

May 8, 2023

News and notes

Before going on to discuss how geology has affected the fate of [Angola](#), here are some news items I thought were interesting.

Research

- General science: [In Defense of Merit in Science](#); from the [Journal of Controversial Ideas](#).
- From the Sandia National Laboratory: [Scientists detect gases from fractured rock](#).
- Coastal geology: [Sand dunes offer clues to coastal erosion and how to prevent it](#).
- Fluvial sedimentology: [Global scale analysis on the extent of river channel belts](#); Phys.org summary [here](#).
- Stratigraphy: [Frenchman Mountain Dolostone: A new formation of the Cambrian Tonto Group, Grand Canyon and Basin and Range, USA](#); Eureka alert summary [here](#).
- Plate tectonics and garnets: [Garnet crystallization does not drive oxidation at arcs](#); behind a paywall, Phys.org summary [here](#).
- More plate tectonics: [How the Indian Ocean Geoid Low Was Formed](#).

Paleontology

- [The Miocene Climatic Optimum at the interface of epicontinental sea and large continent: A case study from the Middle Miocene of the Eastern Paratethys](#); Phys.org summary [here](#).
- [Computed tomography and three-dimensional reconstruction of the skull of the stem tetrapod *Crassigyrinus scoticus* Watson, 1929](#); Phys.org summary [here](#).
- [What role does anoxia play in exceptional fossil preservation? Lessons from the taphonomy of the Posidonia Shale \(Germany\)](#); Eureka alert summary [here](#).
- [Cretaceous pollen cone with three-dimensional preservation sheds light on the morphological evolution of cycads in deep time](#); Eureka alert summary [here](#).

Glaciers and Climate Change

- [Increasing extreme melt in northeast Greenland linked to foehn winds and atmospheric rivers](#); Phys.org summary [here](#).
- [Fossil Java Sea corals record Laurentide ice sheet disappearance](#).
- [Strong Coupling Between Carbon Cycle, Climate, and Weathering During the Paleocene-Eocene Thermal Maximum](#).

Environmental Geology and Hydrogeology

- [Atmospheric nourishment of global ocean ecosystems](#); behind a paywall, Phys.org summary [here](#).

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Geology and the Fate of Societies – Angola



Figure 1 – Map of Angola

Credit: Geobica, [Creative Commons Attribution-Share Alike 4.0 International](https://creativecommons.org/licenses/by-sa/4.0/) license

The [Republic of Angola](#) is located on the west-central coast of Southern Africa. The neighbouring countries are [Namibia](#), to the south, [Zambia](#), to the east, the [Democratic Republic of the Congo](#) (a.k.a Congo-Kinshasa) to the north and the [Republic of the Congo](#) (a.k.a Congo-Brazzaville) to the northwest. A [census in 2014](#) showed that 24,383,301 people lived in Angola at the time. Angola's population is divided into a number of ethnic groups such as the [Ovimbundu](#) (37%), [Ambundu](#) (23%), [Bakongo](#) (13%), as well as 32% other ethnic groups such as the [Chokwe](#), the [Ovambo](#), the [Ganguela](#) and the [Xindonga](#). It's complicated and the people of Angola continue to use Portuguese as a *lingua franca*.

