news items I thought were interesting. The picture above is the [March 13, 2026 Image of the Day](#) from the [NASA Earth Observatory](#) of the Mayon Volcano in the Philippines. The image was compiled by [Michala Garrison](#) using [Landsat](#) data.

If you enjoy my blogs, bookmark the site and check on Mondays rather than relying on social media postings which can get lost in the shuffle. For my news items, I try to stick to open access papers.

Comments

If anyone has comments on any of my postings, please leave a comment on the LinkedIn page for the posting or email me at raymondreichelt@gmail.com.

Geopolitics, Resources and War

- [Chinese firm keeps Canada's only antimony mine idle, raising supply chain concerns.](#)
- [Analysis: Weekend Watch: The Iran War Expert: I Simulated The Iran War for 20 Years. Here's What Happens Next.](#)
- [Cubans take to the streets and attack Communist Party office in rare riot over blackouts.](#)

- [Kharg Island, struck by US, is key hub for Iran oil exports.](#)
- Send in the Marines: [Marine Expeditionary Unit Deploying To The Middle East: Report.](#)
- Venezuela: [A Jungle of Minerals, Politics, and Unanswered Questions.](#)
- [Tehran Denies Mining Hormuz, But Says War Isn't Ending Soon.](#)
- [U.S. Navy Won't Be Ready To Escort Tankers Through Hormuz For Weeks.](#)
- [Oil tankers burn near Iraq as Iranian strikes defy Trump's claim to have 'won' the war.](#)
- [Energy Shock Threatens Fertilizer Supplies As Echoes Of 2022 Food Price Spike Return.](#)
- [Oil Supply Risks Mount as Iran Lays Mines in Strait of Hormuz.](#)
- [Canada as the 51st State: The New Energy Geopolitics of the Western Hemisphere.](#)
- [US has two months of rare earth supplies left, SCMP reports.](#)
- [Strategic mineral resources: an agreement between Greenland and France.](#)

Research and News

- [Fluid-driven element mobility resets plagioclase rubidium strontium and barium clocks while potassium feldspar resists.](#)
- [Laboratory Measurements of Rise Velocity for Individual, Hydrate-Free and Hydrate-Coated Gas Bubbles in Water.](#)
- Geological history: [Cooling-induced intensification of ocean anoxia in the mid-Paleozoic.](#)
- Fluvial geology: [Global Hydroclimatic Controls on Multithread River Dynamics.](#)
- [Tracing the origin of mantle heterogeneities with the Fe isotopic composition of Southwest Indian Ridge Basalts.](#)
- [Geochemical behavior of rare earth elements in pore fluids of turbidite sediments from South Taiwan.](#)
- [Archeointensity Database and Geomagnetic Field Reference Curves for South America Over the Past 5 Millennia.](#)
- [Experimental evidence shows that yttrium does not behave like a heavy rare earth element in chloride-bearing hydrothermal fluids.](#)
- Geophysics: [A Semi-Analytical Approach to Model Borehole Tube Waves for Interpretation of Downhole Seismic Data in Fault Zones.](#)
- [Effect of Fe content on reduced partition function ratios of Ni isotopes in olivine: A first-principles study.](#)

- [The first barium-HREE fluorocarbonate new mineral bayanoboite-\(Y\), Ba₂Y\(CO₃\)₂F₃, from Bayan Obo deposit, Inner Mongolia, China.](#)
- [Natural fractures in cores of Cambrian strata in Southwestern Ontario: their characteristics, implications for tectonic history, and potential importance for carbon capture and storage.](#)
- [Slumping and Sediment Storage at the Shelf-Edge: A Case Study From the Kookfontein and Waterford Formations, Tanqua Karoo Depocenter, South Africa.](#)
- [Contribution of Fe K-edge XANES spectroscopy to the characterization of Fe distribution in clay minerals. Application during experimental alteration of swelling clay minerals.](#)
- [Melting of fluorine-rich biotite as a mechanism for generating lithium-rich granites.](#)
- After the end-Permian mass extinction: [Preservation and overprinting of Early Triassic geochemical proxies.](#)

Planetary Geology

- From Ugo Bardi: [There Was Life on Mars – and Not Only on Saturday Nights.](#)
- [NASA Marshall Lunar, Meteor Observatory Marks 20 Years of Discovery.](#)
- Video: [Fireball over Europe, 8 March 2026](#); Science alert summary [here](#).
- Methanol and cyanide cocktail: [CH₃OH and HCN in Interstellar Comet 3I/ATLAS Mapped with the ALMA Atacama Compact Array: Distinct Outgassing Behaviors and a Remarkably High CH₃OH/HCN Production Rate Ratio](#); Phys.org summary [here](#).

