

August 5, 2024

## News and notes

Before going on to discuss the geology and geopolitics of [Eswatini](#) (formerly Swaziland), here are some news items I thought were interesting. If you were expecting Estonia, I posted on it [last year on August 28](#), together with the other Baltic countries.

## Geopolitics

- Fallout from Venezuela's elections:
  - [Voices across the globe express concern over increasing arrests in Venezuela after disputed election](#);
  - [Venezuela could hand energy rights to BRICS – Maduro](#);
  - [Will Venezuela's disputed election lead to new era of isolation?](#)
  - [Venezuela's oil industry operating normally amid election protests](#).
- Power projection: [Pentagon dispatches carrier strike group, fighter jet squadron to Mideast as tensions escalate](#).
- Another video on Alexander Dugin: ["Is This Our Future? Understanding Dugin's Fourth Theory"](#).
- [Canadian Navy Monitors Chinese Research Vessel in Arctic, Says Foreign Actors 'Collecting Intelligence'](#); related: [The Coming Battle Over the Arctic](#).
- Assassination as a political act: [Haniyeh Killed By Bomb Placed In Tehran Guesthouse 2 Months Ago In Astounding Mossad Penetration Of IRGC Security](#).
- How is that multiculturalism working out? [UK sees worst riots in 13 years, fueled by 'false rumours'](#); over 100 arrested: [What happening in England?](#)
- Review of upcoming documentary series on the BBC: [Corridors of Power TV review – what happens when US foreign policy fails](#).
- Wars and rumours of wars: [Wagner Group Column Mangled In Mali](#).
- Geopolitical risks: [Oil gains on fears of wider Middle East conflict after rocket strike in Golan Heights](#).

## Research and News

- Planetary geology: [Ishtar Terra highlands on Venus raised by craton-like formation mechanisms](#).
- [He was a rising star of academia with multiple papers. He was also a cat](#).

- Sedimentology: [Depositional environments of complex lake systems – palaeogeographical evolution and main controls: A case study of the Lower to Middle Permian Roseneath–Epsilon–Murteree strata, Cooper Basin, Australia.](#)
- Lacustrine geology, Quaternary geology, and archaeology: [Landscape evolution and hydrology at the Late Pleistocene archaeological site of Narabeb in the Namib Sand Sea, Namibia](#); Phys.org summary [here](#).
- Artificial intelligence or artificial nonsense: [The problem of ‘model collapse’: how a lack of human data limits AI progress](#); one problem is that AI can’t feel pain and stupidity should be painful.
- Ooh, shiny: [Petrologically controlled oxygen isotopic classification of cogenetic magmatic and metamorphic sapphire from Quaternary volcanic fields in the Eifel, Germany](#); Phys.org summary [here](#).

## Paleontology

- [The ever-changing tree of life](#); the tree doesn't change, just our understanding of it.
- [Is that a durian? No, it’s a weird ancient mollusc](#); summary in The Independent [here](#).
- [The Wild Tale of the Cerutti Mastodon, a Fossil That Could Rewrite the Human Story.](#)
- [Organ systems of a Cambrian euarthropod larva](#); Live Science summary [here](#).
- [Carcinosomatoid eurypterid palaeoecology and phylogeny: ichnology and palaeocommunities](#); Sci News summary [here](#).
- [Estimation of maximum body size in fossil species: A case study using Tyrannosaurus rex](#); Live Science summary [here](#).

## Mining and Energy

- [Pambili produces first gold from Zimbabwe mine.](#)
- [Salar de Uyuni: The world's largest salt desert and lithium reservoir surrounded by volcanoes.](#)
- Market forces at work: [The lawless mining gangs targeting the Amazon’s precious green energy minerals](#); related: [Why the once 'dirty' mining industry is now touted as key to 'clean' energy.](#)
- [Glencore’s billionaire ex-oil head charged with corruption.](#)
- [Cyprium, Glencore partner to restart Nifty copper mine in Australia](#); might be interesting if you plan to attend the [conference on Australian copper in 2025](#).
- [Manitoba's 1st potash mine readies for market debut.](#)
- [Thousands in Serbia rally against Rio Tinto mine project](#); if the people paying the price for a development don’t get a substantial cut of the benefits, why shouldn’t they object?

