

December 23, 2024

News and notes

Before going on to discuss the geology and geopolitics of [Guatemala](#), here are some news items I thought were interesting.

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](#); new release [here](#).
- Free Groundwater Modeling Course – [HydroGeoCenter](#).

Geopolitics

- [Blinken Admits Past 20 Years Of US Regime Change Efforts Abroad Basically A Failure](#).
- [USGS invests \\$3.6 million in Bipartisan Infrastructure Law funding to map critical minerals in Alaska](#).
- [China Is Halting Critical Mineral Exports to the US. An Idaho Mine Could Help-If It Ever Secures Federal Permits](#).
- [Canada and U.S. Department of Defence invest \\$35M in the Yukon's Mactung mine](#);
- [Nickel at the Core: Alaska Energy Metals' Key Role in Securing U.S. Energy Independence](#).

Research and News

- [The January 2025 edition](#) of the American Association of Petroleum Geologists (AAPG) Bulletin is on line now, sorry it is mostly behind a paywall.
- [Carbonatite evolution at St Honoré \(Canada\), the apatite record](#).
- [Inception of ridge-ridge-ridge triple junctions: Morphostructural analysis and dynamics in the early back-arc extension of the northern Okinawa Trough](#).
- [Bilateral asthenospheric flow fed by the Caroline plume \(western Pacific Ocean\)](#).
- [Episodic Seafloor Hydrothermal Alteration as a Source of Stable Remagnetizations in Archean Volcanic Rocks](#).
- Oceanography: [Denmark Strait cataract: The world's largest waterfall, hidden underwater and unlike any other on land](#).
- [K-Mg salt distribution in the Zechstein Group of the Northern Permian Basin \(UK and Norway\)- Interplays with the Southern Permian Basin and implications for salt cavern development](#).

- [Testing the viability of normal seawater dolomitization in lower Cambrian carbonates using clumped isotopes.](#)
- [3D Model of the Major Crustal Boundaries of Australia 2024 Edition.](#)
- [Fe-dependent structural evolution of peralkaline soda aluminosilicate glasses: Iron speciation vs. glass transition.](#)
- Geotourism: [Witness Some Of The World's Most Unusual Rock Formations At A Little-Known Kansas State Park.](#)
- [Integrated Rock Mass Characterization of the Lower Continental Crust Along the ICDP-DIVE 5071_1_B Borehole in the Ivrea-Verbano Zone.](#)
- Geophysics: [A Novel Method to Predict S-Wave Velocity of Carbonate Based on Variable Matrix and Equivalent Porous Medium Model.](#)
- Bad science: [Shoddy commentaries – a quick and dirty route to higher impact numbers—are on the rise](#); more bad science [here](#).
- Geophysics: [World Magnetic Model \(WMM\)](#); Live Science summary [here](#).
- [The final closure time of the eastern segment of the Paleo-Asian Ocean: Insights from geochronology and geochemistry of Permian-Triassic sedimentary sequence in Wangqing, Jilin Province, China.](#)
- The January 2025 edition of [Sedimentology](#).
- The December 16, 2024 edition of [Sedimentologica](#).
- Planetary Geology: [Finding water on the Moon and Mars: Humanity’s extraterrestrial future](#); followup research articles [here](#), [here](#), [here](#), [here](#), [here](#), and [here](#).
- [Gas hydrates on New Zealand's Chatham Rise: An indicator of Gondwanan thermogenic gas expulsion?](#)
- [Magmatic evolution and magma chamber conditions of the Alpehué tephra from Sollipulli Volcano, Andean Southern Volcanic Zone, Chile/Argentina.](#)
- Manitoba Geological Survey: [Report of Activities 2024](#)

Planetary Geology

- [Terrestrial-origin O⁺ ions below 1 keV near the Moon measured with the Kaguya satellite.](#)
- [Production of highly silicic 3.9 to 4.27 Ga crust on the Moon.](#)
- Planetary geology research series, Introduction: [Finding water on the Moon and Mars: Humanity’s extraterrestrial future](#); research articles [here](#), [here](#), [here](#), [here](#), [here](#), and [here](#).