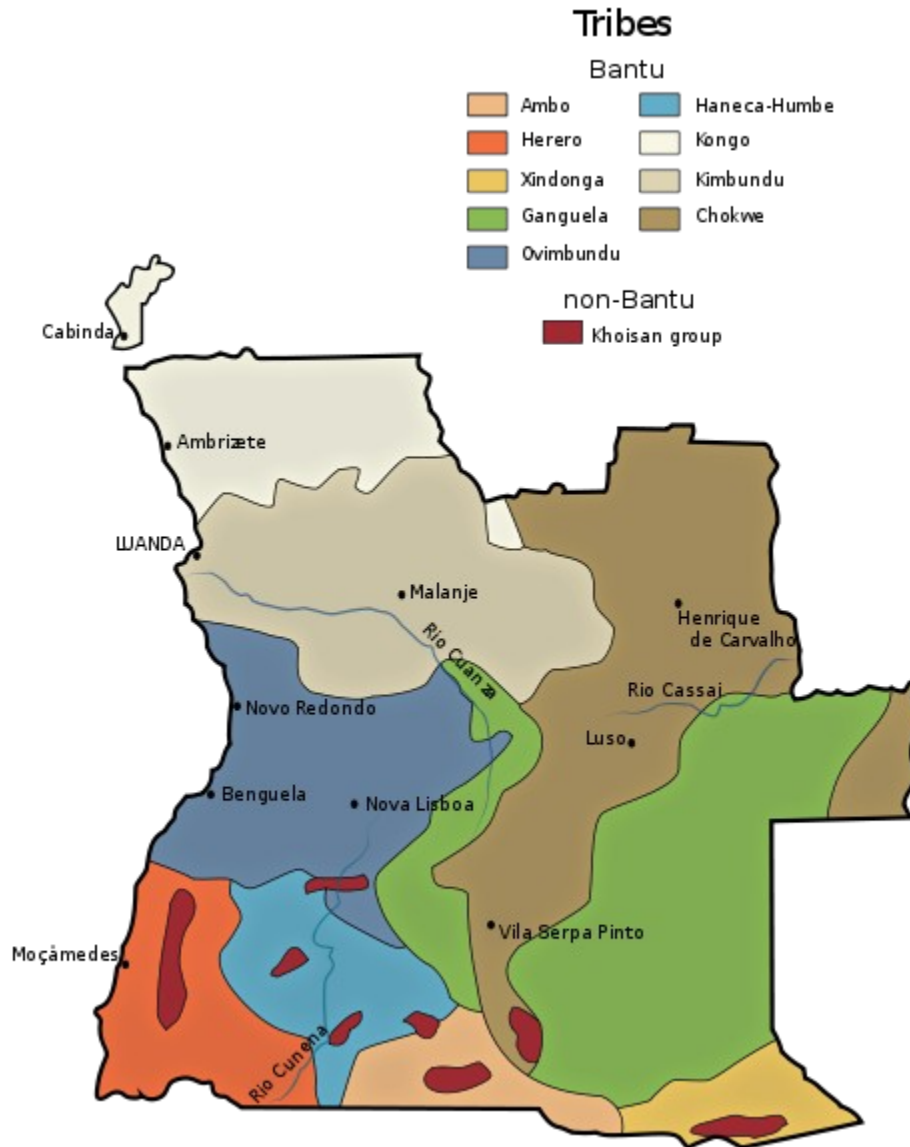


Figure 2 – Ethnic Map of Angola as of 1970
Credit: United States Government, [public domain](#)

Geology

The [geology of Angola](#) can be briefly described as [Mesozoic](#) and [Cenozoic](#) deposits over [Precambrian basement rocks](#):

- The oldest rocks in the country are [Archean](#) deposits found among younger Proterozoic deposits as well in the northeast of Angola are Archean rocks of the [Kasai Craton](#).
- In the west of the country are [Proterozoic metasedimentary](#) rocks; the metasedimentary rocks include [tillites](#) of the [Bembe Group](#).

- Overlying the Precambrian rocks in other parts of the country are clastic sediments and volcanic rocks of the [Karoo Supergroup](#), continental sediments of the [Kalahari Group](#) and marine limestones.
- Associated with the Karoo Supergroup are [kimberlites](#) and [carbonatites](#) resulting from magmatic activity running found along a northeast-southwest line through Angola.