- [Massive KSM copper-gold mine in NW BC deemed substantially started.](#)
- [Guinea's Simandou iron ore project seen aiding climate goal.](#)
- From the Guardian: [Inside the battle for top job that will decide the future of deep-sea mining.](#)
- [Is the dream of nuclear fusion dead? Why the international experimental reactor is in 'big trouble'.](#)
- [OPEC+ to Reevaluate Production Cuts as Brent Crude Prices Falter.](#)
- [World's Deepest Offshore Oil Well Planned for Colombia This Year.](#)
- [Weak Demand in China Weighs on Middle East Oil Price Outlook.](#)
- [Another Fourth-Generation Nuclear Reactor Begins Construction in the U.S.](#)
- [Bandgap-universal passivation enables stable perovskite solar cells with low photovoltage loss;](#) behind a paywall, Phys.org summary [here](#), summary of [perovskite here](#).

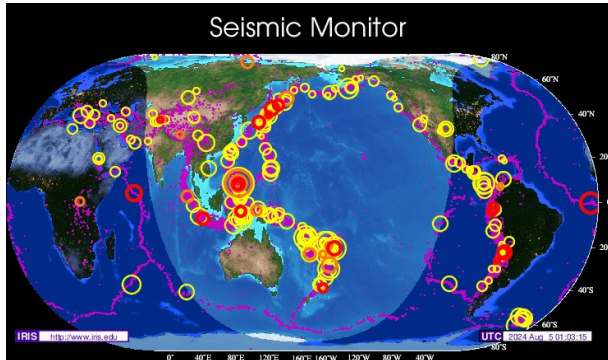
## Environmental Geology and Hydrogeology

- PFAS remediation research: [Synergistic material–microbe interface toward deeper anaerobic defluorination](#); Phys.org summary [here](#).
- [PFAS assessment in fish – Samples from Illinois waters](#); Phys.org summary [here](#).
- [Popular beach in Montreal's east end has contaminated soil, says Public Health.](#)
- [Costly climate 'solutions' look like more pollution in Louisiana's 'Cancer Alley'.](#)
- Remediation research: [Multiphoton-driven Photocatalytic Defluorination of Persistent Perfluoroalkyl Substances and Polymers by Visible Light](#); New Atlas summary [here](#).
- [Groundwater plays an invisible role supporting lakes.](#)
- Plans cancelled: [Court case over Glencore's Great Artesian Basin carbon capture storage plan ends.](#)
- Whiskey's for drinking, water's for fighting: [Lithium and water: Hydrosocial impacts across the life cycle of energy storage](#); Las Vegas Review Journal summary [here](#).

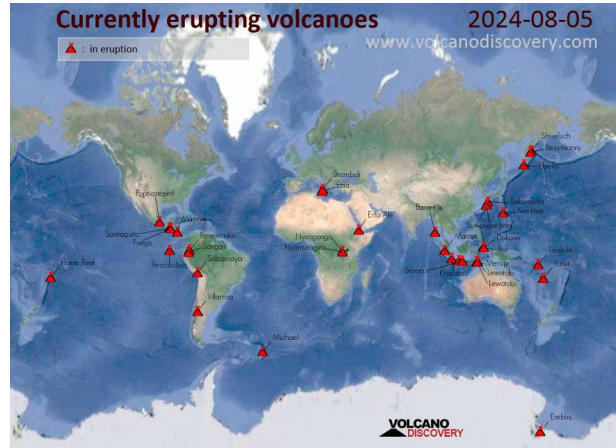
## Glaciers and Climate Change

- Periglacial environment: [Methane 'kitchens' in Siberia's permafrost form mounds that can erupt, creating giant craters](#); link to original research, in Russian, [here](#).
- [Recent tropical Andean glacier retreat is unprecedented in the Holocene](#); Phys.org summary [here](#).
- [Swirls and scoops: Ice base melt revealed by multibeam imagery of an Antarctic ice shelf](#); Phys.org summary [here](#).

## Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

- United States Geological Survey (USGS) Volcano Watch: [HVO bids farewell to its Uēkahuna location](#).
- USGS Yellowstone Volcano Observatory: [The July 23, 2024, hydrothermal explosion at Biscuit Basin](#).
- [Smithsonian / USGS Weekly Volcanic Activity Report](#).
- Iceland:
  - [Warn about an eruption in the next few days](#);
  - [Deep crustal assimilation during the 2021 Fagradalsfjall Fires](#), Iceland; Phys.org summary [here](#).
- [Mount Etna erupts again causing airport chaos](#).
- [Euro-Mediterranean Seismological Centre](#)
- [Earthquakes Monitoring Live Worldwide](#).
- [M4.9 earthquake near Barstow, California](#); USGS summary [here](#).
- [M6.8 earthquake offshore Mindanao is delayed aftershock of 2023 M7.6](#); USGS summary [here](#).
- Landslides: [August 1 Planet Geo podcast](#).
- Dangerous landslide: [Landslide continues to block Chilcotin River Sunday morning, Aug.4](#).

### Upcoming Events

- [Goldschmidt 2024, August 18-24, Chicago IL](#), organized by the Geochemical Society and the European Association of Geochemistry.
- [Lloydminster Heavy Oil Show September 11-12](#); Pipeline Online summary [here](#).
- [Groundwater Week 2024](#), December 10-12 in Las Vegas, Nevada.
- [Copper to the World Conference, Tuesday 26 – Wednesday 27 August 2025](#), in Adelaide, Australia; report on 2024 conference [here](#).

August 5, 2024

## Geology and the Fate of Societies – Eswatini



**Figure 1a – Eswatini**

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



**Figure 1b – Location Map**

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

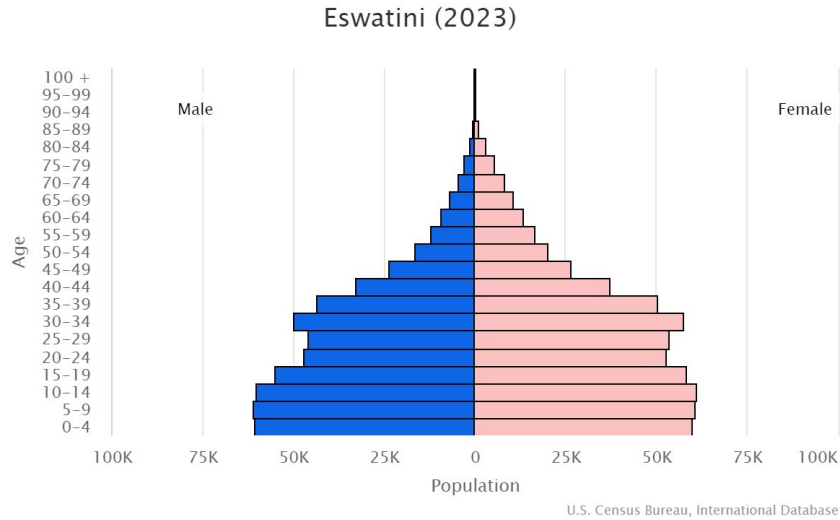
The Kingdom of [Eswatini](#), formerly called Swaziland, is a small landlocked country in the [south of Africa](#). It is bordered by Mozambique on the east and by [South Africa](#) on the rest of its borders. According to the [Central Intelligence Agency \(CIA\) World Factbook](#) on Eswatini, it has a total area of 17,364 square kilometres (km<sup>2</sup>) of which 17,204 km<sup>2</sup> is land and 160 km<sup>2</sup> is water.

Eswatini is an [absolute monarchy](#) ruled by King [Mswati III](#). Other important officials include: the Queen Mother, [Ntfombi](#); the Prime Minister, [Russell Dlamini](#); and the Chief Justice, [Bheki Maphalala](#). King Mswati has a [Parliament](#) composed of a [Senate](#) and a [House of Assembly](#). There are two capital cities: [Mbabane](#), for the executive; and [Lobamba](#), for the legislature. The largest city in Eswatini is Mbabane, population 94,874.

