

July 3, 2023

## News and notes

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

## Research

- Fluvial geology: [We have forgotten what a 'natural' river even looks like.](#)
- Lacustrine geology: [Hyperspectral imaging sediment core scanning tracks high-resolution Holocene variations in \(an\)oxygenic phototrophic communities at Lake Cadagno, Swiss Alps.](#)
- Geophysics: [The Weisweiler passive seismological network: optimised for state-of-the-art location and imaging methods.](#)
- More geophysics: [Electron Scattering, Transport and Energization by Alfvénic Turbulence in Earth's Outer Radiation Belt.](#)
- Plate tectonics: [Rapid topographic growth of the Taiwan orogen since ~1.3–1.5 Ma](#); Eureka Alert summary [here](#).
- Natural systems research: [Rate-induced tipping in natural and human systems.](#)
- Glacial geology: [Meltwater is hydro-fracking Greenland's ice sheet through millions of hairline cracks – destabilizing its internal structure.](#)

## Paleontology

- [A palynoflora of southern Xinjiang, China, and the proximity of the Tarim Plate to western Gondwana during the Llandovery \(Silurian\)](#); behind a paywall, Phys.org summary [here](#).
- [A new fossil katydid of the genus \*Arethaea\* Stål \(Orthoptera: Tettigoniidae\) with exceptionally preserved internal organs from the Eocene Green River Formation of Colorado](#); Phys.org summary [here](#).
- Fossil sharks with big teeth: [Endothermic physiology of extinct megatooth sharks.](#)
- [A record of Late Jurassic vertebrates from Texas](#); Eureka Alert summary [here](#).
- Beneath our feet: [New findings of \*Prototherium ausetanum\* \(Mammalia, Pan-Sirenia\) from paving stones in Girona \(Catalonia, Spain\)?](#)

## Planetary Geology

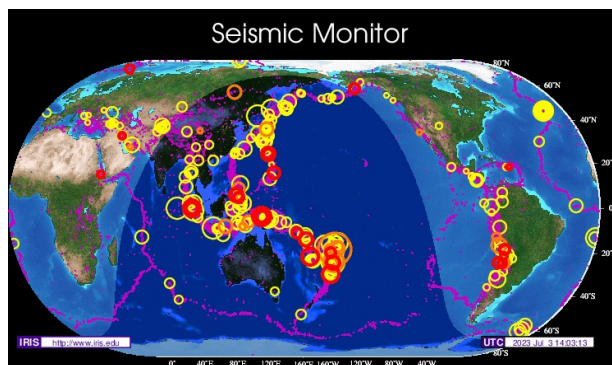
- [Gullies on Mars could have formed by melting of water ice during periods of high obliquity](#); Eureka Alert summary [here](#).
- [Ground magnetic survey on Mars from the Zhurong rover](#); Eureka Alert summary [here](#).
- [The Dielectric Properties of Martian Regolith at the Tianwen-1 Landing Site.](#)

- [Seismic Scattering and Absorption Properties of Mars Estimated Through Coda Analysis on a Long-Period Surface Wave of S1222a Marsquake.](#)
- [Saturn's Rings Shine in Webb's Observations of Ringed Planet.](#)

## Energy and Mining

- [Northvolt Near Deal with Canada on \\$5.3 Billion Battery Plant in Quebec.](#)
- [Japan aims to become major offshore wind energy producer.](#)
- Exploration activity: [US drillers cut oil and gas rigs for ninth week in a row -Baker Hughes.](#)
- Exploration methods: [Editorial: Rock physics modeling and well-log practice for unconventional reservoirs.](#)
- [U.S. Shale Has Finally Grown Up.](#)
- [Rio Tinto invests nearly \\$1 billion in Kennecott as EVs fuel demand for copper.](#)
- [RANKED: World's top 10 rare earth projects.](#)

## Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)