Plate Tectonics

- [Reconstruction of Core-Surface Flows During the Last 3,300 Years.](#)
- [A Random Walker Algorithm for Plate Boundary Detection in Spherical Mantle Convection Models and Global Geophysical Data Sets: Application to Euler Vector Determination.](#)
- [Electron Spin Resonance Thermochronometry Indicates Quaternary Activity of the Brenner Fault \(Eastern Alps\).](#)
- [Geochemical Analysis of Diachronous V-Shaped Ridges and Troughs That Flank the Reykjanes Ridge South of Iceland.](#)
- [Reliability of quartz-hosted melt inclusions and discrete rhyolite reservoirs revealed by H isotopes, trace elements, and volatiles.](#)
- [Large-Scale Deformation, Strain Characteristics, and Locking Distribution of the Qilian-Haiyuan Fault System.](#)
- [Late Carboniferous Geomagnetic Field Events Recorded in Post-Collisional Altenberg–Teplice Caldera, Variscan Belt.](#)

- [Subsurface thermal gradients along the Queen Charlotte plate boundary from a regional mapping of bottom simulating reflectors.](#)
- [Geodynamic Controls on Mantle Differentiation and Preservation of Long-Term Geochemical Heterogeneity: Focus on the Primitive Undegassed Mantle.](#)
- [Eocene Lamproitic Magmatism in Gangdese: Melting Sub-Arc Lithospheric Mantle and Implications for the Early Cenozoic Magmatic “Flare Up” in Southern Tibet.](#)
- [Cenozoic Subduction Polarity Reversal Within the Celebes Sea Inferred From Teleseismic Tomography.](#)
- [Breakup of strong cratonic lithosphere causes extensive magmatism at continental margins.](#)
- [Plate Interactions and Mantle Flows Beneath the Caribbean and Adjacent Regions Revealed by P-Wave Anisotropic Tomography.](#)
- [Neogene mantle delamination beneath the Northern Apennines: Insights from thermo-mechanical modelling.](#)

Paleontology

- I know Melina Jobbins, the lead author on this paper: [Early vertebrate diversity of the Elm Point Formation of Manitoba, Canada, and evidence of fish faunal diversification in the Middle Devonian of North America](#); sorry behind a paywall.
- [A bite to the throat: A probable *Xiphactinus* attack on a *Polycotylus* from the Cretaceous Mooreville Chalk of Alabama, U.S.A.](#); Phys.org summary [here](#).
- [Changes in Shell and Crystal Structure From Life to Sediments: An EBSD Characterization of Subantarctic Planktic Foraminifera.](#)
- [A large tyrannosaurid from the Late Cretaceous \(Campanian\) of North America](#); Science alert summary [here](#).
- [The Karoo Fossil Finder: Discovering life before the dinosaurs in South Africa’s heartland.](#)
- [Nanhsiungchelyid Turtles from the Nanxiong Basin, Southern China, and the Cretaceous–Paleogene Mass Extinction.](#)
- [At the dawn of higher caenogastropods – the importance of colombellinid gastropods in deciphering the origin of Tonnoidea and Cypraeidae.](#)

Mining and Energy

- Artisanal gold miners:
 - [How a disputed Somali town became a hotspot for unregulated gold mining.](#)
 - South Africa: [‘Kill the people’ How men were left to starve in a South African gold mine.](#)

- Mali: [Africa's third-largest gold producer launches 'special task force' to curb illegal mining by local and foreign operators.](#)
- [Asia's EVolution: In the mountains of Mindanao, a copper fight with global stakes powered by electric vehicles.](#)
- [President Trump orders oil drilling operations to resume off California.](#)
- [North Africa's oil powerhouse brings major field back online with support from French oil giant.](#)
- [US pours \\$1B into Latin America critical minerals.](#)
- [Vale more than doubled ore production from waste material in 2025.](#)
- Tamarack nickel project: [Talon Metals surges on new Minnesota drill results.](#)
- [LNG Canada ramping up production, exports amid Iran war, data suggests.](#)
- [Mining the ocean floor: 5 deep-sea sources of critical minerals essential to technology, and the fragile marine life at risk.](#)
- [Greenland's Untested Oil Basin Could Be the Next Big Discovery.](#)

Environmental Geology and Hydrogeology

- [The Radioactive Reality Behind "Clean Energy Metals".](#)
- Palawan, Philippines: ['The last frontier': how red globules of nickel ore are suffocating an island's precious wilderness.](#)
- Remediation techniques: [Fe Phyllosilicates: Targeted Removal by Acid Treatment and Their Differing Potential to Immobilize Aqueous Sulfide.](#)
- [Borehole Thermal Recovery as a Method for Quantifying Subsurface Permeability.](#)

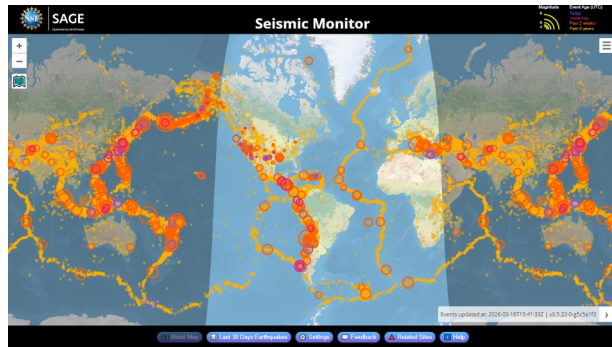
Glaciers and Climate Change

- [Mapping Antarctic geothermal heat flow with deep neural networks optimized by particle swarm optimization algorithm.](#)
- [Ice albedo and its relationship with light-absorbing impurities and weathering crust at Potanin Glacier, Mongolia.](#)
- [Rapid ice-marginal lake growth in Alaska driven by glacier retreat through bed overdeepenings.](#)