Also according to the World Factbook, Eswatini has a total population of 1,138,089 people, 24.8% of whom live in urban areas. Of the approximately 1.14 million people in Eswatini: 84% are ethnic [Swazi](#); 10% are [Zulu](#); and 6% are something other. [English](#) and [siSwati](#) are the two official languages. Most Swati, 88.8% are various kinds of [Protestant Christians](#); 0.5% are other kinds of Christians; 7.4% have no religion; 2.5% follow [traditional faiths](#); and 0.8% are something other. In terms of education, 88.4% of the population can read and write; schooling for most people last 12 – 13 years.

Among the important economic statistics for Eswatini, unemployment was 37.64% in 2023 for all ages and youth unemployment was 65%. 58.9% of the country lives below the poverty line and the [Gini Index](#)

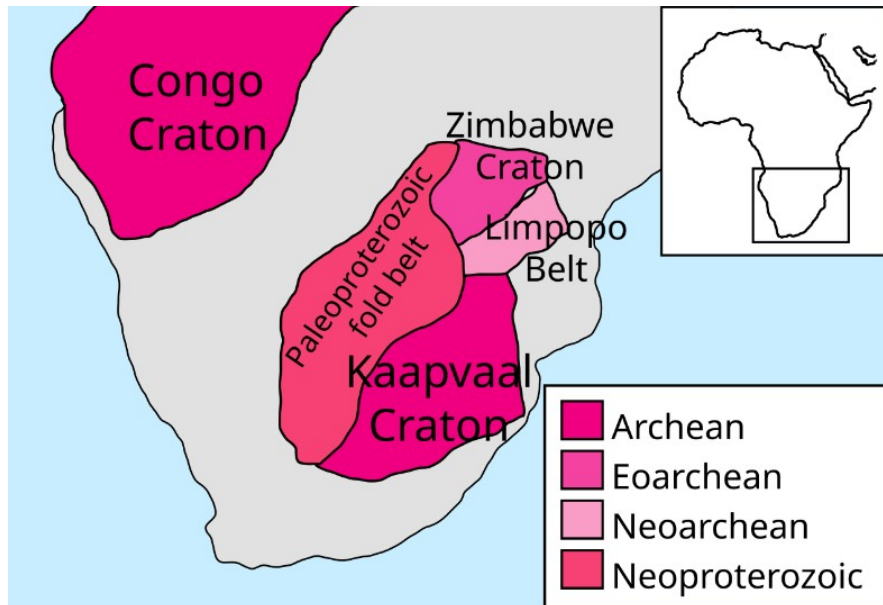
[coefficient](#) is 0.55 (on a scale of 0 to 1). The most common economic activity in Eswatini is [subsistence farming](#) and this may skew the official unemployment statistics.