Paleontology

- [Quantifying the global biodiversity of Proterozoic eukaryotes](#); Phys.org summary [here](#).
- [Terrestrial evidence for volcanogenic sulfate-driven cooling event ~30 kyr before the Cretaceous–Paleogene mass extinction](#); Gizmodo summary [here](#).
- [Early–middle Permian Mediterranean gorgonopsian suggests an equatorial origin of therapsids](#).
- [Completing a molecular timetree of primates](#); Phys.org summary [here](#).
- [A New Frontier in Paleontology for Profit: Selling Shares in a Stegosaurus](#).
- [Vegetative and reproductive morphology of *Othniophyton elongatum* \(MacGinitie\) gen. et comb. nov., an extinct angiosperm of possible caryophyllalean affinity from the Eocene of Colorado and Utah, USA](#); Phys.org summary [here](#).

Mining and Energy

- [Column: Electric dreams turn into a nightmare for battery metals](#).
- Ore deposit geology: [Mantle oxidation by sulfur drives the formation of giant gold deposits in subduction zones](#).
- Exploration method research: [Using coupled bulk-rock geochemistry and short-wave infrared \(SWIR\) spectral reflectance data as rapid exploration tools in metamorphosed VHMS deposits: insights from the King Zn deposit, Yilgarn Craton, Western Australia](#).
- [China’s niche metals export ban lifts prospects for Canadian firms](#).
- Geothermal: [The world has been looking for this energy for decades: We just found it inside a Hawaii’s volcano](#).
- [‘World’s first’ grid-scale nuclear fusion power plant announced in the US](#).
- [Canada clears Paladin’s \\$789 million Fission Uranium takeover](#).
- [Saudi Arabia crude exports reach four-month high in Oct](#).
- [Rio Tinto, BHP, and BlueScope to build ‘green iron’ plant](#).
- [Arcadium Lithium investors sue miner over Rio Tinto takeover](#).
- [Barrick May Close Mali Mine Over Dispute With Government](#); do think it might have something to do with Mali issuing an [arrest warrant](#) for the CEO of Barrick?
- [Norway oil and gas industry eyes record investment in 2025](#).
- [U.S. Shale Nears Limits of Productivity Gains](#).
- Helium: [“It’s a dream” – America opened this mine and found something amazing](#).

- [GE-Hitachi's small reactor design closer to deployment in UK, passes key milestone.](#)
- [Model predictions of global geologic hydrogen resources; Phys.org summary \[here\]\(#\).](#)
- [Wyoming and Montana seek to reverse decision that would end Powder River Basin coal leases.](#)

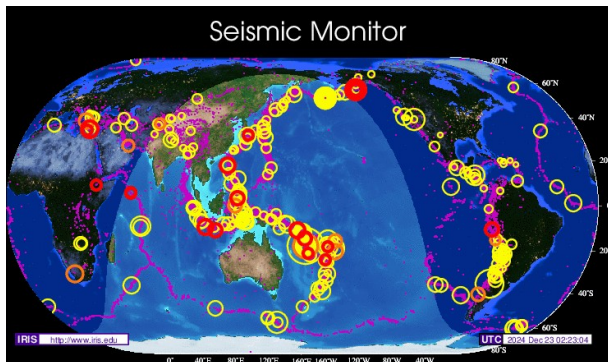
Environmental Geology and Hydrogeology

- Remediation: [Canadian carbon removal company scores US\\$40M grant from fund backed by Bill Gates.](#)