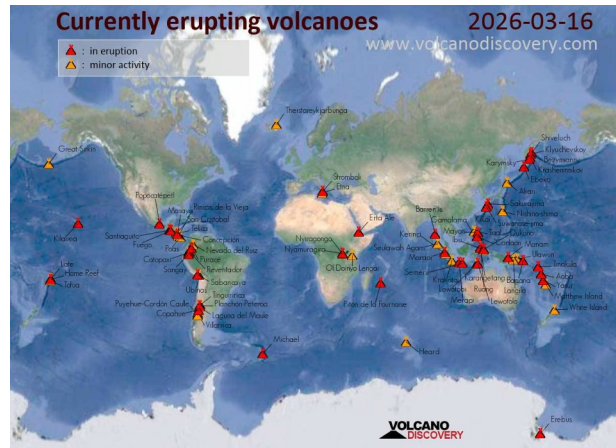
Bad Science

- [The Perils of Using Generative AI to Perform Research Tasks: Editors' and Publishers' Viewpoints.](#)
- [Purdue animal research project reportedly suspended due to misconduct, falsified documents.](#)

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

- [Smithsonian / USGS Weekly Volcanic Activity Report.](#)
- United States Geological Survey (USGS) Volcano Observatories:
 - Yellowstone Caldera Chronicles: [Hot Spring Cleaning!](#)
 - [Cascades Volcano Observatory Weekly Update.](#)
 - Volcano Watch – [Episode 43, new fountain height record and tephra fallout on nearby communities.](#)

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- [Tracking very low frequency earthquakes into long continuous records: application to the Southern Ryukyu subduction zone.](#)
- [M5.3 earthquake strikes along the North Anatolian Fault; USGS summary here.](#)
- [Implications of long lasting post-seismic deformation following the 2005 Mw 7.6 Kashmir earthquake inferred from GNSS & InSAR data.](#)
- [The Influence of Grain Crushing and Pore Collapse on the Formation of Faults.](#)

Geohazards

- [Memories of the 2011 Tsunami.](#)

Free Geology Books and Other Stuff

Free geology books can be downloaded from these sites:

- [OreZone Readers and Experts Telegram Channel](#); the Ore Zone channel also shows employment opportunities for geologists.
- [The Groundwater Project](#) has many groundwater geology books for free download together with free online courses, listed [here](#).
- Free [Groundwater Modeling Courses](#) from the HydroGeoCenter.
- From Western Australia: [Carbonatite, lamprophyre and host rocks in the northern Aileron Province](#).
- The Geology of Indonesia: [Volume 1](#) and [Volume 2](#).
- Brett Davis' book on veins in a deforming rock mass: "[The Veining Bible](#)"; also at [this site](#).
- From the Mineralogical Society of America: [Handbook of Mineralogy](#).
- [Systematic geochemical classification of felsic igneous rocks of the Yilgarn Craton](#).
- From the Arizona Geological Survey: [Geochemistry Diagram Generator v 1.0](#).

Upcoming Events

- It's this week: [March 15-21, 2026, Provincial Engineering and Geoscience Week, Manitoba](#).
- [AGS Annual Conference 2026, 19th Mar 2026, One Great George Street, London, U.K.](#)
- [ISMPP U: Restoring Trust in Science: Storytelling, AI, and Integrity in Scholarly Publishing \(Mar. 26, 2026, 10:00 am ET\)](#).
- [14-15 April 2026: 2026 IAH Ireland Conference – Groundwater 2035, Tullamore, Ireland](#)
- [GAC-MAC 2026 St. John's NL, St. John's Convention Center, May 25-28, 2026](#).
- [PEG2026: 11th International Symposium on Granitic Pegmatites; 16th–19th August 2026, in Perth, Western Australia](#).
- [14-18 September 2026 , IAH 2026, 53rd Congress of the International Association of Hydrogeologists; Budapest Congress Center](#).
- [September 30 - October 3, 2026 SEG 2026 Conference Salt Lake City, United States](#).
- [Paleoamerican Odyssey 2026, October 14-17, 2026, Santa Fe Convention Center, Santa Fe, New Mexico](#).
- [Society of Petroleum Engineers Distinguished Lecturer Schedule](#).
- [American Geophysical Union List of Upcoming Meetings](#).
- The Geological Society: [Events & Courses](#).
- [Upcoming Distinguished Geoscience Australia Lectures \(DGALs\)](#).

March 16, 2026

Geology and Mineral Resources – Nigeria

Introduction



Figure 1 – Nigeria

Credit: [Mapland](#), [Creative Commons Attribution-Share Alike 3.0 Licence](#)

A former [British colony](#), the [Federal Republic of Nigeria](#) is a country of [232,914,864](#) people in [West Africa](#) between the [Sahel](#) to the north and the [Gulf of Guinea](#) in the [Atlantic Ocean](#) to the south. The country has an area of 923,769 square kilometres and has land borders with [Niger](#) in the north, [Chad](#) in the northeast, [Cameroon](#) in the east, and [Benin](#) in the west.

