

October 20, 2025

News and notes



Fall colours on my street, October 15, 2025

This week, before going on to discuss the geology and mineral resources of Mauritania, we will first look at some news items I thought were interesting. If you enjoy my blogs, bookmark the site and check Monday mornings rather than relying on social media postings which can get lost in the shuffle.

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

- [The race for Greenland's Mineral wealth | BBC News.](#)
- [CNPC Defies Niger Junta, Continues Oil Exports.](#)
- [Russia-China LNG Trade Unfazed by Sanctions on Chinese Terminal.](#)

- [Netherlands Seizes Chinese-Owned Chipmaker in Unprecedented Security Move.](#)
- [The Prospect of Civil War in Contemporary America: An Interdisciplinary Analysis.](#)

Research and News

- [Assessment of Surface Heat Flux and Deep Fluid Degassing in Fracture-Dominated Geothermal Zones in Taxkorgan, Xinjiang, Western China.](#)
- [Petrogenesis of the Eocene Rattlesnake Hills Alkaline Magmatic Complex, Wyoming, USA: a carbonatite-bearing igneous center in the southern Great Plains Alkalic Province.](#)
- [Oxygen isotope composition of Mesoproterozoic \(~1360 Ma\) seawater constrained by clumped isotopes of North China limestones.](#)
- [From impact to extinction to recovery: Discoveries of IODP-ICDP Expedition 364 to the Chicxulub impact structure.](#)
- [Quantification of geothermal carbon dioxide fluxes using radiocarbon.](#)
- [Geochemical controls on coupled glauconite–feldspar diagenesis and its implications for fluid–rock interactions in glauconitic-rich sandstones.](#)
- [Synchrotron 4D X-Ray Computed Tomography of a Porous Limestone: Influence of Porosity on Deformation Mechanisms at Multiple Scales.](#)
- [Crystal Structure Evolution of Nano hematite during Dissolution: Evidence for Partitioning of Iron Vacancies in Nanoparticle Shells.](#)
- [Sedimentary dynamics in the subaqueous delta of the abandoned estuary: Effects of strong wave activity and riverine re-supply.](#)
- [Microtextural analyses of detrital zircon for paleoenvironmental interpretations of metasedimentary rocks.](#)
- [Mampsisite, \$\text{Ca}_4\text{Al}_2\(\text{OH}\)_{12}\(\text{CO}_3\)\cdot 5\text{H}_2\text{O}\$, a new mineral and a new polymorph of the cementitious AFm monocarboaluminate.](#)
- [Incongruent melting of garnet during garnet-spinel transition and its implication to the lithospheric exhumation.](#)
- [Effect of Deformation Mechanisms on Magnetic Record in Marble Shear Zones.](#)
- [Numerical modelling to identify permeable fractures from geophysical imaging of natural degassing areas. Example from the Matese Fault system \(Italy\).](#)
- [Precambrian Greenstone Belts of North Baffin Island, Canadian Arctic: Geochronological Constraints on Magmatism and Stratigraphy in the Rae Craton.](#)

- [Disentangling Continental Weathering During the Late Paleozoic Ice Age](#); Phys.org summary [here](#).
- [Magnetostratigraphic constraints on the late Ediacaran paleomagnetic enigma](#); Phys.org summary [here](#).

Geologists in the News

- [University of Manitoba PhD Graduate Brock Edwards Awarded the 2025 Distinguished Dissertation Award for Research on Mercury Emissions](#).

Plate Tectonics

- [The Mg-Fe Isotope Compositions and Geochemical Effects of Supercritical Fluids: Constraints From an Ultrahigh-Pressure Eclogite-Vein System in the Dabie Orogen](#).
- [Deep Attenuation Structure of Japan Subduction Zone From Joint Inversion of Local and Teleseismic Data](#).
- Large Low Shear Velocity Provinces: [Secular Variation in the North American Kimberlite Formation: The Variable Connection to LLSVPs](#).
- [Carbonate- and silicate-metasomatized mantle beneath Himalayan-Tibetan orogenic belt](#).
- [Helium Isotope Variations in Gulf of Aden Basalts and the Surface Expression of Mantle Heterogeneity During Afar Plume-Triple Junction Interaction](#).
- [Exploring the Relationship Between Stress State and Fault Stability at the Hikurangi Subduction Margin, New Zealand](#).
- [Stress heterogeneities in exhumed high-pressure rocks shed light on deep subduction interface transient coupling](#).
- [Flexural Development in the Foreland Basin Adjacent to Northern Oman-UAE Mountain Belt: Effect of Lithospheric Weakening](#).
- [Ultra-hot origins of stable continents](#); Phys.org summary [here](#).
- [Shortening, Exhumation, and “Flip” in Tectonic Vergence of the Cordillera Central and Southern Dominican Republic](#).