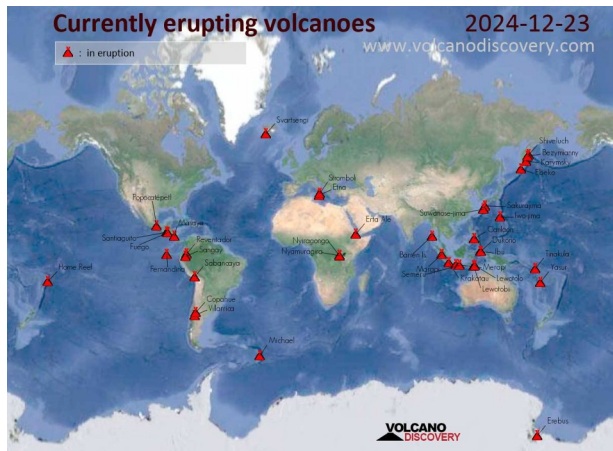
Glaciers and Climate Change

- [Ice thickness and bed topography of Jostedalbreen ice cap, Norway.](#)
- [Greenland Ice Sheet Elevation Change From CryoSat-2 and ICESat-2; Phys.org summary \[here\]\(#\).](#)
- [Very high resolution aerial image orthomosaics, point clouds, and elevation datasets of select permafrost landscapes in Alaska and northwestern Canada.](#)
- [Discovery of a strange form of life under Antarctic ice.](#)
- [Newly dated permafrost deposits and their paleo-ecological inventory reveal a much warmer-than-today Eemian in Arctic Siberia; Phys.org summary \[here\]\(#\).](#)

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

- United States Geological Survey (USGS) Volcano Watch: [The U.S. Geological Survey's review process: checking and verifying our information.](#)
- USGS Yellowstone Volcano Observatory: [Wildlife in Yellowstone National Park's Thermal Basins.](#)
- [Smithsonian / USGS Weekly Volcanic Activity Report.](#)

- [The Ol Doinyo Lengai Volcano's Lava Flows Are So Cold It's Possible To Fall In And Survive.](#)
- Volcano research: [Trace Element Emissions Vary With Lava Flow Age and Thermal Evolution During the Fagradalsfjall 2021–2023 Eruptions, Iceland.](#)

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- [Distribution of Interseismic Coupling Along the Maidan Fault in Tianshan Before the 2024 Mw 7.0 Wushi Earthquake.](#)
- [Subsurface structures around the subducting seamount illuminated by local earthquakes at the off-Ibaraki region, southern Japan Trench.](#)
- [Why Vanuatu should brace for even more aftershocks after this week's deadly quakes: a seismologist explains.](#)
- [Deadly Mw7.3 earthquake shakes Vanuatu; USGS summary \[here\]\(#\).](#)
- Glacial rebound earthquakes: [Exploring the impact of deglaciation on fault slip in the Sangre de Cristo Mountains, Colorado, USA](#); Phys.org summary [here](#).

Landslides

- [Land use and land cover changes without invalid transitions: A case study in a landslide-affected area](#); Phys.org summary [here](#).

Upcoming Events

- The Geological Society: [Hybrid Conferences, January 16, 2025 – September 9, 2025, Climate and Ecology: Off the Rails.](#)
- European Geosciences Union: [EGU General Assembly 2025, Vienna, Austria & Online 27 April–2 May 2025](#)
- [Sedimentary Geology and the Energy Transition Conference, June 2-5, 2025 – Salt Lake City, UT USA.](#)
- [Geoscience Beyond Borders, GAC-MAC-IAH-CNC 2025 Ottawa, Ontario, May 11-14, 2025.](#)
- [Society for Sedimentary Geology conference, Mountjoy IV – August 10-13, 2025, in Montreal, Canada.](#)
- [Copper to the World Conference, Tuesday 26 – Wednesday 27 August 2025](#), in Adelaide, Australia; report on 2024 conference [here](#).
- 2024-2025 [Society of Petroleum Engineers Distinguished Lecturer Schedule.](#)
- [List of geoscience events in 2025 from the International Union of Geological Sciences.](#)
- [American Geophysical Union List of Upcoming Meetings.](#)

December 23, 2024

Geology and the Fate of Societies – Guatemala



Figure 1a – Guatemala

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

Figure 1b – Location of Guatemala

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

The [Republic of Guatemala](#) (*la República de Guatemala*) is found in [Central America](#). Bordering on Guatemala, starting in the southwest and going clockwise are: the [North Pacific Ocean](#), [Mexico](#), [Belize](#), the [Gulf of Honduras](#), [Honduras](#), and [El Salvador](#). According to the [Central Intelligence Agency's](#) (CIA) [World Factbook for Guatemala](#), the total area of the country is 108,889 square kilometres (km²), of which 107,159 km² is land and 1,730 km² is water.