**Figure 2 – Demographic Profile, Eswatini**  
**Credit: U.S. Census Bureau, International Database, public domain**

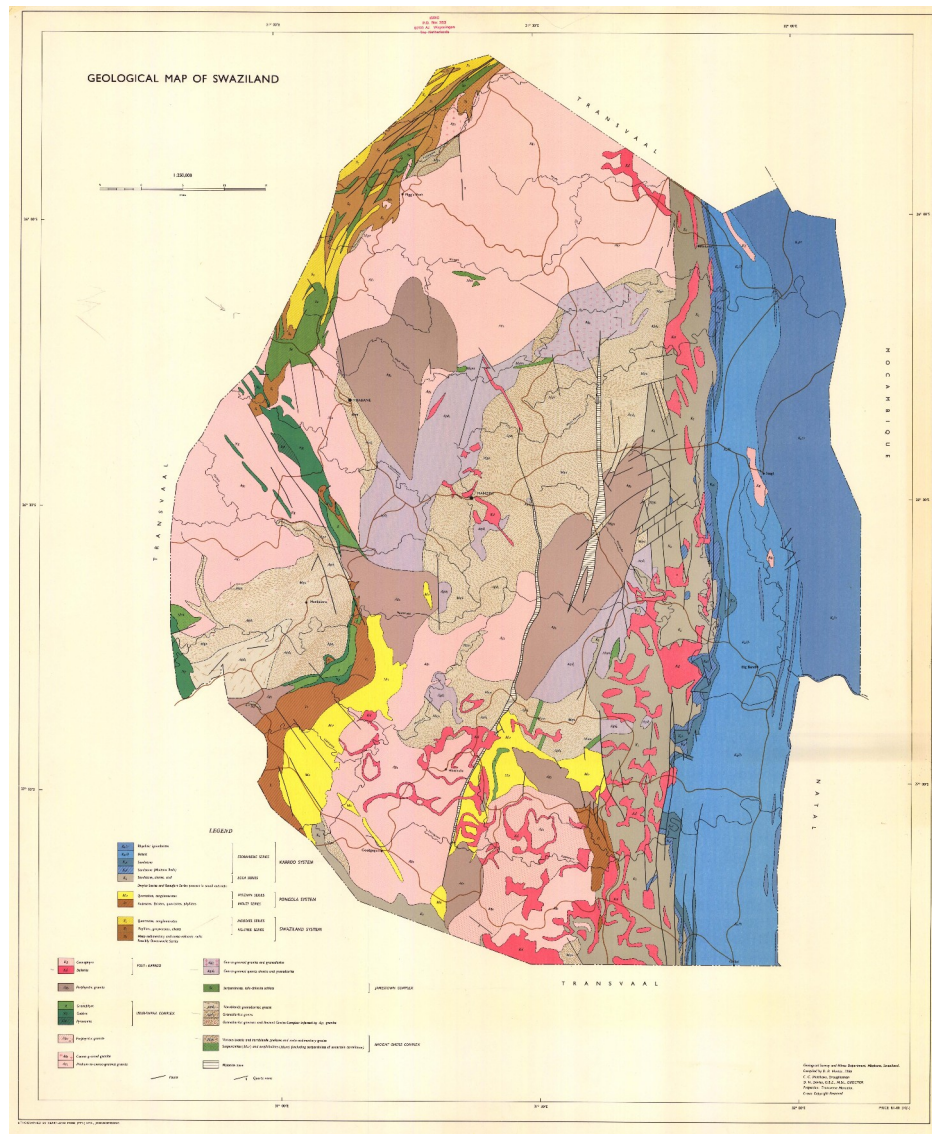
The [demographic profile of Eswatini](#) shows a young country where the median age is 24.6 years. Life expectancy at birth for both sexes is 60.2; the annual growth rate is 0.7%; and total fertility rate is 2.41 births per woman. One thing that regularly skews the demographic profile of Eswatini is that men frequently migrate to South Africa in search of work, [especially in the mining sector](#).

## Geology



**Figure 3 – South African Cratons**  
**Credit: Aymatth2, public domain**

The [geology of Eswatini](#) consists of [Archean](#) aged [basement](#) rock of the [Kaalvaal Craton](#) overlain in places by [Proterozoic](#) and [Phanerozoic](#) deposits.



**Figure 4 – Geological Map of Eswatini**  
**Credit: [European Soil Data Centre \(ESDAC\)](#), public domain**

The oldest rocks are the [Paleoarchean](#) aged [Ancient Gneiss Complex](#), and the Swaziland or [Barberton Supergroup](#). The Ancient Gneiss Complex consists of three main units: (a) a bimodal suite of interlayered [gneisses](#) and [metabasalt](#); (b) [tonalite](#) gneiss; and (c) a unit of interlayered gneiss, metabasalt, and minor [metasedimentary](#) rocks.

The Barberton/Swaziland Supergroup is further divided into three main units: a) [Onverwacht Group](#) consists of submarine [ultramafic-mafic](#) volcanic rocks and minor [felsic](#) volcanic and sedimentary rocks; b) the [Fig Tree Group](#), consisting of [shale](#), [greywacke](#), and felsic [volcaniclastic](#) rocks with minor [conglomerate](#) and [banded iron formation](#); and c) the [Moodies Group](#) that is made up of fluvial [sandstone](#)

and conglomerate with minor shale and banded iron formation. Also included in the Barberton Supergroup are the rocks of the [Jamestown Ophiolite Complex](#).

The next youngest group of deposits are from the [Pongolo Supergroup](#) and the [Usushwana Complex](#), both of which are [Mesoarchean](#) in age. The Pongolo Supergroup is divided into two groups: a) the lower [Nsuzze Group](#), dominated by volcanic rocks ranging from [basalt](#) to [basaltic andesite](#) through to [intermediate volcanic rock](#) and [rhyolite](#) compositions; and b) the upper [Mozaan Group](#), dominated by sedimentary units including marine shales and [quartzites](#). The Usushwana Complex consists of layered [gabbro](#) and [pyroxenite](#).