Paleontology

- [Holocene Paleoenvironmental Reconstruction at 47° S \(Patagonia, Argentina\) from Sedimentary Sequences \(Fens and Lagoon\) and Archaeological Sites: A Regional Synthesis](#).
- Stable isotope analysis of fossils: [Determination of \$\delta^{11}\text{B}\$ in Planktonic Foraminifera at the ng Level: Application to the Ontogenetic Variability in *Globigerina bulloides*](#).
- [Remarkable dominance of myctophid otoliths in Upper Miocene Chagres Formation, Caribbean Panama](#).

- Evolution: [Loss of macroevolutionary species fitness explains the rise and fall of clades.](#)
- [The relationship between microbial community succession, decay, and anatomical character loss in non-biomineralized animals.](#)
- [A Carnian theropod with unexpectedly derived features during the first dinosaur radiation.](#)
- [Dinosaur footprints from 166 million years ago discovered in UK quarry.](#)
- 10/13 [A Cnidarian affinity for *Salterella* and *Volborthella*: implications for the evolution of shells](#); SciTechDaily summary [here](#).
- [Functional morphology and biomechanics of an ontogenetic series of the Triassic cynodont *Brasilodon quadrangularis* and bite performance in the sister taxon of Mammaliformes.](#)
- [Silicified brachiopod and bivalve fossils from the mid-Permian \(Kungurian–Roadian\) Wandrawandian Siltstone of the southern Sydney Basin, southeastern Australia: implications for taphonomy and silicification.](#)
- [The oldest Gondwanan non-biting midge \(Diptera, Chironomidae, Podonominae\) sheds light on the historical biogeography of the clade](#); Science Daily summary [here](#).

Mining and Energy

- [United States Antimony kicks off mining operations in Montana.](#)
- [As oil market surplus keeps rising, something's got to give.](#)
- Seabed mining: [Japan has boundless supply of rare earths that can blunt China's dominance but are costly to mine.](#)
- [The Slowly Mounting Mineral Shock.](#)
- Ore geology: [Oil–water interfaces drive gold precipitation via microdroplet chemistry in thermal geological systems.](#)
- Batteries: [Vale scraps plans to build Quebec nickel sulphate facility.](#)
- Ore Geology: [Multi-disciplinary characterisation of the splinter rock clay-hosted REE prospect, Western Australia.](#)
- [North Sea Oil Giants Choose Norway Over Unpredictable UK Market.](#)
- [BHP eyes revival of long-closed copper mines in Arizona.](#)

Environmental Geology and Hydrogeology

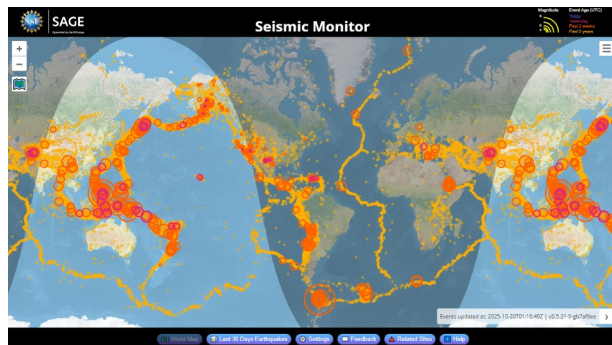
- [Mapping of Productive Aquifer Horizons in the Crystalline Bedrock Environment of the Bounkani Region \(Northeastern Ivory Coast\).](#)
- [Groundwater, not glaciers, is the Ganga's lifeline, says study.](#)

- [Spatial modelling of groundwater potential zones in the Neyyar Basin using machine learning and morphometric analysis.](#)
- Not just asbestos: [Characterization and classification of unregulated mineral fibers: The case of fibrous datolite from Rio Manubiola Valley, Parma \(Italy\).](#)
- Heavy metal pollution: [Energy dispersive X-ray fluorescence characterization of soil and its geological provenance assessment – Mvengue subdivision of Cameroon.](#)
- [3D Structural Modelling and Restoration of a Deformed Alpine Karst Reservoir: Insights into the Groundwater Flows of the Dévoluy Massif \(French Alpine Foreland\).](#)
- [Microbial oxidation significantly reduces methane export from global groundwaters;](#) Phys.org summary [here.](#)
- [Nuclear waste disposal: Geology must come first.](#)