The [Government of Guatemala](#) is unitary [presidential republic](#). The President is [Bernardo Arévalo](#) and the Vice President is [Karin Herrera](#). Guatemala's legislature is called the [Congress of the Republic](#) (*el Congreso de la República*), the [President](#) of which is [Nery Ramos](#). The Capital and largest city is [Guatemala City](#) (pop. 3,014,000 in the urban area).

Also according to the CIA World Factbook, 18,255,216 people live in Guatemala, 53.1% of whom live in urban areas. Of those approximately 18.3 million people: 56% are [Mestizo](#) (mixed Indigenous-Spanish, locally called [Ladino](#)); 41.7% are [Maya](#); 1.8% are [Xinca](#); 0.2% are of [African descent](#); 0.1% are [Garifuna](#) (mixed West and Central African, Island Carib, and Arawak); and 0.2% are foreigners. [Spanish](#) is the official language of Guatemala, spoken by 69.9% of the population. 29.7% of the country speaks various [Mayan](#) languages (including [Q'eqchi'](#), [K'iche](#), [Mam](#), [Kaqchikel](#), [Q'anjob'al](#), and [Poqomchi'](#)) and the remaining 0.4% speak other languages such as [Xinca](#) and [Garifuna](#). In terms of religion, almost all are some variety of [Christianity](#): 45.7% are [Evangelical Protestants](#); 42.4% are [Roman Catholic](#); and 11.9 % have no religion or are unspecified. In terms of education, 83.3% of people aged 15 and over can read

and write and the general length of education is 11 years. Economically: the per capita [GDP](#) is \$6,295; the [Gini](#) coefficient is 48.3, indicating high inequality; and the [Human Development Index](#) is medium at 0.629.

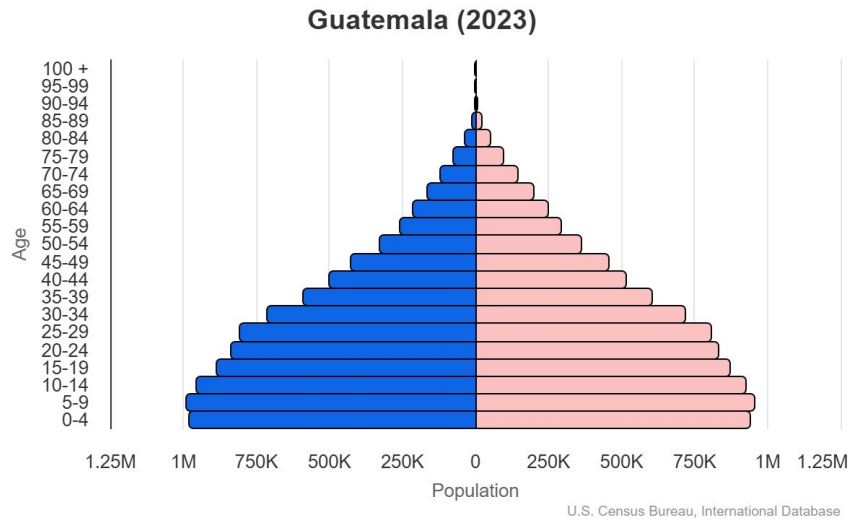


Figure 2 – Demographic Profile of Guatemala
Credit: U.S. Census Bureau, International Database; public domain

The demographic profile for Guatemala shows a fairly young country where almost a third of the population, 31.5%, is under 14 years old and the median age is 24.8. The total fertility rate is 2.57 births per woman, above the replacement rate of 2.1. The resulting annual growth rate is 1.54% even accounting for the many Guatemalans who [migrate out of the country](#). The life expectancy at birth for both sexes is 73.2 years.