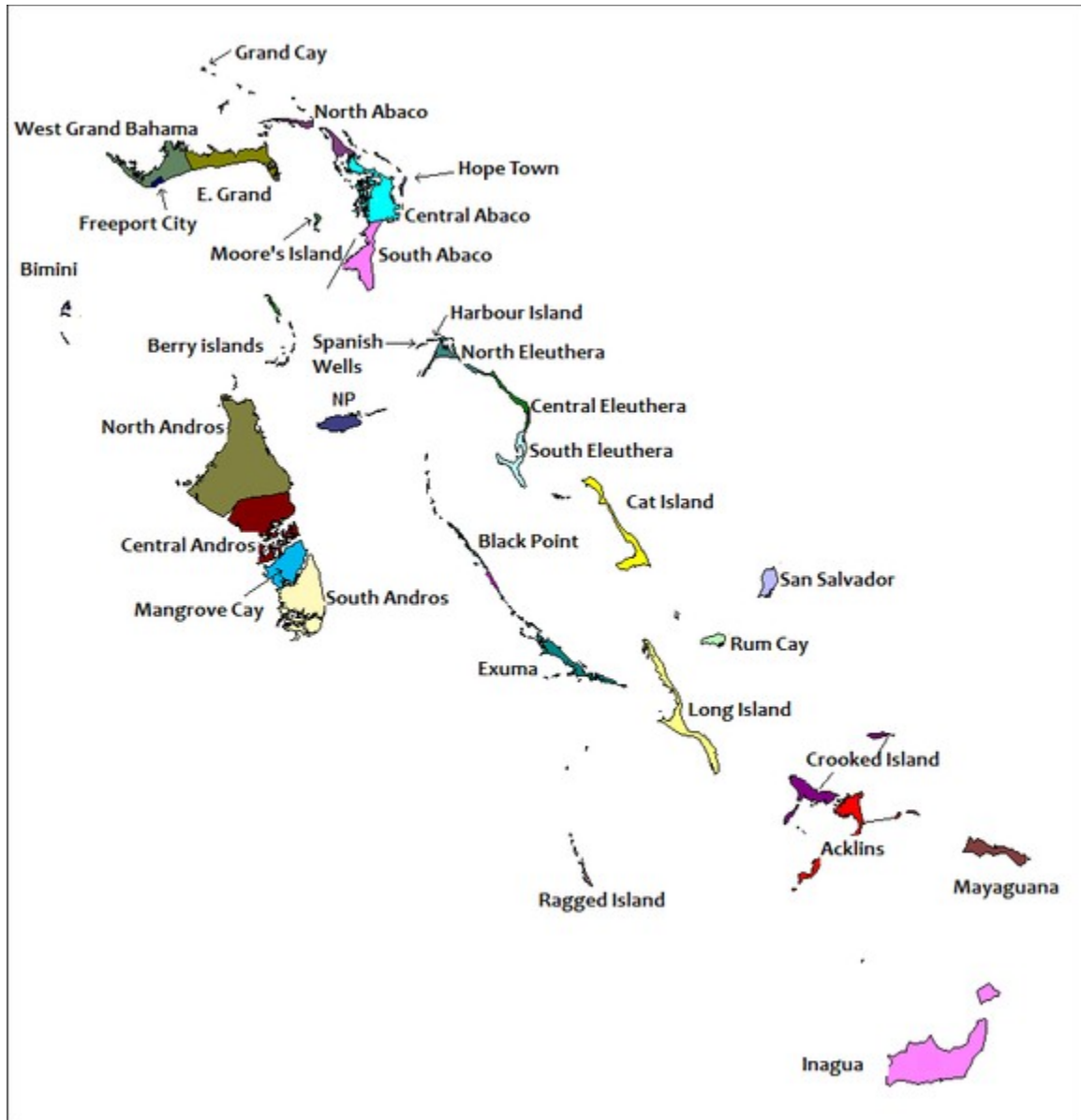


[Active Volcano Map](#)