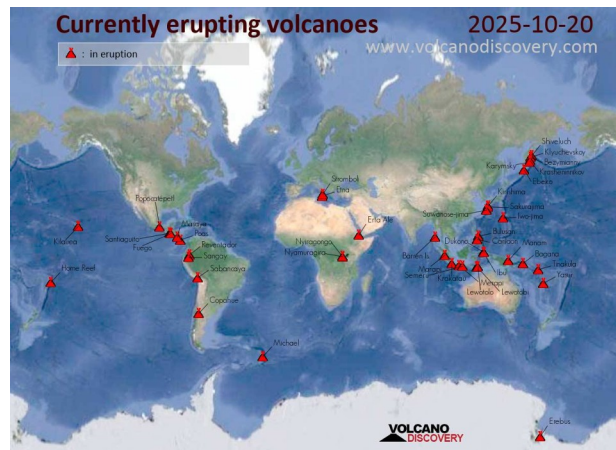
Glaciers and Climate Change

- 10/17 [Southern Ocean freshening stalls deep ocean CO2 release in a changing climate;](#) Phys.org summary [here.](#)
- Icebergs: [Ice-Rafted Detritus of the Southeast Grand Banks Slope, Newfoundland, Throughout Heinrich Layers 1 to 5a: 1. Petrology and Abundance.](#)
- [Global mean sea level over the past 4.5 million years;](#) Phys.org summary [here.](#)
- [Southern Ocean evidence for recurring West Antarctic Ice Sheet destabilization during Marine Isotope Stage 11;](#) Phys.org summary [here.](#)

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

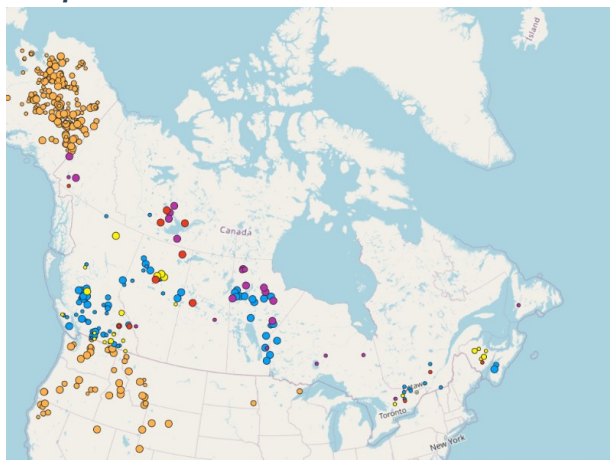
- [Smithsonian / USGS Weekly Volcanic Activity Report.](#)

- The United States Geological Survey (USGS) Volcano Observatories are generally not reporting because of the [US government shutdown](#); there is, however, the [Cascades Volcano Observatory Weekly Update](#).
- Campi Flegrei Volcano:
 - [Unveiling "too-old" radiocarbon ages at Serapeo \(Pozzuoli\) enhances understanding of the present unrest crisis at Campi Flegrei caldera, Italy.](#)
 - [Sassolite Precipitation at the Restless Campi Flegrei Volcano in Italy Points to Hydrothermal Flashing by Deep Boron-Rich Brines.](#)
- [Expansion and Contraction of the Patagonian Ice Sheet and Its Influence on Magma Storage Beneath Mocho-Choshuenco Volcano, Chile.](#)
- [An Iranian volcano appears to have woken up — 700,000 years after its last eruption.](#)
- Video: [Inflation Continues As Iceland's Next Eruption Looms: Geologist Analysis.](#)

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- [Linking Coseismic Slip and Afterslip in Intraplate Earthquakes: A Case Study of the 2016 Central Tottori Earthquake, Japan.](#)
- [Scientists obtain detailed maps of earthquake-triggering high-pressure subsurface fluids.](#)

Wildfires and Other Geohazards



Interactive Wildfire Map October 19, 2052
Credit: ©[Canadian Wildland Fire Information System](#)

- [State of Wildfires 2024–2025](#); Phys.org summary [here](#).

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; also they now have a [Free Online Learning Module: Pumping Test Analysis](#).
- Free Groundwater Modeling Course – [HydroGeoCenter](#).
- From Western Australia: [Carbonatite, lamprophyre and host rocks in the northern Aileron Province](#).
- Two volumes of Geology of Indonesia now can be accessed for [FREE/GRATIS](#). The books can be accessed from: vol 1 <https://lnkd.in/eH6Gcka4>; vol 2 <https://lnkd.in/egTYmpjk>.
- 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](#).