Geology

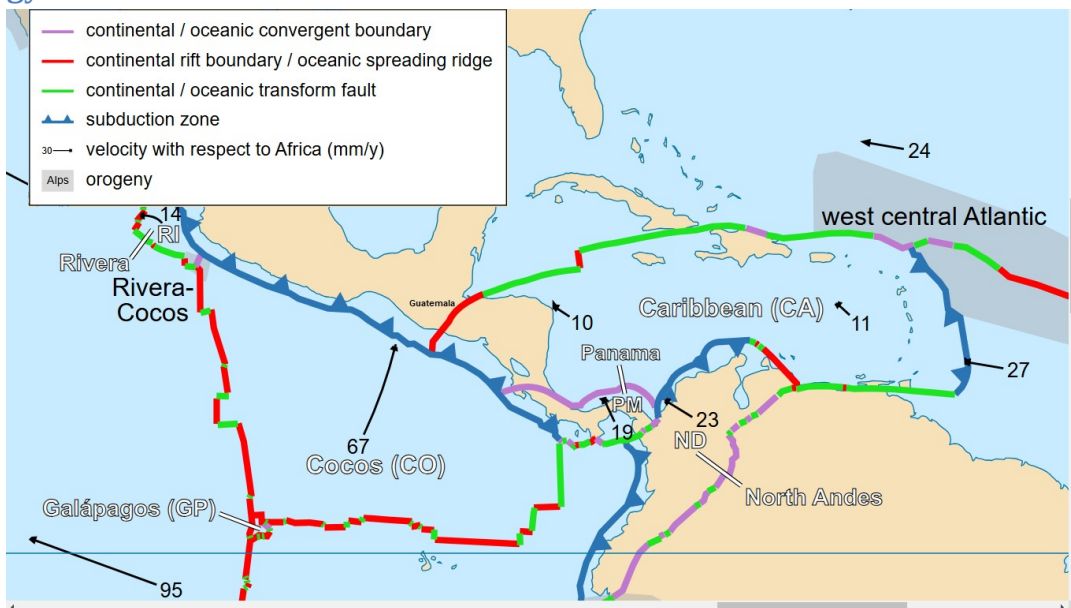


Figure 3 – Tectonic Background of Central America
Credit: Eric Gaba (Sting), Creative Commons Attribution-Share Alike 2.5 Generic license

basement complex is exposed in the [Mixtequita Massif](#), [Chiapas Massif](#), [Cuchumatanes Dome](#), the Tucuru–Teleman area, and the [Maya Mountains](#).

The Chortis Block is a complex assemblage of [Precambrian](#) to Palaeozoic aged continental crust. The numerous [terranes](#) of the block may have originated in the ancient [Gondwana](#) supercontinent or may have been formerly part of ancient [Laurentia](#). Research continues into the [tectonic evolution](#) of the block.

For further reading on the geology of Guatemala, check out these two publications as well as the links above:

- McIntyre, T. *et al*, 2019, *Ancient and modern subduction and modern Volcanism in Guatemala*, Diamond Exploration and Research Training School, University of Alberta, https://cdn7.pdac.ca/web/files/university-of-alberta-derts-guatemala_2024-06-25-034036_veve.pdf.
- Anthony, P. *et al*, 2005, *Field Guide to Guatemalan Geology*, Stanford Alpine Project Department of Geological and Environmental Sciences, Stanford University, https://pangea.stanford.edu/groups/SAP/previous_expeditions/Guatemala/SAP_Guatemala_guidebook.pdf

Resources

Agriculture



Figure 5 – Quetzaltenango Farm, Guatemala Highlands
Credit: [Chensiyuan](#), [Creative Commons Attribution-Share Alike 4.0 International](#), [3.0 Unported](#), [2.5 Generic](#), [2.0 Generic](#) and [1.0 Generic](#) license

According to the CIA World Factbook, 41.2% of the land area in Guatemala is agricultural land (14.2% arable land, 8.8% permanent crops, 18.2% permanent pasture). Of the remainder, 33.6% is forest and 25.2% has other uses. The [main crops](#) in Guatemala are [maize](#) (corn), [palm oil](#), [soybean](#), [sorghum](#), [rice](#) and [peanuts](#). [Sugarcane](#), [coffee](#), [bananas](#), [melon](#), berries, and vegetables are the [main export](#) crops. Livestock raised in Guatemala include [cattle](#) (for meat and [dairy](#)), [pigs](#) and [poultry](#) (for meat and eggs). [Around 62%](#) of the farmers in Guatemala are [subsistence farmers](#). However, the growth of commercial

agriculture, especially [palm oil production](#), has caused change and conflict. [Land tenure issues](#) lie at the heart of many of Guatemala's political problems

Statistics on food production from the [United Nations Food and Agriculture Organization](#) (FAO) in Guatemala can be found [here](#). [Select indicators on food production in Guatemala](#), also from the FAO indicate that more than half the population, 59.8%, suffer from moderate or severe food insecurity.

