

February 23, 2026

News and notes



Northern Glow Spans Iceland and Canada
Credit: [NASA Earth Observatory](#), public domain

This week, before going on to discuss the geology and mineral resources of New Caledonia, we will first look at some news items I thought were interesting. The picture above is the [Image of the Day](#) for February 19th from the [NASA Earth Observatory](#).

If you enjoy my blogs, bookmark the site and check on Mondays rather than relying on social media postings which can get lost in the shuffle. For my news items, I try to stick to open access papers.

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

- Iran:
 - [Iran Monitor – ongoing reports](#).
 - [US Air Force deployed more than 50 fighter jets to the Middle East over the last 24 hours](#).
 - [The Sheer Scale Of The U.S. Military Presence Building Up Around Iran](#).

- [U.S. military prepared to strike Iran as early as this weekend, but Trump has yet to make a final call, sources say.](#)
- [US-Iran talks updates: Tehran says understanding on main principles reached.](#)
- [India seizes three Iran-linked US-sanctioned tankers, source says.](#)
- Petroleum Geopolitics
 - [\\$100 Oil Price Forecasts Resurface Amid U.S.-Iran Standoff.](#)
 - [FT Uncovers \\$90 Billion Russian Oil Smuggling Operation.](#)
 - [What's the status of international oil companies in Venezuela?](#)
 - [Why big oil is not interested in Venezuela; but Oil companies jostle for projects to boost Venezuelan output quickly; a real grind awaits.](#)
 - [China's Unprecedented Oil Stockpiling Sparks Questions If Beijing Is Preparing For War.](#)
 - [Citi says geopolitics to support oil near term; peace deals seen lowering prices.](#)
- Mexico
 - [Tourists in Mexico's Puerto Vallarta told to 'shelter in place' as cartel violence erupts.](#)
 - [Mexico says top cartel boss killed as violence engulfs Puerto Vallarta and several states.](#)

Research and News

- [TTG plutonism in the Archean Abitibi greenstone belt, Superior craton: geodynamic and metallogenic perspectives.](#)
- [Sedimentary dynamics and sources at the “Tsunami conglomerate locality” \(Fig Tree Group, 3.28–3.23 Ga, Barberton Greenstone Belt, South Africa\).](#)
- [A 600-km-long Seafloor Disruption in the Arctic Ocean \(~2.8 Ma\): Geochemical Evidence for a Marine Impact Event.](#)
- [Sedimentation across a coastal plain to deep-water system: Insights from a Carboniferous succession, northern England.](#)
- [Neogene Marine Incursions in Western Amazonia Revealed by Palynology of Boreholes from the Marañón Basin, Peru.](#)
- [The making of pure quartzose sand in continental interiors: Paraná River \(Brazil and Argentina\).](#)
- [Sedimentary biogeochemical provinces in the northern limit of the oxygen minimum zone from the northeastern Mexican Pacific.](#)

- [Correlation of the lower and middle Turonian chalks of south-west England and north-west France — condensation towards the Cornubian and Armorican massifs.](#)
- Planetary Geology: [Nitrogen isotopic variations in the early Solar System recorded by pallasites.](#)
- [Sulfur speciation in silicate melts at high pressure.](#)

Plate Tectonics

- [Reconciling Seismic and Thermo-Chemical Models of Cratonic Lithosphere.](#)
- [Deformation and faulting in the Bellingham Basin and southern Georgia Strait, western United States and Canada.](#)
- [Nitrogen mineral hosts in subduction zone metamorphosed ultramafic rocks: Implications for deep Forearc \(to Subarc\) transfer.](#)
- [Arc-related two-stage magmatic episodes during the Orosirian in the northeastern Yeongnam Massif, Korean Peninsula: geochronological and geochemical insights from Buncheon and Okbang amphibolites and Seokpo granite.](#)
- [Rapid Transition From High-Pressure Metamorphism to Exhumation Driven by Orogen-Parallel Extensional Shearing \(Adula Unit, Eastern Central Alps\).](#)
- [Global Imaging of the Mantle Transition Zone Using SS Precursors Shows Lower Mantle Convection Patterns that are Broadly Linked to Tectonics.](#)
- [Evolution of the Source Mineralogy and Lithospheric Controls on Magmatism During the Northeast Atlantic Continental Breakup.](#)