The [Karoo Supergroup](#) was deposited in a basin formed when a [rift valley](#) opened up in [Gondwana](#) during the [Paleozoic](#). Karoo Supergroup deposits in Eswatini include [Permian](#) aged claystone and [Jurassic](#) aged basalt and rhyolite. Post Karoo intrusions include [granophyric granite](#) and [dolerite](#).

## Resources

### Agriculture



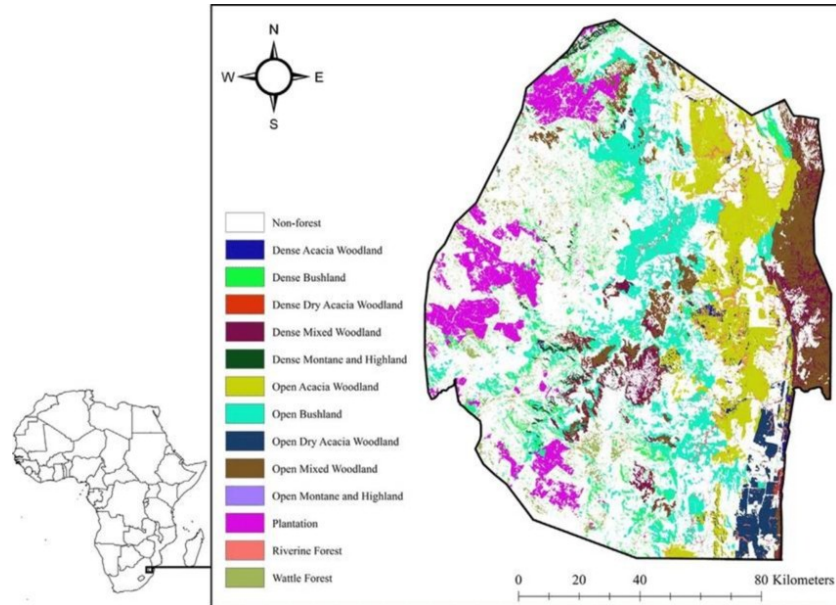
**Figure 5 – Farm Round Huts in Lowveld, Eswatini**  
**Credit: [Bgabel](#), [Creative Commons Attribution-Share Alike 3.0 Unported](#), [2.5 Generic](#), [2.0 Generic](#) and [1.0 Generic](#) license**

According to the CIA World Factbook on Eswatini, 68.3% of the land is used for agriculture. Of that 68.3%: arable land is 9.8%; permanent crops are 0.8%; and permanent pasture is 57.7%. The main agricultural in Eswatini, by tonnage, are [sugarcane](#), [maize](#), [root vegetables](#), [grapefruits](#), [oranges](#), [dairy products](#), [pineapples](#), [bananas](#), [beef](#), and potato, both [sweet](#) and [common](#). Keep in mind that most of the agriculture in Eswatini is [subsistence agriculture](#).

You can find statistics on food production from the [United Nations Food and Agriculture Organization \(FAO\)](#) [here](#).

Eswatini is a poor country where food insecurity is significant, according to the FAO, about 56% of the population experienced [moderate to severe food insecurity 2021 to 2023](#). Also, food insecurity is [getting worse](#) in 2023-2024.

### Forestry



**Figure 6 – Forest Types in Eswatini**

**Credit:** Figure 3 in [Singwane, 2020](#)

[Forests in Eswatini](#) cover about 31.7% of the total area of the country. Figure 6 shows the various forest types in Eswatini and if this interests you, check out the [Swaziland Tree Atlas](#) and [this post](#). Interestingly, most of the forest in Eswatini is planted as opposed to natural forest. The main types of trees planted were pines and eucalyptus. You can find statistics on forest production from the FAO [here](#).