Guatemala also has an active fishing industry including wild harvesting, aquaculture and sports fishing. A list of the wild species in Guatemala can be found [here](#). The [most common types](#) of fish raised for aquaculture are [marine shrimp](#) and [tilapia](#). Statistics on the fishing industry in Guatemala can be found [here](#).

Forestry



Figure 6 - Rain Forest Around the Ancient Mayan City of Tikal
Credit: [Rebecca Wilson](#), [Creative Commons Attribution 2.0 Generic](#) license

As noted above, 33.6% of the land in Guatemala is forest of which there is a large variety. The eco-regions of these forests include:

- Tropical and subtropical moist broadleaf forests such as: the [Central American Atlantic moist forests](#), the [Central American montane forests](#), the [Chiapas montane forests](#), the [Petén–Veracruz moist forests](#), together with the moist forests of the [Sierra Madre de Chiapas](#) and the [Yucatán](#);
- Tropical and subtropical dry broadleaf forests such as: the [Central American dry forests](#), and the [dry forests of Chiapas](#);

- The [Central American pine-oak forests](#);
- The [Motagua Valley thorn-scrub](#); and
- The mangrove forests of the [Belizean Coast](#), [Northern Honduras](#), and the [Northern Dry Pacific](#).

Statistics on forest production, from the FAO, can be found [here](#).

Mineral Resources



**Figure 7 – Aerial View Photograph of the [Escobal Mine](#) in San Rafael Las Flores
Credit: [Tahoe Resources](#), public domain**

According to the USGS [Minerals Yearbook on Central America](#), Guatemala mineral commodities includes [antimony](#), [petroleum](#), [gemstones](#), [gold](#), [gypsum](#), [lead](#), [limestone](#), and [nickel](#). The production sites of these minerals are listed in [Table 2 of the Yearbook](#); here are a few notable ones:

- Antimony is produced at the [Ixtahuacan Mine](#), the [La Florinda Mine](#), the [Los Lerios Mine](#), and the [Annabcella Mine](#) near [Huehuetenango](#).
- Gold is produced at the [Marlin Mine](#).
- Lead, silver, and zinc is produced at the [Escobal Mine](#).
- Nickel is produced at the [Fenix mine](#).
- Petroleum is produced from the [Rubelsanto](#), [West Chinaja](#), [Caribe](#), [Tierra Blanca](#), and the [Xan](#) oilfields.

Mining in Guatemala is also a contentious issue, with many protests (see [here](#), [here](#), and [here](#)) against the operation of existing mines and the development of new mines. Essentially, the protests revolve around

issues of [land tenure and pollution](#). Many locals object to taking the brunt of negative effects, such as pollution, while the benefits of the mining, in the form of profits, go elsewhere. It doesn't help when the government uses [coercive measures](#) against the protestors.

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

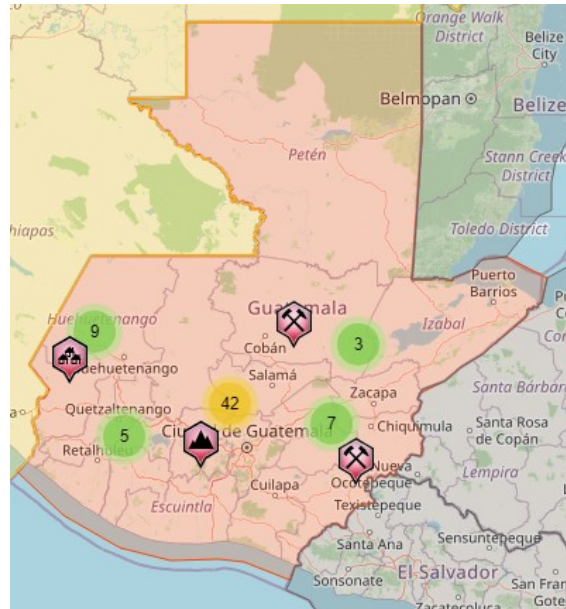


Figure 8 – Mineral Occurrence Map of Guatemala
[Credit: ©Mindat.org](#)