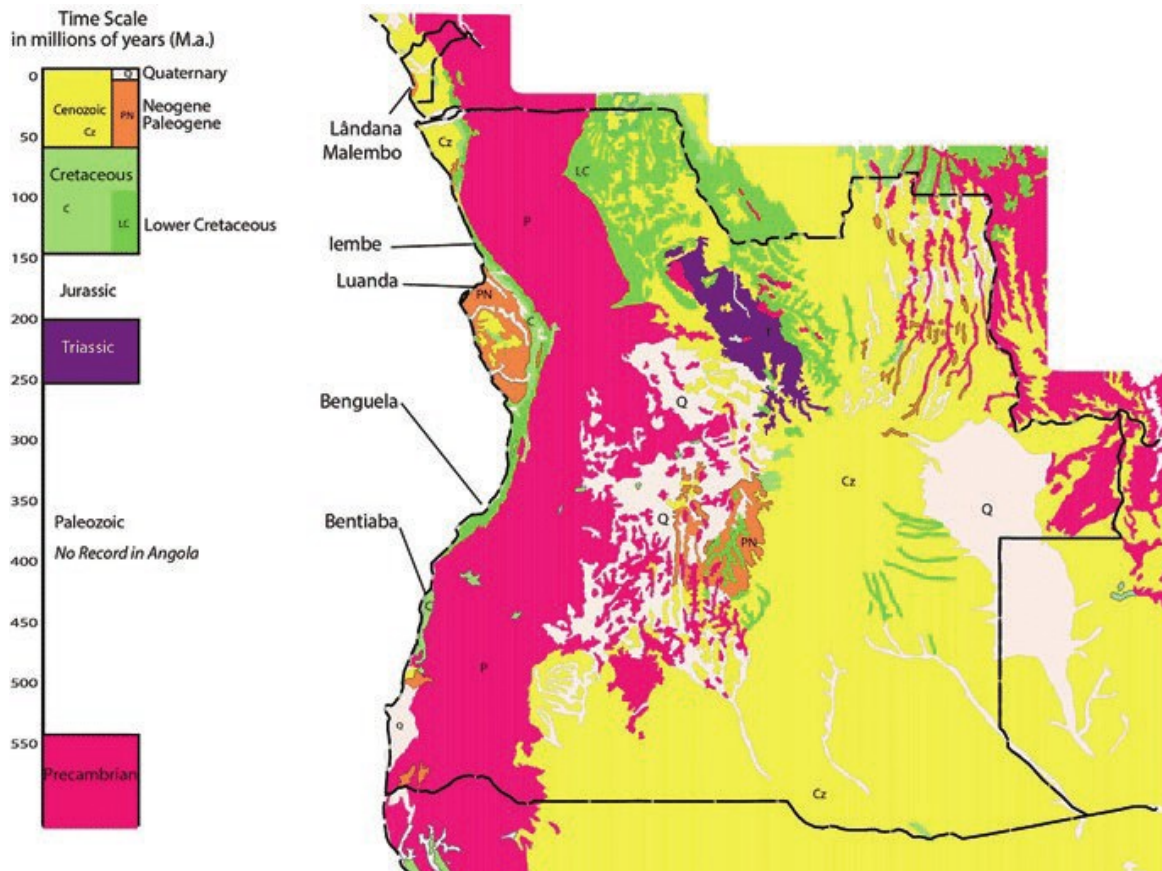


Figure 3 – Geology of Angola

Credit: Figure 4 in [Mateus et al 2019](#), extracted from [USGS 2002](#)

Resources

Agricultural Resources

[Angola has great agricultural potential](#), with a favourable climate and approximately 5.0 million ha of arable land. However, their corrupt government has not repaired the agricultural system, disrupted by a long civil war (1975-2002), and they are currently unable to meet all their food needs through domestic production. Angola requires 4.5 million tonnes a year of grain but grows only about 55% of the maize it needs, 20% of the rice and just 5% of its required wheat.