Paleontology

- [Phosphatized soft tissue preservation in ‘*Pelagiella*’ *subangulata* from the early Cambrian of the Flinders Ranges, South Australia.](#)
- [Oxygen metabolism in descendants of the archaeal-eukaryotic ancestor.](#)
- [Behavioral implications of an embedded tyrannosaurid tooth and associated tooth marks on an articulated skull of *Edmontosaurus* from the Hell Creek Formation, Montana; Phys.org summary \[here\]\(#\).](#)
- [The historiography of dinosaur footprints of the Lower Cretaceous Wealden Group on the Isle of Wight, UK.](#)
- [Digesting an ancient ecosystem: coprolites from the Grippia bonebed, Lower Triassic, Svalbard.](#)
- [Reappraisal of the extinct barbelthroat shark †*Bavariscyllium* and the nebulous origin of carcharhiniform galeomorphs; Phys.org summary \[here\]\(#\).](#)
- Video: [Jurassic World Evolution 3 | *Cryolophosaurus*.](#)

- [A second species of non-crocodyliform crocodylomorph from the Late Triassic fissure deposits of southwestern UK: Implications for locomotory ecological diversity in Saltoposuchidae](#); Phys.org summary [here](#).
- [New flat wasps \(Hymenoptera: Bethyidae\) from the middle Cretaceous Kachin amber of Myanmar](#).
- [Early Permian terrestrial apex predator regurgitalite indicates opportunistic feeding behaviour](#); Brandon University press release [here](#).

Ore and Petroleum Geology

- [Lithospheric multilevel structural controls on the genesis of orogenic gold deposits](#).
- [In situ Rb–Sr geochronology records multiple fluid pulses in Neoproterozoic sequences from the Lubambe-Mingomba Cu deposits in the Zambian Copperbelt](#).
- [Episodic Ore Redistribution in Carlin-Type Gold Deposits in Southeastern Yunnan Province, SW China](#).

Mining and Energy

- Kazakhstan: [Geologists Uncover One of the Largest Rare Earth Deposits in Former Soviet Republic Long Tied to Oil Wealth](#).
- Northern Ontario: [Moose Cree First Nation says it will block steps to develop a niobium mine in its homeland](#).
- Diamonds might be forever, but not the profits: [Anglo American posts \\$3.7B loss on fresh De Beers writedown](#).
- [Canada broke all-time production level for natural gas in November, CER says](#).
- [Geothermal energy could replace 42% of EU's fossil electricity. Which nation has the most potential?](#)
- [US agencies have developed critical minerals price floor system](#).
- United Kingdom: [Map of BGS BritPits showing the distribution of worked mineral commodities across the country](#).
- [Ontario fast-tracks Great Bear gold mine project](#).
- [Knowledge interdependencies between lithium- and sodium-ion battery chemistries](#).
- [Churchill Resources Consolidates High-Grade Gold-Antimony Footprint in Central Newfoundland; Enters LOI For 100% Of Golden Baie](#).
- [Turkey Begins Ultra-Deepwater Oil Drilling in Horn of Africa](#).
- [Trafigura's Nyrstar ships first antimony batch from Australia plant](#).

- [Comparing safety profiles of lithium-ion, sodium-ion and solid-state batteries.](#)

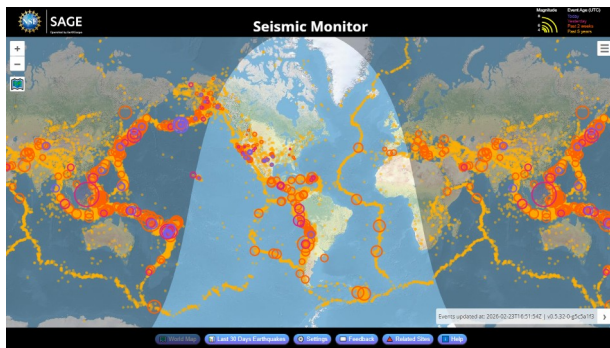
Environmental Geology and Hydrogeology

- [Measurement of a lithium plume from the uncontrolled re-entry of a Falcon 9 rocket](#); Phys.org summary [here](#).
- [‘They pushed so many lies about recycling’: the fight to stop big oil pumping billions more into plastics.](#)
- [‘We prepare for the wrong disasters’: Earth's fight against encroaching saltwater.](#)
- [What to know about the disastrous Potomac sewage spill.](#)