Climate

Guatemala map of Köppen climate classification

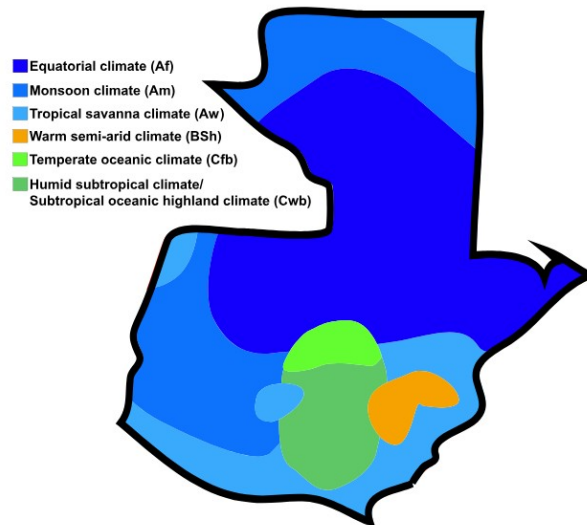


Figure 9 – Guatemala Map of Köppen Climate Classification
[Credit: Ali Zifan, Creative Commons Attribution-Share Alike 4.0 International license](#)

Guatemala enjoys a hot tropical climate that varies with elevation and distance from the ocean. In the lowlands, tropical climates ([Af](#), [Am](#), and [Aw](#)) predominate. Subtropical oceanic climates ([Cfb](#) and [Cwb](#)) are found at higher elevations and there is a zone of warm semi-arid climate ([BSH](#)) further inland.

Guatemala looks like it could be a nice place to get away from winter in the Northern Hemisphere, [this website](#) encourages it. However, before you book your trip to [escape winter weather](#), you might want to check out the travel advisories for Guatemala [here](#) and [here](#). The main issue seems to be “[high levels of violent crime, roadblocks, strikes and demonstrations that occur throughout the country](#)”. [Yellow fever](#), [malaria](#), and [dengue fever](#) are also common in the country. Still, if you want to go check out [Climates to Travel](#) and [Lonely Planet](#). Also, if you go, you might want to consider being part of a [guided tour](#).

History and Geopolitics

History



Figure 10 – Ruins of Tikal

Credit: [Shark at the Lithuanian language Wikipedia](#),
[Creative Commons Attribution-Share Alike 3.0 Unported license](#)

The [history of Guatemala](#) is fairly interesting, and if you like to go into detail, check out these two sites [here](#) and [here](#). You might also enjoy Paul Cooper’s [podcast](#) on the Maya. However, rather than dwell on the details, I’ll point out three general themes of Guatemalan history.

1. Authoritarian Government

Prior to the [arrival of the Spaniards](#) in 1524, the various [Mayan city states](#), were organized along a strict authoritarian hierarchy of the king, the priests, and the commoners (who did most of the work). Although many Mayan states had [fallen apart](#) by the time of the Spanish conquest, the traditions of authoritarian rule were easily taken up by the new lords ([hidalgos](#)). Independence from Spain merely replaced one elite with another.

2. Violence

The [Mayans were not a peaceful people](#) although many people wished [to believe them so](#). The Mayans also [practised human sacrifice](#), in fact, one of the objects of their [frequent wars](#) was to capture people for sacrifice. Violence was a fact of life throughout the time of the [Mayan Civilization](#).

The [conquest of Central America](#) by the Spaniards was anything but peaceful and it took a long time to suppress the native population in Guatemala; around 79 years in the case of the [Peten country](#). The violence didn't stop there. After independence from Spain, Guatemala engaged in [one war after another](#). Many of the wars were internal such as the recent, bloody, [civil war of 1960 to 1996](#).