[2018 agricultural production](#) included:

- 8.6 million tons of cassava (9th largest producer in the world);

- 3.5 million tons of banana (7th largest producer in the world, or the 10th largest, if we consider together with plantain);
- 2.2 million tons of maize;
- 1.2 million tons of sweet potato (10th largest producer in the world);
- 721 thousand tons of potato;
- 597 thousand tons of pineapple (13th largest producer in the world);
- 572 thousand tons of sugarcane;
- 355 thousand tons of cabbage;
- 314 thousand tons of beans;
- 280 thousand tons of palm oil;
- 154 thousand tons of peanut; and
- 16 thousand tons of coffee.

Forestry Resources

A sub-tropical country, Angola has large stands of both natural and planted [forest](#). Most of the development appears to be for local demand, especially firewood and charcoal. There are no reliable figures on production, the United Nations Food and Agriculture Organization ([FAO](#)) estimates that 9,000,000 m³ of wood are needed to produce charcoal for domestic consumption.

Mineral Resources

The [major mineral resources](#) of Angola are petroleum and diamonds.

There are an [estimated](#) 9 billion barrels of proven crude oil reserves and 11 trillion cubic feet of proven natural gas reserves with current production at 1.16 million barrels of oil per day and 17.9 billion cubic feet of natural gas. There is apparently [great potential for further production](#), especially offshore.

Angola is [among the largest diamond producers](#) in the world. [In 2021](#), Angola's diamond production amounted to 8.7 million carats.

Other [mineral resources](#) in Angola include iron ore, manganese, copper, gold, phosphates, granite, marble, uranium, quartz, lead, zinc, tungsten, tin, fluorite, sulfur, feldspar, kaolin, mica, asphalt, gypsum, and talc.

Climate

[Angola's climate](#) is generally sub-tropical and can be divided into three main [Köppen–Geiger Climate zones](#):

- The tropical savanna ([Aw](#));
- An arid zone of hot desert ([BWh](#)), cold desert ([BWk](#)), hot steppe ([BSh](#)) and cold steppe ([BSk](#)); and
- A temperate zone of dry, hot summers ([Csa](#)); dry, warm summers ([Csb](#)); dry winters with hot summers ([Cwa](#)); and dry winters with warm summers ([Cwb](#)).

Figure 4, below, shows the extent of these climate zones.