Upcoming Events

- [2025 Kentucky Geological Survey Geoscience Open House](#); October 28, 2025, 6:00 PM – 7:30 PM, University of Kentucky Mining and Minerals Resources Building, 310 Columbia Avenue, Lexington, KY 40506
- November 3 – 4, 2025 [Central Canada Mineral Exploration Convention 2025](#) Victoria Inn Hotel & Convention Centre, 1808 Wellington Avenue, Winnipeg, Manitoba R3H 0G3, Canada.
- [5th International Professional Geology Conference \(IPGC\), November 5 to 7, 2025, Zaragoza, Spain](#).
- [Saskatchewan Geological Open House, December 1 to 3, 2025, Delta Bessborough Hotel, Saskatoon](#); Registration for the 2025 Conference now open.
- [Groundwater Week 2025, December 9-11, 2025 in New Orleans](#).
- [GAC-MAC 2026 St. John's NL, St. John's Convention Center, May 25-28, 2026](#).
- [14-18 September 2026 , IAH 2026, 53rd Congress of the International Association of Hydrogeologists; Budapest Congress Center](#).
- [Society of Petroleum Engineers Distinguished Lecturer Schedule](#).
- [American Geophysical Union List of Upcoming Meetings](#).
- The Geological Society: [Events & Courses](#).
- [International Union of Geological Sciences calendar of geoscience events](#).
- [“Geology Hour” Online](#), evenings on the 3rd Monday of the Month from the Geological Society of the Oregon Country.
- [Canadian Energy Geoscience Association Upcoming Events](#).

October 20, 2025

Geology and Mineral Resources – Mauritania

Introduction



Figure 1a – Mauritania

Credit: [CIA World Factbook](#), public domain

Figure 1b – Location of Mauritania

Credit: [CIA World Factbook](#), public domain

A former French colony, the [Islamic Republic of Mauritania](#) is a country of 4,328,040 people in [Northwest Africa](#). The country has an area of 1,030,700 square kilometres. To the west of the country is the [Atlantic Ocean](#); to the north and northwest is the [Western Sahara](#); to the northeast is [Algeria](#), to the east and southeast is [Mali](#), and to the southwest is [Senegal](#). Mauritania is not a prosperous country, the per capita [GDP \(PPP\)](#) is \$8,650 and the [Human Development Index](#) is medium at 0.563. The Mauritanian economy is mainly agricultural, with most people making a living from subsistence agriculture and livestock. For more details on the country, check out the [CIA World Factbook on Mauritania](#) as well as the [Wikipedia article](#).

Geology

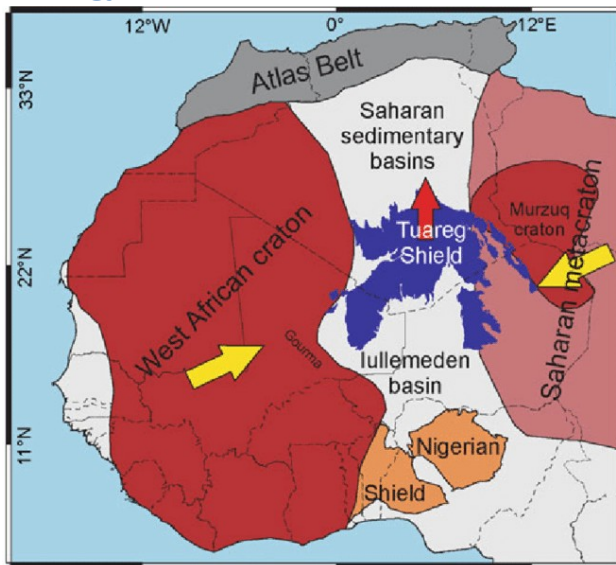


Figure 2 – Tectonic Framework of West Africa

Credit: Figure 1 in [Liégeois, 2019](#)

Mauritania sits on the [West African Craton](#), which forms the basement of much of the country and is overlain by [Phanerozoic](#) aged sedimentary deposits and, in places, [Paleozoic](#) and [Mesozoic](#) aged intrusive rocks. The [geology of Mauritania](#) includes deposits ranging in age from the [Quaternary Period](#) to the [Archean Eon](#). We'll discuss them from youngest to oldest, starting with the deposits of the Phanerozoic Eon, then digging deeper to the Proterozoic and Archean aged rocks.