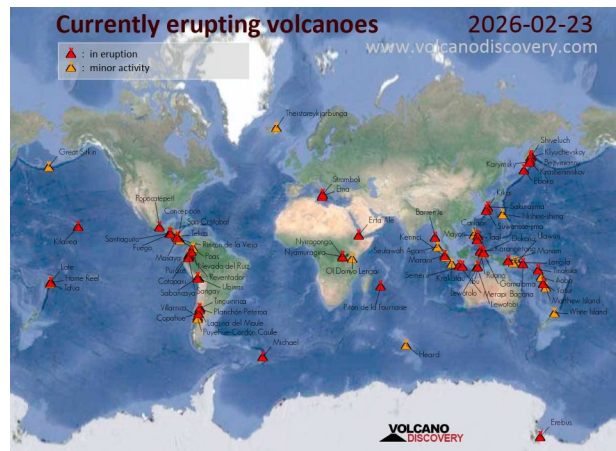
Glaciers and Climate Change

- [70 Years of Glacier Loss on the Nevados de Chillán volcanic complex, Chile.](#)
- [Deepest-ever rock core extracted from under Antarctic ice sheet](#); Daily Galaxy summary [here](#).
- [Debris-covered glaciers on Deception Island \(Antarctica\) as analogues for possible glaciers on the lower northwest flank of Hecates Tholus volcano, Mars](#); Phys.org summary [here](#).
- [Cordilleran Ice Sheet early deglaciation inferred from evolution of Late-Pleistocene glacial Lake Dzulh Stun in east-central British Columbia, Canada.](#)
- [The potential of Marine Ice Cliff Instability for Amundsen Sea glaciers revisited.](#)
- [Scaling up enhanced rock weathering for equitable climate change mitigation](#); Phys.org summary [here](#).

Volcanoes, Earthquakes and Geohazards



[Seismic Monitor](#)



[Active Volcano Map](#)

Volcanoes

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

- United States Geological Survey (USGS) Volcano Observatories:
 - Yellowstone Caldera Chronicles: [Yellowstone's Wubb Springs and Death Gulch—unusual features with unusual names.](#)
 - [Cascades Volcano Observatory Weekly Update.](#)
 - Volcano Watch – [A sight to see: maintaining HVO's webcams during a historic eruption.](#)
 - Professional Paper 1890-N: [Toward a Four-Dimensional Petrogenetic Model of a Distributed Volcanic Field on the Southern Edge of the Colorado Plateau.](#)
- [Deep Mw7.1 earthquake strikes Sabah, Malaysia; USGS summary here.](#)
- [Pre- and syn-eruptive processes during ancient pre-caldera activity at Campi Flegrei \(Italy\): Petrology and chemostratigraphy of the Vitafumo and Miliscola tuff-cones.](#)
- [The evolution of a magmatic plumbing system from inception to extinction: The case of the Aegina magmatic province \(Greece\).](#)

Earthquakes

- [Euro-Mediterranean Seismological Centre \(EMSC\).](#)
- [Earthquakes Monitoring Live Worldwide.](#)
- [Solving for Earthquake Recurrence Rates from Fault-Slip Rates in a Multisegment, Multifault Rupture System: An Overdetermined Inversion Approach.](#)
- [The 20 June 2025 Mw 4.9 Event in the Central Alborz, Iran: A Rare Normal-Faulting Earthquake Within a Complex Transpressional Regime.](#)
- [Dynamic Triggering of Earthquakes in Costa Rica.](#)
- [Tephra seismites - Understanding seismic hazard of hidden faults by analyzing liquefied tephra layers in lakes.](#)
- [Leakage During Hydropower Tunnel Construction: A Possible Trigger Mechanism for the Earthquake Swarm at Sørfjorden, Norway.](#)
- [Locating Anthropogenic Seismic Activity at the Redmond Salt Mine.](#)
- [Back-Propagating Earthquakes on Simple Faults; MIT News release \[here\]\(#\).](#)
- [Five major earthquakes since the Late Classic Maya Period on the Motagua Fault in Guatemala.](#)

Geohazards

- [Rock mass characterization of the Niagara Escarpment, Hamilton, Ontario: implications of Schmidt hammer measurements for geohazard management.](#)

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 together with free online courses, listed [here](#).
- Free [Groundwater Modeling Courses](#) from the HydroGeoCenter.
- From Western Australia: [Carbonatite, lamprophyre and host rocks in the northern Aileron Province](#).
- The Geology of Indonesia: [Volume 1](#) and [Volume 2](#).
- 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](#).
- [Systematic geochemical classification of felsic igneous rocks of the Yilgarn Craton](#).
- From the Arizona Geological Survey: [Geochemistry Diagram Generator v 1.0](#).