Nigeria is modestly wealthy with a per capita [GDP \(PPP\)](#) of \$9,488 and a medium [Human Development Index](#) of 0.560. Nigeria has a diversified economy including energy, financial markets, pharmaceuticals, and entertainment. After petroleum, the largest source of foreign exchange earnings for Nigeria are remittances sent home by Nigerians living abroad. In 2024, the top [exports](#) of Nigeria were crude petroleum, natural gas, refined petroleum, cocoa beans, and nitrogen fertilizers. The top destinations for their exports were Spain, India, the United States, France, and the Netherlands. In 2024, the top [imports](#) of Nigeria were refined petroleum, wheat, crude petroleum, cars, and raw sugar. The top origins were China, Belgium, the United States, India, and the Netherlands.

For more details on Nigeria, check out the [Wikipedia](#) and [Grokopedia](#) articles on the country.

Geology

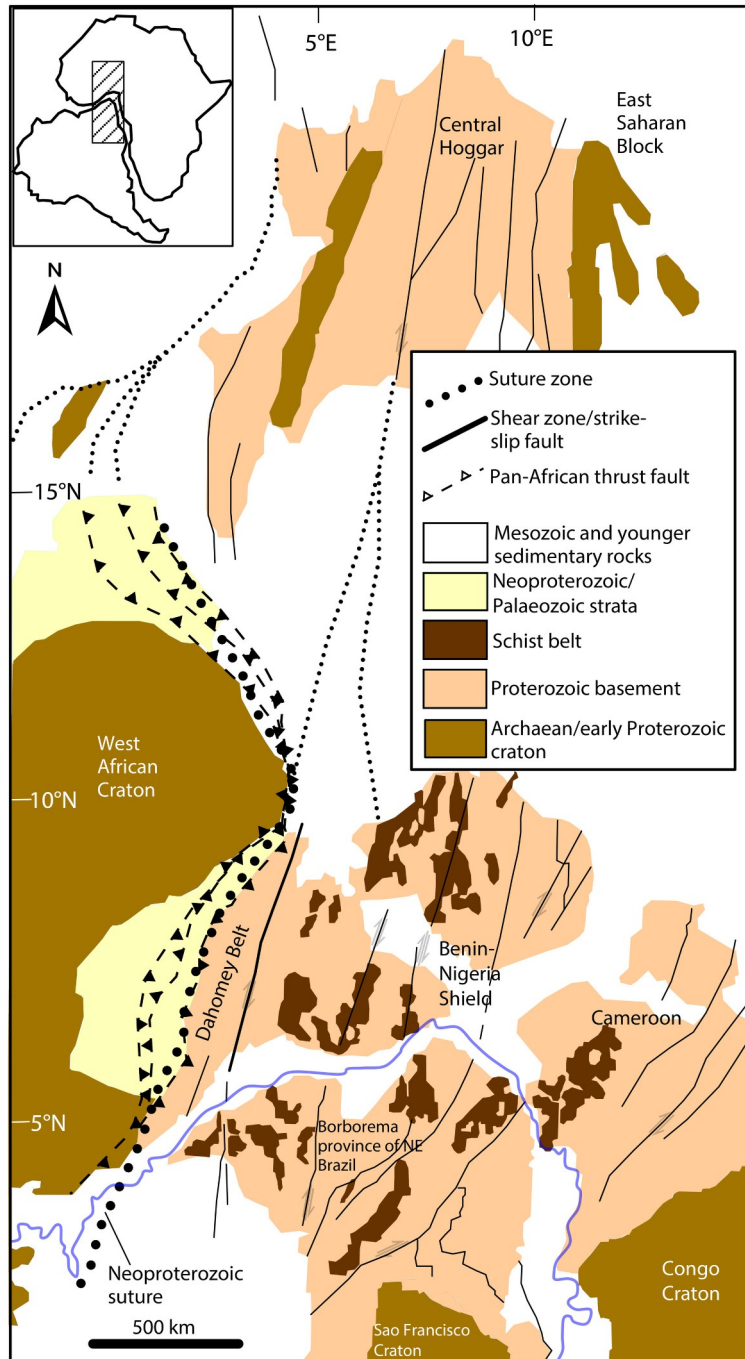
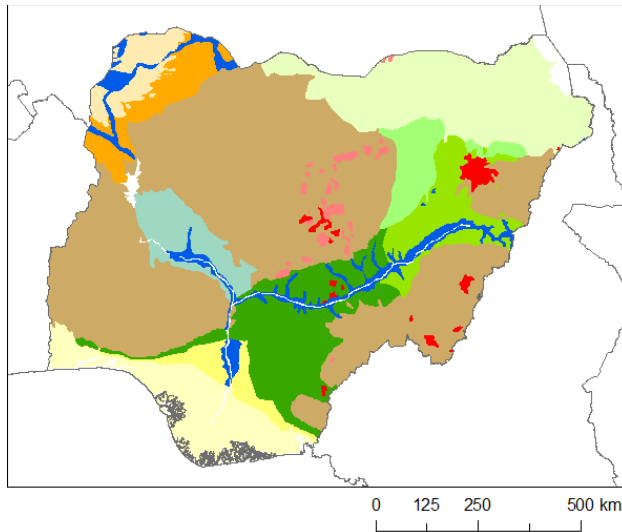


Figure 2 – Benin Nigerian Shield during the Proterozoic
Credit: Figure 1 in [Hoffman et al, 2025](#)

The [geology of Nigeria](#) rests upon the [African tectonic plate](#). The [basement](#) geology in Nigeria largely sits upon the [Neoproterozoic](#) aged [Benin Nigerian Shield](#) (BNS). The BNS itself is a mobile belt created during the [Pan-African Orogeny](#) and is related to the formation of the supercontinents [Gondwana](#) and [Pannotia](#) about 600 million years ago, at the end of the Neoproterozoic. The [breakup of Gondwana](#) during the [Late Jurassic](#) separated the basement rocks of modern day Brazil from those of Nigeria.