Phanerozoic Eon

The youngest deposits in Mauritania are [Quaternary](#) aged: [alluvial fans](#), cones, and [talus](#) deposits; [calcrete](#) deposits; [sand dunes](#); [alluvial](#), [fluvial](#) and [lacustrine](#) deposits; [marine and beach deposits](#); [desert pavement](#) sometimes covered with [sand](#) and [calcrete](#); and [sebkha \(gypsum\)](#) deposits.

Next oldest are [Tertiary \(Neogene and Paleogene\)](#) aged [analcimite](#) intrusive rock; chalky [limestone](#) with local [basal conglomerate](#); [laterite](#) and [ferricrete](#). The Neogene aged [Mbidane Formation \(Continental Terminal\)](#) contains [sandstone](#), [clayey sand](#), [kaolinitic clay](#), and [iron pan](#). The Bababé Group includes the sandstones and [siltstones](#) of the Neogene Rinndiao Formation; the [dolomitic limestone](#), [argillaceous sandstone](#), [mudstone](#), [phosphorite](#), and fine sandstone of the Paleogene Bofal Formation; and the undivided Bofal and Gorgol Formations made up of [ferruginous sandstone](#), argillaceous sandstone, [claystone](#), mudstone, and dolomitic limestone.

Moving on to [Mesozoic](#) aged deposits we have the [conglomerate](#), sandstone and [chert](#) of the [Cretaceous Aïdiate Formation](#); and the quartz-rich sandstone of the Continental Infill Formation, also Cretaceous in age. Deeper still is the Oulata Super-Group consisting of a Cretaceous aged Nema Group – mudstone, siltstone, and sandstone – together with Jurassic aged intrusions: [gabbro](#), [diorite](#), [dolerite](#), [microgabbro](#), and [microgranite](#).

We have many [Paleozoic](#) aged deposits in Mauritania; these include [Carboniferous](#) aged conglomerate, sandstone, limestone, and [marl](#); [Devonian](#) aged the sandstone, siltstone, [argillite](#), claystone, limestone, and coquina; [Silurian](#) aged the sandstone, [shale](#), and black argillite; [Ordovician](#) aged [glaciogenic conglomerate](#), sandstone, siltstone, mudstone and [pelite](#) and [quartzite](#); and Cambrian aged sandstone, siltstone, mudstone, pelite, [dolomite](#), limestone, quartzite and [schist](#).

Proterozoic Eon

The Proterozoic geology of Mauritania includes the [Neoproterozoic](#) and [Mesoproterozoic](#) sedimentary deposits of the [Taoudeni Basin](#) and those of the Hodh Super-Group, [dolostone](#), mudstone, siltstone, shale, sandstone, [turbidites](#) pelites, [tuff](#), [carbonate breccia](#), and [stromatolitic](#).

The Neoproterozoic aged intrusive rocks of the [Mauritanide Orogen](#) include: [mylonitized granite](#), granitic [augen gneiss](#) and [quartz/muscovite/tourmaline pegmatite](#), granite, [alkali feldspar granite](#), [metagranite](#), [leucogranite](#), [tonalite](#), [metatonalite](#), [orthogneiss](#), [amphibolite](#), [granodiorite](#), [metadiorite](#), [eclogite](#), gabbro, microgabbro, [metagabbro](#), [syenite](#), [phonolite](#), [trachyte](#), [basalt](#), and [ultramafic](#) rocks.

Stratified rocks of the Mauritanide Orogen include Neoproterozoic to Paleoproterozoic aged [amphibolite](#), [metasedimentary](#) rocks, [metavolcanic](#) rocks, schists, [banded iron formations](#), basalt, [metabasalts](#), [metasiltstones](#), quartzite, sandstones, schists, [phyllites](#), [volcaniclastics](#), metavolcanics, metagabbro, and gneiss.

Paleoproterozoic aged intrusive rocks of the [Rgueibat Shield](#) include granite, tonalite, granodiorite, quartz diorite, diorite, syenite, [nepheline syenite](#), phonolite, gabbro,, ultramafic rocks, pegmatite and pegmatitic gabbro, and orthogneiss. Paleoproterozoic aged stratified rocks of the Rgueibat Shield include metavolcanics, metasedimentary, rocks, granite, amphibolite, metagabbro, metapyroxenite, paragneiss, quartzite, dolomitic marble, schists, and conglomerates.