- From the United States Geological Survey (USGS): [Volcano Watch — Tracking down Mauna Loa's carbon dioxide.](#)
- [Tracking carbon from subduction to outgassing along the Aleutian-Alaska Volcanic Arc;](#) Phys.org summary [here.](#)
- [Global Characteristics of Observable Foreshocks for Large Earthquakes;](#) behind a paywall, Phys.org summary [here.](#)
- [From ambient vibration data analysis to 1D ground-motion prediction of the Mj 5.9 and the Mj 6.5 Kumamoto earthquakes in the Kumamoto alluvial plain, Japan.](#)

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## Geology and the Fate of Societies – Bahamas



**Figure 1 – Districts of The Bahamas**  
Credit: Rarelibra, public domain

[The Bahamas](#), officially the [Commonwealth of The Bahamas](#), is an island nation country made up of more than 3,000 islands, cays, and islets in the Atlantic Ocean off the east coast of North America. The Bahamas are part of the [Lucayan Archipelago](#) that also includes the [Turks and Caicos Islands](#), to the southeast. South is the Island of [Hispaniola](#) ([Haiti](#) and The [Dominican Republic](#)), southwest is [Cuba](#) and northwest is the [American](#) State of [Florida](#). Figure 2 shows the neighbourhood around The Bahamas.

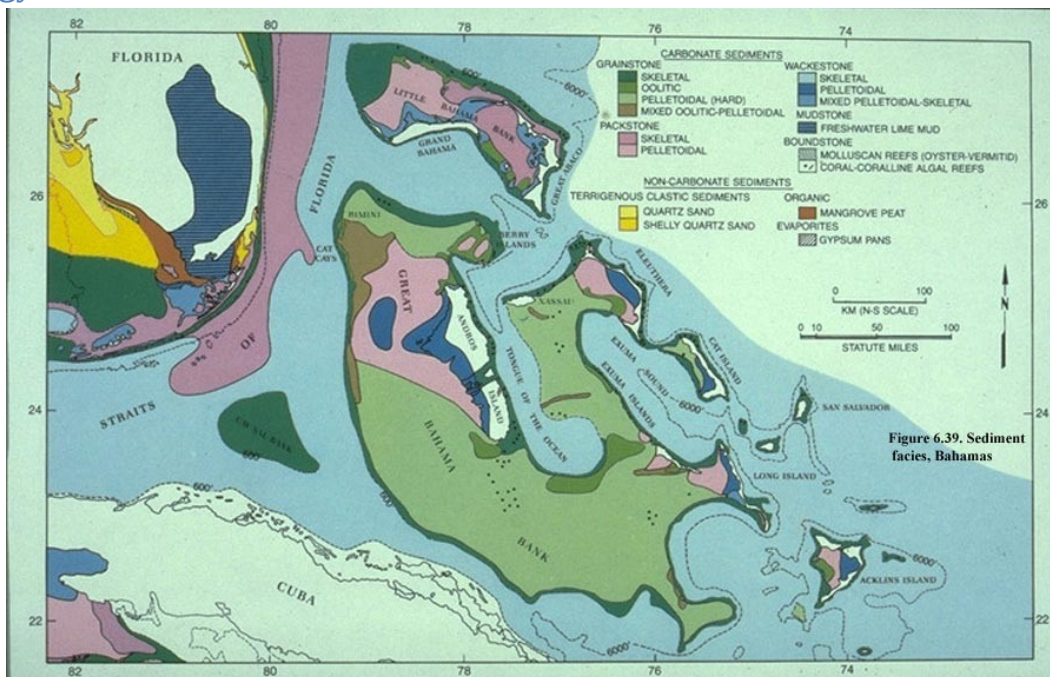


**Figure 2 – Neighbourhood of The Bahamas**  
 Credit: [Google Earth](#)

According to the Central Intelligence Agency’s [World Factbook](#), The Bahamas has a population of 358,508 (2023 estimate) of whom 90.6% are of African descent, 4.7% White, 2.1% mixed, 1.9% other, and 0.7% unspecified (2010 estimate). Most of the population is urban, with two-thirds living on [New Providence Island](#) where the capital city, [Nassau](#), is located.

The total area of The Bahamas is 13,880 square kilometres (km<sup>2</sup>) of which 10,010 km<sup>2</sup> is land and 3,870 km<sup>2</sup> is water. Only 1.4% of the land is agricultural land, 51.4% is forest, and 47.2% is listed as “other”.