Figure 3, shows a general geology of Nigeria.



Nigeria - Geology

■	Unconsolidated sedimentary - Quaternary
■	Igneous - Volcanic - Tertiary
■	Niger Delta Basin - Unconsolidated sedimentary - Tertiary-Quaternary
■	Niger Delta Basin - Sedimentary - Tertiary
■	Chad Basin - Sedimentary - Tertiary-Quaternary
■	Nupe Basin - Sedimentary - Cretaceous-Tertiary
■	Sokoto Basin - Sedimentary - Tertiary
■	Sokoto Basin - Sedimentary - Cretaceous
■	Upper Benue Basin - Sedimentary - Tertiary
■	Upper Benue Basin - Sedimentary - Cretaceous
■	Lower Benue Basin - Sedimentary - Cretaceous
■	Sedimentary - Cretaceous - east
■	Igneous - Younger granite - Jurassic
■	Basement Complex

Figure 3 – Geology of Nigeria

Credit: [BGS Earthwise, Hydrogeology of Nigeria, Creative Commons Attribution-Share Alike 3.0 Unported license](#)

The oldest rocks in Nigeria are the [Proterozoic](#) aged basement complex, including:

- The [Migmatite-Gneiss Complex](#) of the [Jos Plateau](#) of the north-central area of Nigeria and in the [southwest of Nigeria](#). They comprise [granites](#), [gneisses](#), [migmatites](#), [amphibolites](#), [schists](#), [phyllites](#), [quartzites](#), and [marble](#).
- [Schist belts](#), made up of phyllites, schists, quartzites and [banded iron formations](#), found in northwestern Nigeria.

Next younger are [Jurassic aged granite intrusions](#), associated with the breakup of Gondwana.

Overlying the basement complex are [Cretaceous](#) to [Paleogene](#) (e.g. [Tertiary](#)) aged [Benue Basin](#) or Trough. The [Lower Benue Basin](#) consists of Cretaceous [shales](#), [siltstones](#) and silty shales with subordinate [sandstones](#) and [limestones](#), intruded by [dolerite](#) dykes. The [Upper Benue Basin](#) consists of Cretaceous aged sandstones and limestones overlain by a thick succession of Paleogene continental sandstones that are in turn overlain by marine and estuarine shales and limestones. The neighbouring [Anambra Basin](#) is sometimes considered the youngest part of the Benue Trough. Also Cretaceous in age

are the sandstones, siltstones, [claystones](#) and [conglomerates](#) of the [Nupe Basin](#), alternatively known as the Bida or Niger Basin.

In northwest Nigeria are the Late Jurassic, Cretaceous, Paleogene and [Neogene](#) deposits of the [Sokoto Basin](#), which is the Nigerian extension of the [Iullemeden Basin](#). The oldest rocks in the Sokoto basin are the Late Jurassic to Cretaceous aged [Rima Group](#) and [Illo/Gundumi Formation](#). The Rima Group comprises a series of friable marine sandstone, mudstones, and some [marly](#) limestone and shale. Overlying these are Paleogene and Neogene interbedded sandstones, clay and some limestone.

The [Niger Delta Basin](#) is made up of a 10 km thick sequence of sediments ranging in age from [Eocene](#) to [Quaternary](#). The Niger Delta sedimentary rocks consist of shales, sandstones overlain by unconsolidated sands and gravels with thin peats, silts, and clays. This basin is the major petroleum basin in Nigeria.

Ranging in age from Cretaceous to Quaternary are the sandstone, siltstone and shale of the [Chad Basin](#), in the northeast of Nigeria. There are also [igneous intrusions](#) ranging in age from Paleogene to Neogene in eastern Nigeria. The youngest deposits in Nigeria are unconsolidated Quaternary aged sediments: sands, gravels, silt and clay.

Paleontology

The [fossils found in Nigeria](#) are associated with the various sedimentary basins, such as the [Niger Delta Basin](#), the [Benue Trough](#), the neighbouring [Anambra Basin](#), and the [Sokoto Basin](#). Here are a few examples:

Watinoceras



Figure 4 – *Watinoceras*

Credit: Peter Massicard, [Creative Commons Attribution-Share Alike 4.0 International](#) license

Watinoceras was a genus of [acanthoceratid ammonite](#) that lived during the early [Turonian](#) stage of the Late Cretaceous. In Nigeria, [Watinoceras fossils were found](#) in the [Eze-Aku Formation](#) of the Benue Trough.