Archean Eon

Archean aged intrusive rocks of the Rgueibat Shield include various gabbro, granite, granodiorite, tonalite, syenite and ultramafic rocks. Archean aged stratified rocks of the Rgueibat Shield include banded iron formations, quartzite, gneiss, schist and amphibolite.

In 2015, the USGS published a very detailed [geological study of Mauritania](#). Figures 3a and 3b link to the map and legend published in that report.

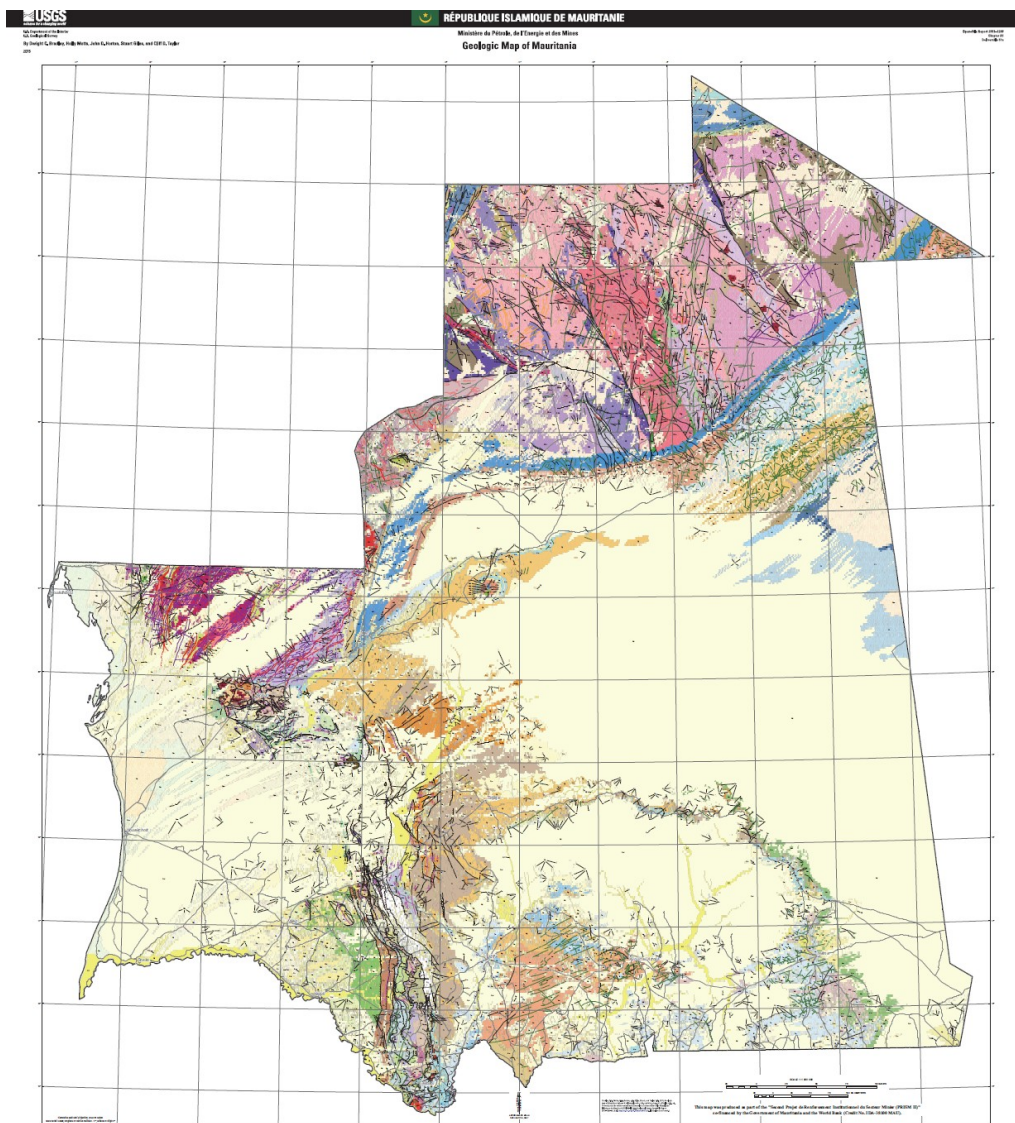


Figure 3a – Geological Map of Mauritania
Credit: [USGS Open-File Report 2013-1280-A1](#), public domain