3. Vulnerability

An important lesson on the past and current history of Guatemala is captured in a simple statistic, namely that according to the FAO, more than half the population, 59.8%, suffer from moderate or severe food insecurity. Think about that for a moment and what it means for people living in Guatemala.

One takeaway from the food insecurity statistic is that it is possible that the people of Guatemala have reached, or exceeded, the [carrying capacity](#) of the land. This isn't because the people are poor farmers, they are experts in getting the most out of the land. It simply means that the population has grown to the point that the people are very vulnerable to disruption to food production from any change in climate. There is only a small buffer in the system against crop failures, and this means that any change in the climate can lead to famine.

The story of the [Mayan Civilization](#) shows that it is very difficult to make a living in Central American. Just as a combination of climate change, expressed as periods of drought, soil erosion, and political instability led to the collapse of the Mayan city states, the modern Guatemalan Republic is also vulnerable to the caprices of nature. The leaders know this. There are reasons why the governments of Guatemala are consistently authoritarian.

For the ordinary people of Guatemala, this vulnerability presents many challenges. What do you do if you can't make a living from your farm because of years of bad weather or bad market conditions? One is to seek employment on a nearby commercial farm, forest harvesting operation or mine. This can have the advantage of keeping you close to home and your home farm.

If you can get access to capital, you might try your hand at modern agriculture, [a major Guatemalan import is ammonium nitrate fertilizer](#). This might expand the productivity of the land. You're still vulnerable to the weather, but there might be a greater chance of producing more food.

Going further afield, you might seek employment in the market economy of the urban areas, although this carries its own set of dangers, especially if it brings you closer to the authorities. Many have taken this route, 53.1% of the Guatemalan population lives in urban areas.

Finally, if all else fails, you might just join the now [endless stream of people](#) moving north to the United States in hope of a better life. Given the choice of starvation or migration, can you blame people for taking this route?

Geopolitics



Figure 11 – Panoramic View of Guatemala City

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

Internally, the government of Guatemala and its citizens are often at odds. [Demonstrations](#), peaceful or otherwise, are common. The issues are often fairly fundamental: land and local control of resources. As noted above, mining ventures are often controversial.

[Land ownership is another problem](#). Often the best land is in the hands of commercial operations while the traditional peasants are left with the worst land. Do people resent this state affairs? You bet they do.

Corruption in Guatemala is another problem. As recorded by [Transparency International](#), Guatemala ranks at fairly low on the list at 154/180. The fact of life in Guatemala is that if you want to establish any large commercial venture, you will need to get allies within the government and reward them handsomely.

Externally, Guatemala has disputes with its neighbours. One that I have [mentioned before](#) is their [dispute with Belize](#). Guatemala has never really accepted Belize as a legitimate state, seeing them as the heirs of British freebooters who appropriated the land from the Spanish. In this dispute, the International Court of Justice [is still working](#) on a solution. Guatemala has also had mixed relations with [Mexico](#), [Honduras](#), and [El Salvador](#).

However, the elephant in the room is migration. For reasons described above, people from Guatemala, and other Latin American countries, are migrating north to United States in a modern day [Völkerwanderung](#). Seen by some Americans as little more than an invasion, the migration of poor desperate people from and through Guatemala and Mexico into the USA is a [major political issue](#). It is hard to see how it will be resolved.

[Guatemala's relationship with the United States](#) has other aspects besides the current migration crisis. Historically, American businesses have invested in Guatemala. The Americans have also been accused, not without proof, of interference in Guatemalan politics in order to safeguard and/or extend their investments. We can expect American commercial interests to continue to operate in Guatemala and for those interests to make the appropriate payments to safeguard their investments and reward their friends.

Finally, the Chinese have taken an interest in the affairs of Central America. Commerce is their main aim, but they also have sought to have Guatemala [recognize the People's Republic of China as the sole](#)

[legitimate government of all China, including Taiwan](#). This might also be part of the ongoing rivalry between China and the United States and presents a [challenge to American influence](#) in the region.

That kind of wraps up this quick look at Guatemala. It is hard to be optimistic, but we can hope for positive change and justice for long-suffering people of Guatemala.

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.