Sphenodiscus



Figure 5 – *Sphenodiscus*

Credit: [Ghedoghedo, Creative Commons Attribution-Share Alike 3.0 Unported license](#)

Another ammonite fossil from Nigeria is *Sphenodiscus*. An extinct genus of [acanthoceratacean](#) ammonite, *Sphenodiscus* has been found on many continents and seems to have had a large global distribution during the [Maastrichtian](#) stage of the Late Cretaceous. Interestingly, it was one of the few ammonoids to have survived the [Cretaceous–Paleogene extinction event](#), only becoming extinct during the [Paleocene](#). In Nigeria, *Sphenodiscus* was found in the [Nkporo Shale Formation](#) of the Anambra Basin.

Goronyosaurus nigerensis



Figure 6 – *Goronyosaurus nigerensis*

Credit: [Dmitry Bogdanov, Creative Commons Attribution-Share Alike 3.0 Unported license](#)

Also called *Mososaurus nigeriensis*, [Goronyosaurus nigeriensis](#) was a marine lizard in the [mosasaur family](#). Fossils of *Goronyosaurus* were found in the Late Maastrichtian of the [Iullemeden Basin](#), specifically in the [Taloka Formation](#) and in the [Dukamaje Formation](#) of Nigeria.

Mineral Resources



Figure 7 – Gas Flares in the Niger Delta
Credit: Chebyshev1983, [pubic domain](#)

According to the [USGS Minerals Yearbook for Nigeria](#), the mineral industry of Nigeria includes the production of metallic minerals, industrial minerals, and fuel minerals i.e. petroleum, natural gas and coal. The most recent production statistics from the USGS can be found [here](#).

Metallic Minerals



Figure 8 - Artisanal Gold Miner, Kano State, Nigeria
Credit: [Gwanki](#), [Creative Commons Attribution-Share Alike 4.0 International license](#)

- Copper is produced by [Sun and Sand Industries Ltd.](#) in [Ota](#).
- Gold is mined by artisanal miners in [Kaduna State](#) and [Kano State](#).
- Iron is mined by the [National Iron Ore Mining Co. Ltd.](#) at a mine in [Itakpe](#).
- Lead and zinc are mined by the [Tongyi Allied Mining Ltd.](#) at their mine near Abuja within the [Federal Capital Territory](#).
- Manganese is mined by [Sino Minmetals Nigeria Ltd.](#) and [Luxeon Mining Company Ltd.](#) at mines in [Kebbi State](#).
- Niobium and tantalum ([coltan](#)) are mined by artisanal miners at various locations. Coltan is also mined by mines at various locations operated by: [Coltan Minerals Ltd.](#), the [West African Mining Company Ltd.](#), [Sodex Mines Nigeria Ltd.](#), [Malcomines Ltd.](#), [First Patriot Ltd.](#), and [Don & Chyke Nigeria Ltd.](#)
- Tin ([cassiterite](#)) is mined by artisanal miners at various locations. Industrial miners include: [Sodex Mines Nigeria Ltd.](#), [Coltan Minerals Ltd.](#), [Taoshi Mining and Exploration Ltd.](#), and [Astro Minerals Ltd.](#)

Industrial Minerals

- [Barite](#) is produced by artisanal miners at various locations in [Benue State](#).
- [Cement production in Nigeria](#) includes at least 12 production facilities in various states.
- [Kaolin clay](#) is produced by [Porcelainware Industries Ltd.](#) at their mine in [Ogun State](#).
- Other clay and shale quarries are found in [Kogi State](#), [Edo State](#), and Ogun State.
- Gemstones including amethyst, aquamarine, garnet, sapphire, and tourmaline are produced by artisanal miners at various locations in Kaduna State, [Kwara State](#), [Nasarawa State](#), [Niger State](#), [Oyo State](#), and [Plateau State](#).
- Gypsum is mined by [Lafarge's Nigerian subsidiary](#) at a [mine in Fika](#) in [Yobe State](#) .
- [Laterite](#) is produced at mines in [Akwa Ibom State](#), the Federal Capital Territory, [Katsina State](#), [Lagos State](#), and Ogun State.
- Ammonia and nitrogen fertilizer (urea) are produced at plants at [Port Harcourt](#) and [Onne](#) operated by [Indorama Eleme Fertilizers & Chemicals Ltd.](#) and [Notore Chemical Industries Plc.](#)
- Sand and crushed stone are produced at numerous quarries.
- Sulphur is produced by the [Kaduna Refinery and Petrochemicals Co. Ltd.](#)