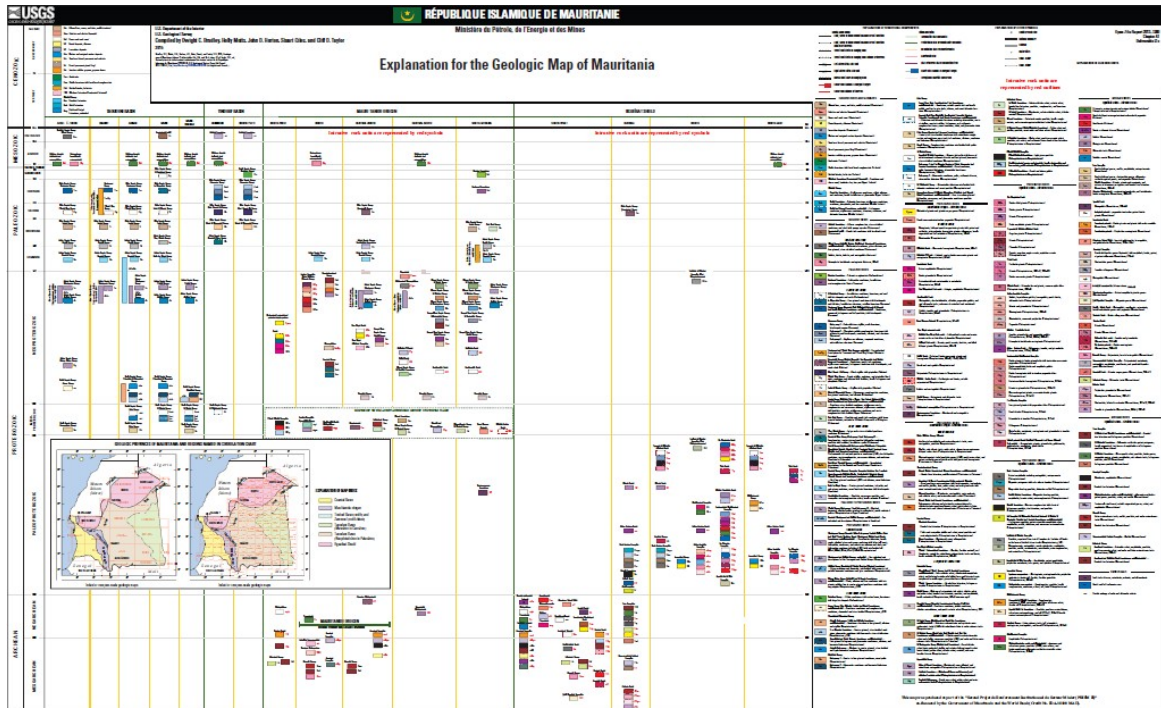


Figure 3b – Legend for Geologic Map of Mauritania
 Credit: [USGS Open-File Report 2013-1280-A1](#), public domain

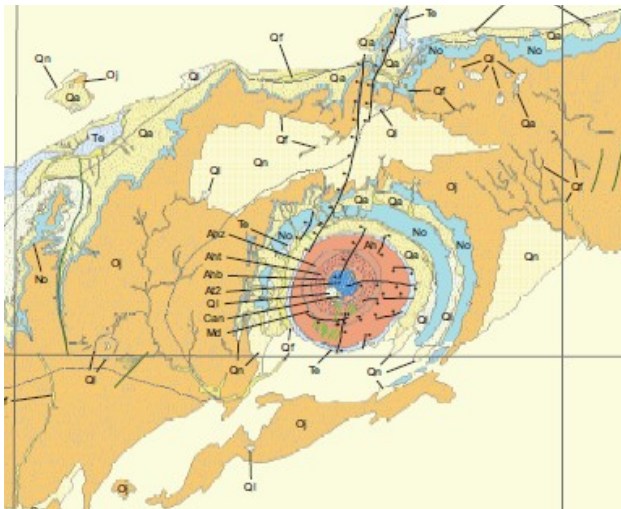


Figure 3c – Extract of Figure 3a, Richat Structure
 Credit: [USGS Open-File Report 2013-1280-A1](#), public domain

If you took a look at the map in Figure 3a, you might have noticed an odd structure, centred at 21°04'N/11°22'W, I've extracted it for Figure 3c. This is the [Richat Structure](#), sometimes called “the Eye of Africa”. At first glance, it looks like the result of an impact, an [astrobleme](#). However, investigations ([here](#) and [here](#)) indicate that it is not an impact structure but rather an [igneous dome structure](#) with a [crystallization age](#) between ca. 230 and 201 Mya, around the time of the formation of the [Central Atlantic Magmatic Province](#) (CAMP). Interesting, however.