Upcoming Events

- [March 15-21, 2026, Provincial Engineering and Geoscience Week, Manitoba](#).
- [AGS Annual Conference 2026, 19th Mar 2026, One Great George Street, London, U.K.](#)
- [ISMPP U: Restoring Trust in Science: Storytelling, AI, and Integrity in Scholarly Publishing \(Mar. 26, 2026, 10:00 am ET\)](#).
- [14-15 April 2026: 2026 IAH Ireland Conference – Groundwater 2035, Tullamore, Ireland](#)
- [GAC-MAC 2026 St. John's NL, St. John's Convention Center, May 25-28, 2026](#).
- [PEG2026: 11th International Symposium on Granitic Pegmatites; 16th–19th August 2026, in Perth, Western Australia](#).
- [14-18 September 2026 , IAH 2026, 53rd Congress of the International Association of Hydrogeologists; Budapest Congress Center](#).
- [September 30 - October 3, 2026 SEG 2026 Conference Salt Lake City, United States](#).
- [Society of Petroleum Engineers Distinguished Lecturer Schedule](#).
- [American Geophysical Union List of Upcoming Meetings](#).
- The Geological Society: [Events & Courses](#).

February 23, 2026

Geology and Mineral Resources – New Caledonia

Introduction



Figure 1 – New Caledonia
Credit: ©FreeWorldMaps.net

[New Caledonia](#) is a semi-autonomous [French possession](#) (*sui generis* collectivity) of 264,596 people in the southwestern [Pacific Ocean](#). The country has an area of 18,575 square kilometres and consists of an archipelago in [Melanesia](#). It includes the main island of [Grande Terre](#), the [Loyalty Islands](#), the [Chesterfield Islands](#), the [Belep Islands](#), the [Isle of Pines](#), and a few remote islets. Nearby countries include [Vanuatu](#), 220 kilometres (km) to the northeast, and [Australia](#), 1,210 km to the west.

New Caledonia is a modestly wealthy country with a nominal per capita [GDP](#) of \$34,939. The biggest part of the economy is [nickel mining](#) with some manufacturing (such as re-building delivery trucks) and commercial seafood harvesting. In 2024, the [top exports](#) of New Caledonia were ferroalloys, nickel ore and concentrate, delivery trucks, and seafood (mostly crustaceans). The top destinations for exports were China, South Korea, Japan, Taiwan, and France. In 2024, the top [imports](#) of New Caledonia were refined petroleum, packaged medications, cars, coal, and delivery trucks. The top origins for imports were France, Singapore, Australia, China, and New Zealand.

For more details on the country, check out the [Wikipedia](#) and [Grokopedia](#) articles on the country.