Fuel Minerals: Coal, Petroleum and Natural Gas

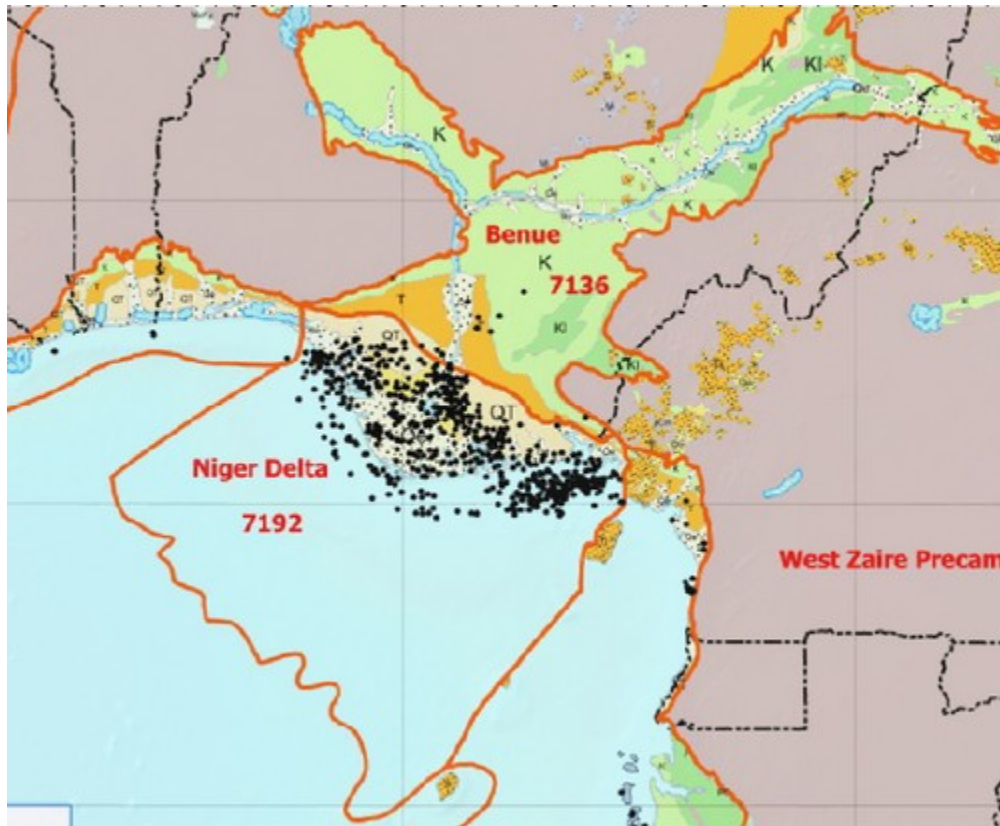


Figure 9 – Oil Fields in the Niger Delta and Benue Trough

Credit: Geomappapp, [Creative Commons Attribution-Share Alike 3.0 Unported license](#)

[Nigeria](#) is one of the world’s major producers of petroleum and natural gas, [producing](#) approximately 1.6 million barrels/day; ranking 15th in the world. Hydrocarbons are [currently extracted](#) from 323 developed fields located both onshore and offshore. 2025 production statistics from the [Nigerian Upstream Petroleum Regulatory Commission](#) can be found [here](#).

The major oil production province in Nigeria is the [Niger Delta](#). The USGS report on the province can be found [here](#). The [geology of the Niger Delta](#) is made up of a thick sequence of sediment deposits ranging in age from Late Cretaceous to Eocene as in Figure 10, below.

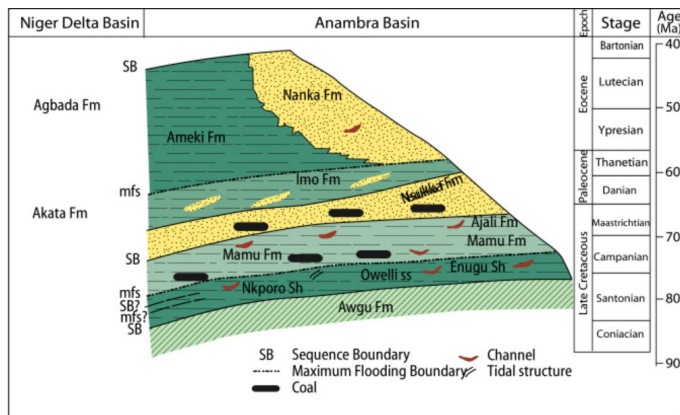


Figure 10 – Cross-section of Niger Delta

Credit: Figure 5 in [USGS Open-File Report 99-50-H, public domain](#)

In the [Niger Delta province](#), the petroleum system is called the [Tertiary Niger Delta \(Akata-Agbada\) system](#). The delta itself formed at the site of a [rift triple junction](#) related to the [opening of the southern Atlantic](#) starting in the Late Jurassic and continuing into the Cretaceous. The delta proper began developing in the Eocene, accumulating sediments that now are over 10 kilometers thick.

The other geological province producing petroleum and natural gas in Nigeria is the [Benue Trough](#). The [Anambra Basin](#) links the Benue Trough with the Niger Delta Basin.

Petroleum and natural gas production in Nigeria has not been without its problems. While providing [ample revenues](#) for the central government, the development can be best described as a [mixed blessing](#), especially for the [people living in the Niger Delta](#). The [environmental costs](#) of Nigerian oil production are mostly borne by the people living in close proximity to the oil production facilities, while the benefits tend to go to the [central government, and its cronies](#).

In other fuel minerals, coal is produced by [Zuma 828 Coal Ltd.](#) at mines in Kogi State and by [Ashaka Cement Plc](#) (Lafarge) at a mine in [Gombe State](#)

Figure 11 links to an interactive map of mineral occurrences in Nigeria from [Mindat.org](#).