Mineral Resources



Figure 4 – Iron Ore Train at Nouadhibou Station, Mauritania

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

The USGS [Mineral Yearbook for Mauritania](#) indicates that the country produces, or produced, metallic minerals (copper, gold, iron ore, uranium), industrial minerals (cement, gypsum, phosphate rock, quartz, salt), and fuel minerals (natural gas and petroleum). The most recent production statistics are [here](#). Among fuel minerals, petroleum was produced from the offshore Chinguetti oilfield until 2018.

For metallic minerals:

- Copper and gold are mined at the [Guelb Moghrein Mine](#).
- Gold is also mined at the [Tasiast Gold Mine](#).
- Iron ore is mined at the [Guelb el Rhein](#), [Kedia d'Idjill](#), and [M'Haoudat](#) mines.
- A project to produce uranium is underway at the [Tiris Uranium Project](#), a [permit to develop the mine](#) was issued in 2024, and production is [scheduled to begin this year](#).

Among industrial minerals:

- [Cement](#) is produced at four locations in Mauritania.
- Gypsum is mined at [Sebkha N'dramcha, Nouakchott](#).
- Quartz is mined at facilities at [Oum Agueneina](#) and in [Chami](#) province.
- Salt is produced from the [Sebkha de N'Terert and Sebkhet ej Jill salt flats](#).
- Between 1967 and 1968, French company P echiney mined some 1,200 tonnes of [yttrium](#) and [thorium](#) from the [Bou Naga alkaline complex](#).



Figure 6 – Water Well in Mauritania

Credit: [LBM1948, Creative Commons Attribution-Share Alike 4.0 International license](#)

One critical commodity important in a desert country like Mauritania is groundwater. [The British Geological Survey \(BGS\) report on the Hydrogeology of Mauritania](#) indicates that the country is dependent on groundwater for virtually all its water supply.

Also according to the BGS report, the most productive aquifers are laterally extensive, deep basin-fill sedimentary sequences, particularly the Trarza aquifer in the coastal zone, and the Taoudeni Basin aquifer in the south and southeast. There is little information on groundwater levels and extraction rates across the country and the coastal basin aquifers are likely overused. Quality is also a problem, with high salinity in many aquifers.

Figure 6 links to an interactive mineral occurrence map for Mauritania.

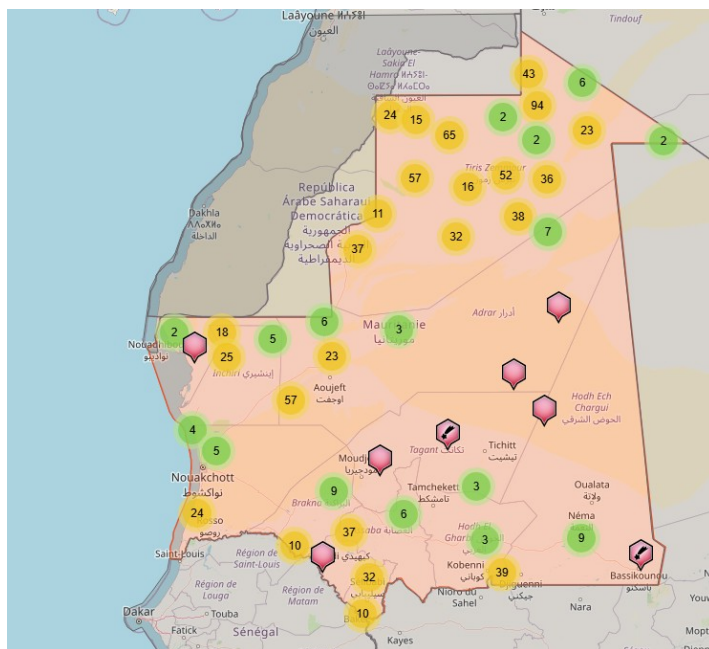


Figure 5 – Interactive Mineral Occurrences, Mauritania [Credit: ©Mindat.org](#)

Summary



Figure 6 – Mauritanian Landscape

Credit: [Ammar Hassan](#), [Creative Commons Attribution 2.0 Generic](#) license

With its complex geology, and wide open desert landscape, Mauritania looks like a promising place for mineral exploration. For example: the [Bou Naga alkaline complex](#) is the country's largest deposit of yttrium, thorium, rare earths, barite, and fluorite; it was developed in the 1960's and [evaluated](#) by the USGS in 2015. There might also be further opportunities for petroleum development offshore.

Keep an eye on [developments](#) in Mauritania.

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.