### Mineral Resources



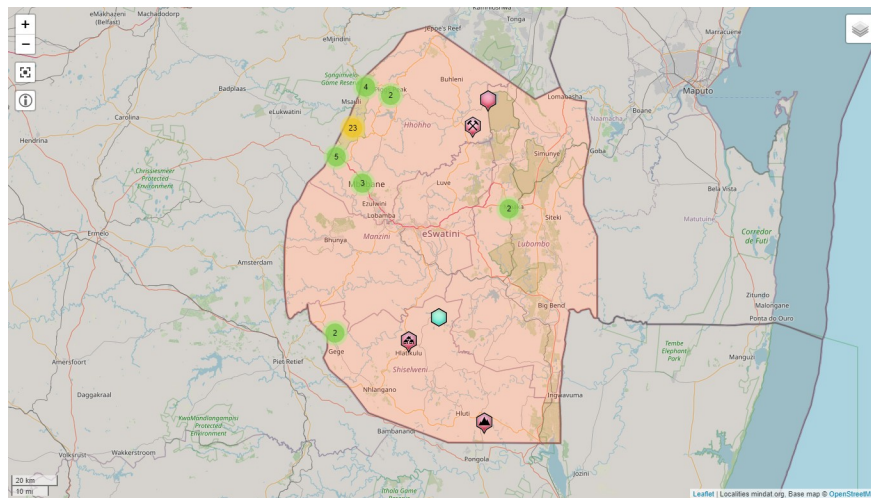
**Figure 7 – Former Ngwenya Mine**

**Credit:** [Heather Dowd](#), [Creative Commons Attribution-Share Alike 2.0 Generic](#) license

According to the [USGS](#), production of mineral commodities in Eswatini represents only a minor part of the country's economy. Major commodities produced are coal, gold, and crushed stone.

[Anthracite](#) coal is produced at the [Maloma Mine](#). Gold is produced at the [Lomati Mine](#), near [Hhelehhele](#). Crushed stone is produced the [Kwalini quarry](#) (it also sells [red-mix cement](#)), in [Matsapha](#), and at the [Mbabane quarry](#) (it also produces [bricks and concrete products](#)), in [Mahamba](#). While not currently in production, the [Ngwenya Mine](#) was mined for [red ochre](#) during the [Paleolithic](#) and was mined for [hematite](#) iron ore from circa 400 AD until 2014 making it the longest operating mine in history. Other former mines are listed [here](#).

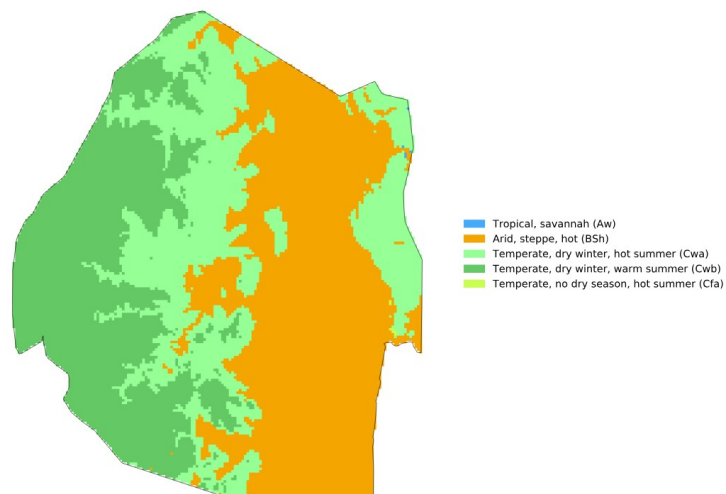
Statistics on mineral production from the USGS can be found [here](#). Figure 8 links to an interactive mineral occurrence map for Eswatini.



**Figure 8 – Mineral Occurrences, Eswatini**  
[Credit: ©Mindat.org](#)

## Climate

Köppen-Geiger climate classification map for Swaziland (1991–2020)



**Figure 9 – Köppen-Geiger Climate Classification, Eswatini**  
[Credit: Beck et al, 2023, Creative Commons Attribution 4.0 International license](#)