## Geology



**Figure 3 – Sediments of the Bahamas**  
 Credit: [Geological Oceanography Program, Department of Geology, University of Puerto Rico – Mayaguez Campus](#)

The [geology of The Bahamas](#) is that of a [carbonate bank](#) sitting on top of [oceanic crust](#). Deposition of carbonates began in the region of islands during the [Jurassic](#), after the breakup of the supercontinent [Pangaea](#) and continues to the present [Holocene](#). The total thickness of carbonate deposits is over 4.5 km, divided into two main banks: the Little Bahamas Bank, to the north and the Great Bahamas Bank.

In terms of plate tectonics, The Bahamas sit near the edge of an active tectonic region: the boundary between the [Caribbean Plate](#) and the [North American Plate](#). This location has given the island a [complex tectonic history](#).

The [depositional history of The Bahamas](#) has also been complex. While the main types of rocks in the carbonate platform are predominately various varieties of [limestone](#) and [dolomite](#), these are the end result of a series of events. First, we had various kinds of primary carbonate production, such as from [corals](#), [shellfish](#) and [coraline algae](#). Exposure of the deposits after periodic [sea level changes](#) resulted in erosion and deposition of deposits such as [carbonate sand](#) and [coquina](#). Exposure to surface erosion also created [karst topography](#) creating caves and caverns in the [Blue Holes National Park](#). Also, over time the original [aragonite](#) and [calcite](#) of the [reef forming organisms](#) became dolomite through the process of [diagenesis](#).

Carbonate banks, like those of The Bahamas, have been studied widely because their association with petroleum deposits. This has lead people to investigate the potential for petroleum deposits in The Bahamas (examples [here](#), [here](#), [here](#) and [here](#)). However, [exploration efforts](#) have been [unsuccessful](#) to date.

## Resources

Although The Bahamas enjoys a fairly high standard of living, mostly from tourism and financial services, it is a resource poor nation. It's main resources are [salt](#), [aragonite](#), timber, limited arable land.

[Agriculture in the Bahamas](#) is limited. An estimated 80% of the Bahamian food supply is imported. Major crops include onions, okra, tomatoes, oranges, grapefruit, cucumbers, sugar cane, lemons, limes, and sweet potatoes. Much of this is for local consumption although some is exported to the United States.

As an island nation, fishing is an important part providing food and employment. Aquatic species harvested include the [Caribbean spiny lobster](#), queen conch ([Strombus gigas](#)), groupers ([Epinephelidae](#)), and [snapper](#) ([Lutjanidae](#)), as well as grunts ([Haemulidae](#)) and jacks ([Carangidae](#)). Many of these products are exported to the European Union although some is eaten locally.

Hardwood and conifer ([Caribbean Pine](#)) have been [harvested commercially since the 1700's](#). [Current production](#) is for fire wood, charcoal, and building materials.

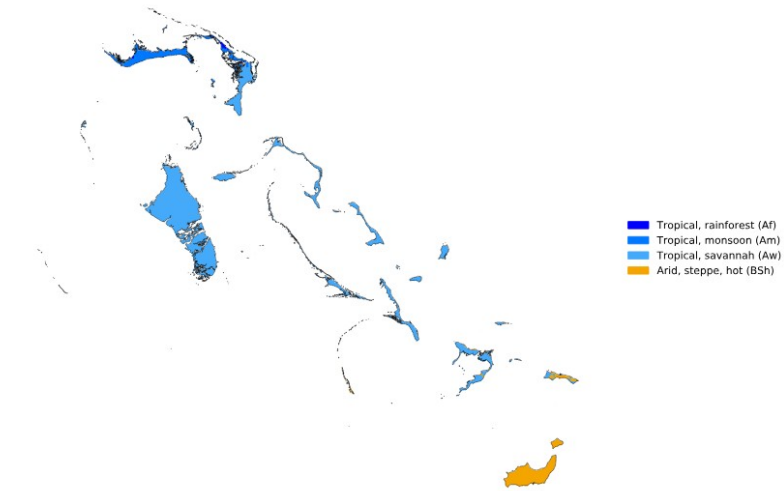
## Climate

The Bahamas has a hot, tropical climate. As shown in Figure 4, there are four main zones:

- [Af](#): Tropical rainforest climate; average precipitation of at least 60 mm (2.4 in) in every month;
- [Am](#): Tropical monsoon climate; driest month (which nearly always occurs at or soon after the "winter" solstice for that side of the equator);

- [Aw](#): Tropical wet and dry or savanna climate; with the driest month having precipitation less than 60 mm; and
- [BSh](#): Hot semi-arid climate.

Köppen-Geiger climate classification map for Bahamas (1980–2016)



Source: Beck et al.: Present and future Köppen-Geiger climate classification maps at 1-km resolution, *Scientific Data* 5:180214, doi:10.1038/sdata.2018.214 (2018)

**Figure 4 – Köppen-Geiger Climate Classification of The Bahamas**  
**Credit: [Beck et al, 2018](#), [Creative Commons Attribution 4.0 International](#) license**

## History and Geopolitics



**Figure 5 – Love Beach, New Providence Island, Bahamas**  
**Credit: [Rüdiger Stehn](#), [Creative Commons Attribution-Share Alike 2.0 Generic](#) license**

The original inhabitants of The Bahamas, the [Lucayans](#), migrated there around 500 – 800 AD, probably from Cuba and/or Hispaniola. In 1492, [Christopher Columbus](#) arrived from [Spain](#) and things went bad for the Lucayans after that. Eventually, the [Lucayans died out](#), mostly from diseases introduced by the Spaniards and other Europeans.

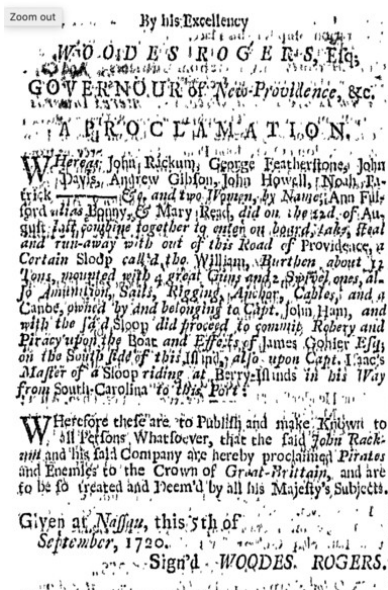
The Spanish were not terribly interested in the Bahamas, there wasn't much there to take, but various pirates and privateers were interested in hiding out among the islands. The British [first established a colony in the Bahamas in 1648](#) and the most lucrative activities for these settlers was [piracy](#), preying on the [Spanish treasure ships](#), and “[wrecking](#)”, luring ships into shipwrecks. The British government began to suppress piracy starting 1713 although piracy and privateering continued until the American Revolution.

After the American Revolution, Loyalists settled in the Bahamas and later, after the United States acquired Florida, escaped slaves made their way to the Bahamas. During the remainder of the 19<sup>th</sup> century and into the 20<sup>th</sup>, The Bahamas remained a British colony until 1973, when it became [independent](#).

Geopolitically, The Bahamas remains dependent on other nations for its livelihood, so, while technically independent, they remain an economic colony of larger nations, mainly the United States. This is apparent in that their main businesses are [tourism and financial services](#). Most tourists to the Bahamas are North Americans seeking relief from winter weather. As for the financial sector, the Bahamas have [banks that don't ask too many questions about where you got your money](#) and they are a good place to hide your cash.

Among the [clients of the Bahamian financial industry](#) are people trading in illegal drugs. There is a lot of money there for someone willing to look the other way. The Bahamas has also been an [important trans-shipment point](#) for drugs going from South America to North America.

The old pirate habits are alive and well.



## 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.

**Figure 6 – Proclamation of the Governor of New Providence**  
[Credit: Woodes Rogers, public domain](#)