Geology

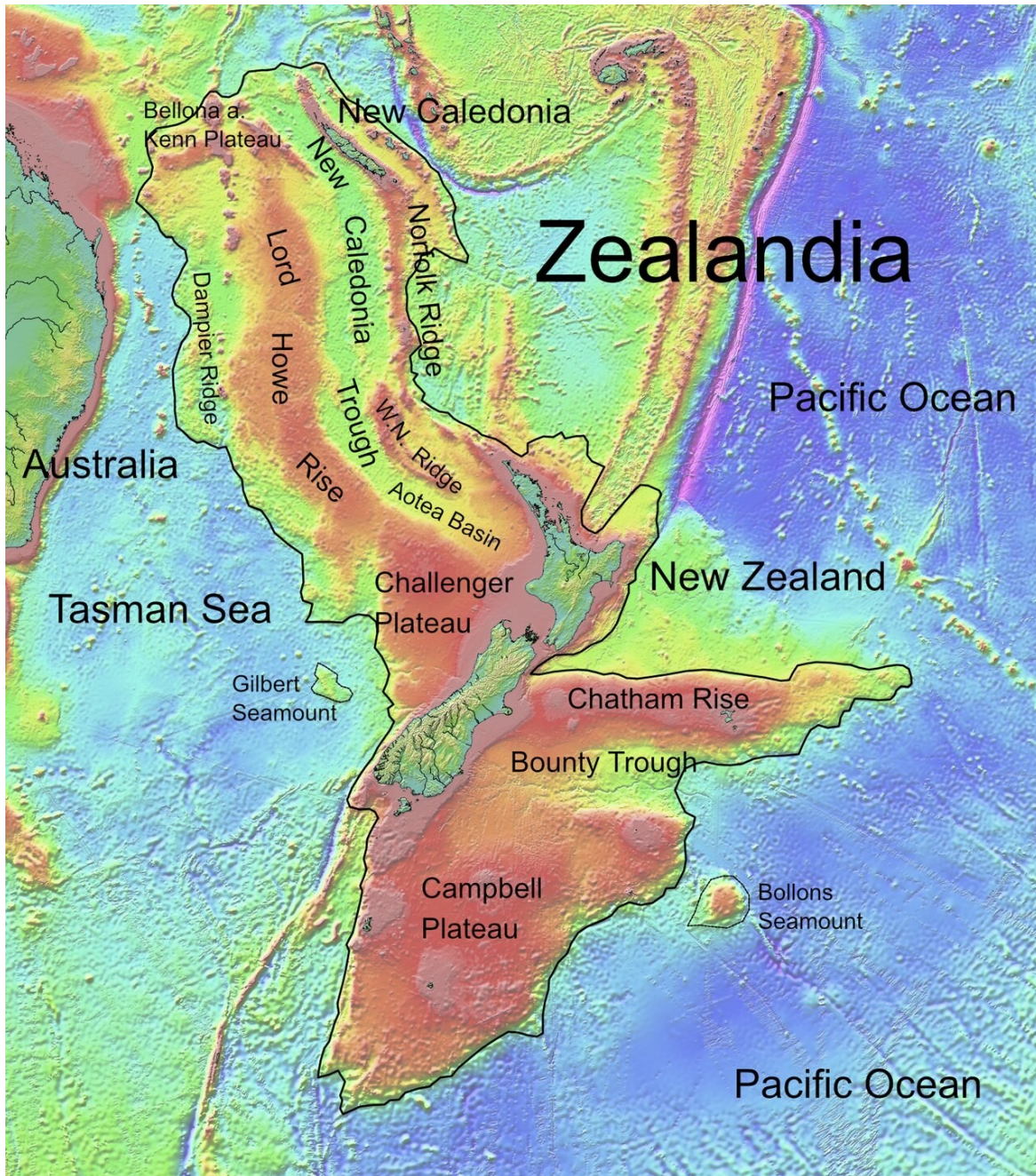


Figure 2 – Topographic map of Zealandia

Credit: Ulrich Lange, [Creative Commons CC0 1.0 Universal Public Domain Dedication](#) license

New Caledonia sits on a small continental plate called [Zealandia](#). Zealandia is a [submerged continent](#) and [represents](#) a vestige of [Gondwana](#) that separated from the [Australian Plate](#) and the [Antarctica Plate](#) in the [Late Cretaceous](#) with the [opening of the Tasman Sea](#).

The rocks [underlying New Caledonia](#) range in age from the [Permian](#) to the present [Quaternary](#).