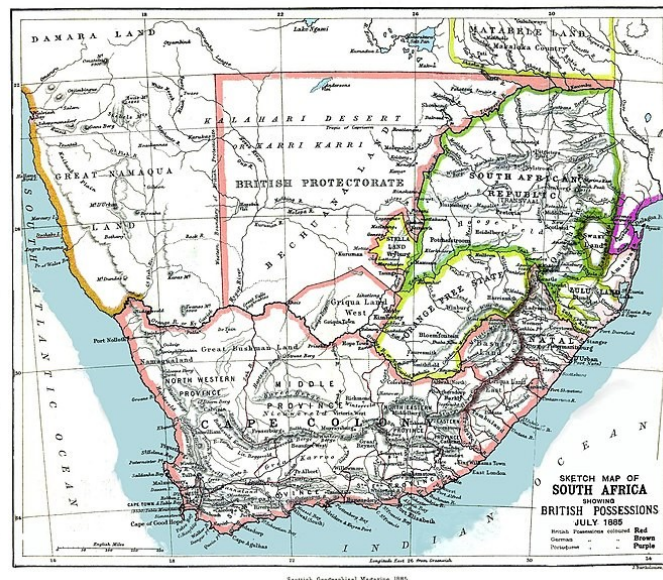
The climate in Eswatini varies from tropical to near temperate, depending on elevation. There are three main zones:

- A small area of tropical savanna ([Aw](#)) in the lowlands;
- Hot arid steppe ([BSh](#)) in the east/central part of the country; and
- Temperate climates ([Cwa](#), [Cwb](#), [Cfa](#)) in the higher elevations.

Eswatini looks like a nice place to visit. If you plan to go, check out these travel advisories [here](#) and [here](#). If the prospect of civil unrest and petty crime doesn't frighten you off, check out [Climates to Travel](#) and [Lonely Planet](#). Also, if you like to live on the wild side, keep in mind that Eswatini has a high incidence of [HIV/AIDS](#).

## History and Geopolitics

### History



**Figure 10 – Sketch Map of South Africa Showing British Possessions, July 1885**

**Credit: [John George Bartholomew](#) (1860–1920), public domain**

In the [history of Eswatini](#), human settlement goes back to the [Paleolithic](#). The earliest recorded humans in the area were people related to the ancestors of the modern [Khoisan](#) people. These Khoisan people are believed to be responsible for the [Nsangwini rock art](#).

Beginning around 2000 years ago, [Bantu](#)-speaking people began [migrating](#) into southern Africa. The Bantus had a suite of agricultural and iron based technologies that gave them both superior numbers and weapons when compared to the Khoisan hunter-gatherer. Consequently, the Bantu-speaking people overcame the previous inhabitants, chasing some off, conquering and assimilating the rest.

Under the leadership of [Ngwane III](#), Swati people began settling in what is now Eswatini in the early 1700's. At the same time, [Portuguese](#), [Dutch](#) and [British](#) began arriving in southern Africa for trade and

settlement. The effect on the indigenous Khoisan peoples was like being between a hammer and an anvil, the survivors ended up in the [Kalahari Desert](#).

Following the British defeat of the [Dutch-speaking Afrikaner republics in the Boer War](#) in 1902, they extended their influence over the Swati kingdom, with Swaziland becoming a [British Protectorate](#) from 1903 till 1963. As a result, the Kings of Swaziland retained their thrones under British “protection”.

Swaziland received their full independence in 1963. The current king, Mswati III changed the name of the kingdom from Swaziland to Eswatini in 2018. Independence has brought its share of political problems, with [mildly chaotic politics](#) and, more significantly, frequent protests. The most recent round of protests occurred [2021-2023](#).

### ***Geopolitics of a Landlocked Nation***

The biggest internal challenges for King Mswati III revolve around expanding economic opportunities for his subjects and effectively answering the calls for increased democratic reform. [Corruption](#) and poverty are a couple of the causes of the call for increased democracy. History suggests that failure to address the legitimate interests of his people will not end well for King Mswati III.

In terms of relations with their neighbours, Eswatini’s [relations with South Africa](#) are probably the most critical. In many ways, South Africa inherited the British role in being Eswatini’s “protector”. The key for Eswatini is to manage the relationship with South Africa to ensure their own independence. So far, it seems to be working well although there are concerns with South African economic domination.

[Relations with Mozambique](#) are also peaceful and marked by common interests in trade.

So, overall, Eswatini is not in too bad a shape. Things could go sour, quickly, if calls for democratic reform go unheeded.

### **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.