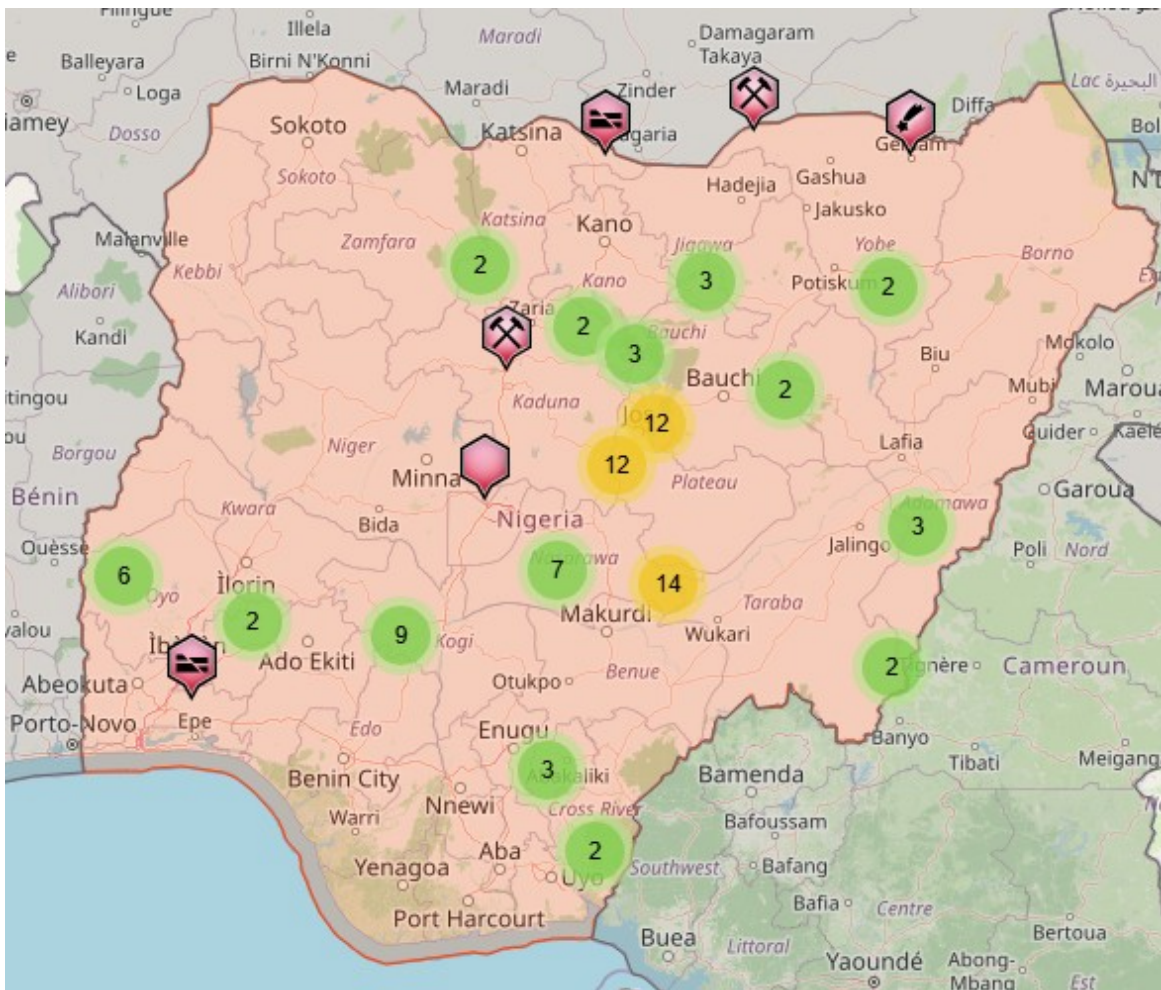


Figure 11 – Interactive Mineral Deposits Map of Nigeria
Credit: [Mindat.org](#)

Summary



Figure 12 – A Group of Nigerians from the Yoruba tribe at a Public Event
Credit: [Oramfe](#), [Creative Commons Attribution-Share Alike 4.0 International](#) license

Nigeria looks like a promising place for mineral development in both [hard rock](#) and [soft rock](#) mineral plays. Although a mature petroleum province, [Nigeria has room for more development](#), such as [this recent discovery](#). A similar story can be said for [metallic and industrial minerals](#). Although the surface and near surface deposits have probably all been discovered, what do you think that all those artisanal miners have been up to, modern techniques for finding deeper deposits could yield significant new discoveries.

Working in Nigeria, however, is not without its problems. Violence from [Boko Haram](#) continues in the northern states, with [massacres of Christians](#) a common occurrence. Also, [government corruption in Nigeria](#) is simply a fact of life that will impact any project you may plan to conduct in that country. Crooked behaviour is not limited to government officials, ordinary people mimic their “betters” in activities such as [oil theft](#). Overall, [travel to Nigeria is not currently recommended](#). For the sake of the people of Nigeria, we hope that their many problems can be solved.

Standard Caveat

[J. Robert Oppenheimer on freedom and scientific inquiry](#)

The purpose of my weblog postings is to spark people's curiosity in geology. Don't entirely believe me until you've done your own research and checked the evidence. If I have sparked your curiosity in the subject of this posting, follow up with some of the links provided here. If you want to, go out into the field and examine some rocks on your own with the help of a good field guide. Follow the evidence and make up your own mind.

In science, the only authority is the evidence.