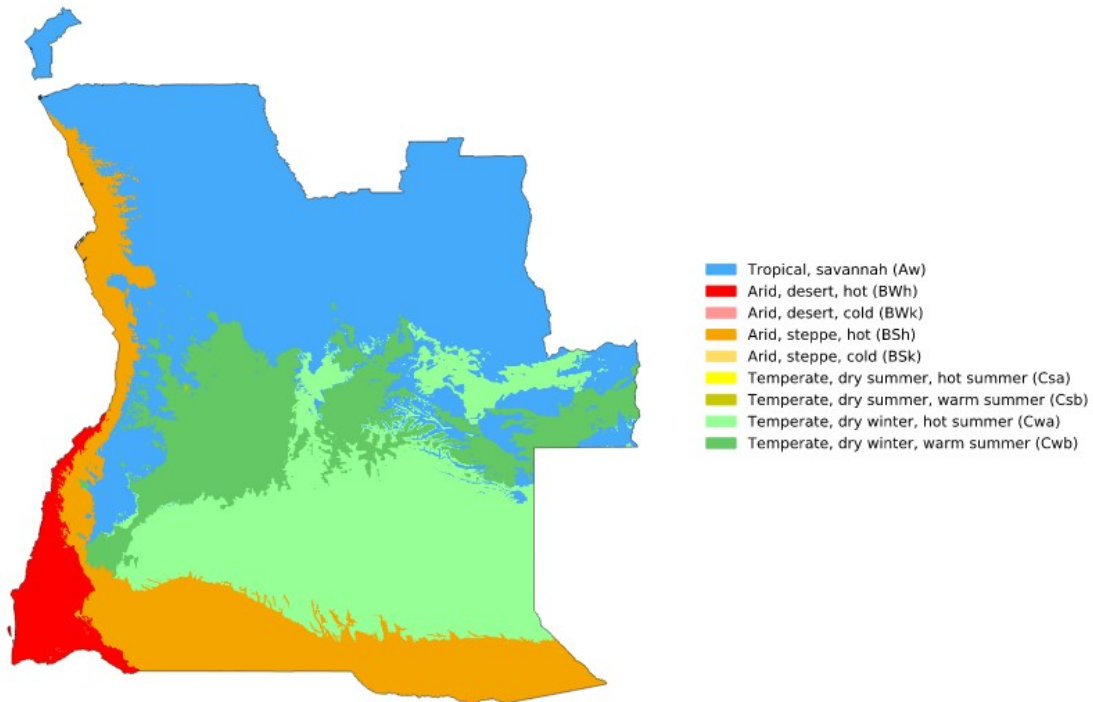


Figure 4 – Köppen–Geiger Climate Classification Map for Angola

Credit: [Zimmermann et al 2018, Creative Commons Attribution-Share Alike 4.0 International license](#)

History

Humans have lived in Sub-Saharan Africa since we first evolved there. The earliest, and longest, occupation of the country we now call Angola were [Paleolithic hunters and gatherers](#). The most recent of the hunter/gatherer groups that lived in Angola, and still live there, are people of the [Khoisan](#) group.

The next phase of Angolan history was the [migration of the Bantu](#) during historic times. The Bantu peoples originated in what is now Nigeria and Cameroon. They developed a [system of agriculture](#) that was [suitable for tropical conditions](#) that was based upon crops such as millet and sorghum as well as tropical forest plants like yams and cassava. The Bantu peoples also [developed iron working](#), giving them a key technology for expansion.

The earliest state-level society in the area was the [Kingdom of the Kongo](#) that began in the 14th Century and continued until 1862. In 1862, the Portuguese absorbed much of Kongo into their Angolan colony with the remainder taken over by the [Belgian Congo](#).

The Portuguese began trading in the Angolan area in 1484 and gradually claimed possession of the land, although most Portuguese settlements were confined to the area along the Atlantic coast. Angola was one of the sources of slaves for the [Atlantic Slave Trade](#). The Portuguese bought captives from Angolan tribes who took the captives into slavery through raiding and/or open warfare.

Portugal retained Angola as a colony until 1975, when they left the county to its inhabitants. Anti-Portuguese insurgencies began in the 1950's and the three main insurgent armies fought a civil war from 1975 till 2002 for control of Angola. The eventual winner of the war, the Marxist–Leninist Popular Movement for the Liberation of Angola (MPLA) forms the current government.

Geopolitics

Angola has the unfortunate situation of being a country rich in natural resources but with poorly developed human resources. Colonial relationships continue under the current regime, where the benefits of the mineral wealth extracted from the country largely go to outside entities, mostly trans-national corporations. This is done with the well compensated connivance of corrupt local officials. Money for infrastructure and education is only found when it benefits the ruling class. Otherwise revenues from mineral extraction go into the pockets of the people running the country. Basic food security is lacking for most people in Angola and the destruction caused by the civil war has not been repaired – some 20 years after the end of said war. An irony not lost on observers of Angola is that the MPLA rulers, allegedly Marxist-Leninist, [are every bit as rapacious as the worst capitalists](#).

A wise government would put as much wealth as was available into improving infrastructure to make agriculture more productive and profitable for farmers. Another wise investment would be widespread education to improve the ability of individuals to create wealth.

While hungry, ignorant people are not good at creating wealth, they are easier to rule. Perhaps that explains why Marxist-Leninists would rather loot their country than develop its people – an educated population wouldn't tolerate the behaviour of the current government of Angola.

That winds up the brief look at Angola. When assessing a country's politics and economy, I am not a great lover of ideological analyses that automatically assign virtue to any one system. Rather, I think that you have to look at the results of any particular system of rule, or as Jesus famously said "by their fruits you will know them" ([Matthew 7: 20](#)).

Standard Caveat

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.