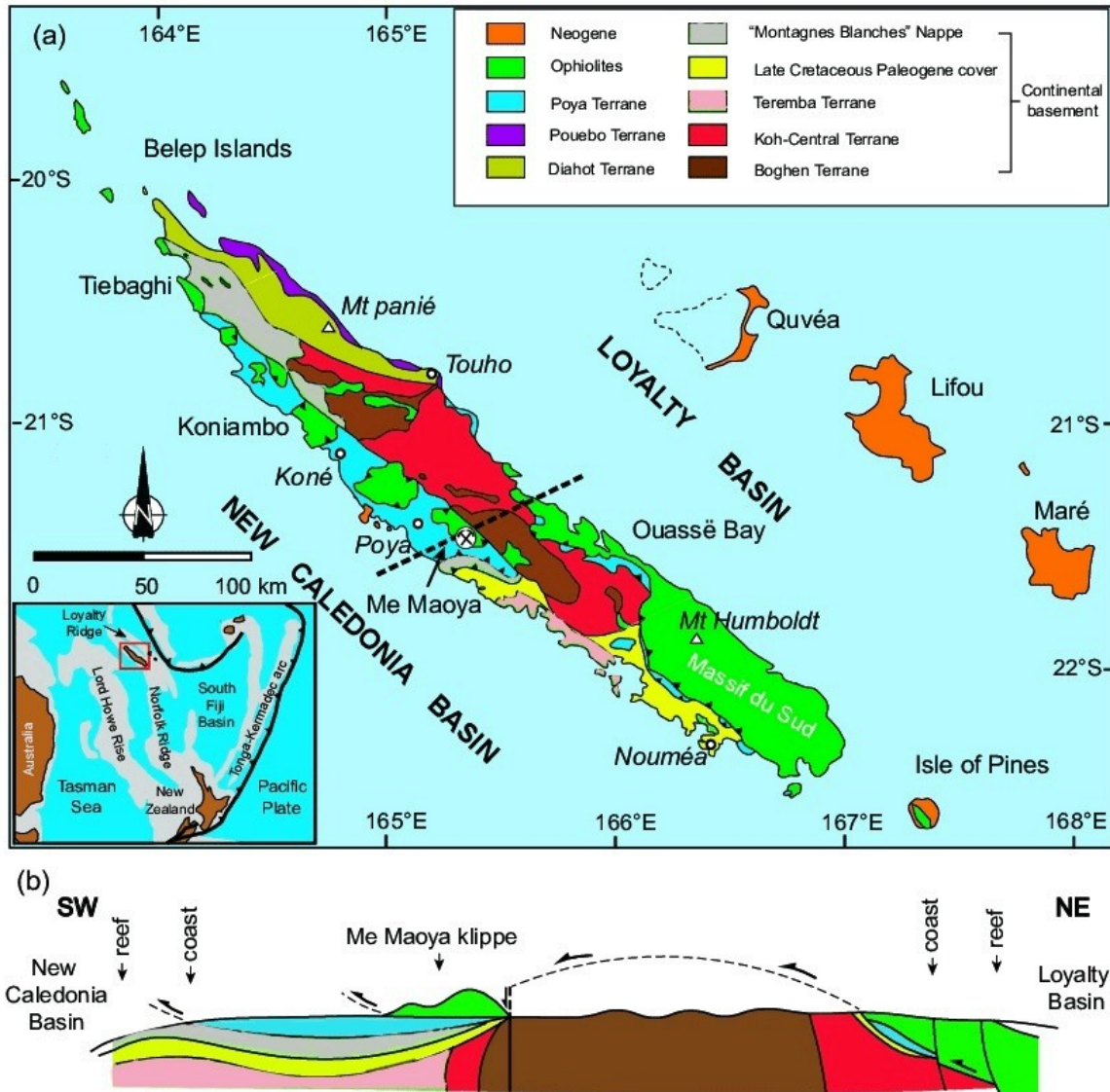


Figure 2 – Simplified Geology of New Caledonia

Credit: Yang Xu & Chuan-Zhou Liu, [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/) license

The oldest [rocks in New Caledonia](#) are those of the [Koh Ophiolite](#) dating from the [Early Permian](#). Formed by [volcanism](#) beneath the ocean, then transported and scrapped off during collision between tectonic plates, the Koh Ophiolite is made up of [mafic to ultramafic intrusive and extrusive igneous rocks](#) such as [gabbro](#) and [basalt](#) with [pelagic sediments](#) such as [chert](#).

Next oldest, ranging age from [Permian](#) to [Early Jurassic](#) are the mostly sedimentary rocks of the [Teremba Terrane and the Central Terrane](#). Formed mainly by marine sedimentation with some volcanic rocks, the Teremba Terrane is composed of deep sea Permian to [Mesozoic](#) [arc-derived volcanic rocks](#) and [greywackes](#). The Central Terrane includes at its base an [ophiolite](#) with island arc [tholeiitic basalt](#) and [boninites](#) from the Koh Ophiolite overlain by a thick sequence of greywacke.

Next younger is the [Boghen Terrane](#). Formed by [metamorphism](#) in a [subduction zone](#) during the [Jurassic](#) and [Cretaceous](#) periods, the Boghen Terrane consists mostly of [foliated metamorphic rocks](#) such as [schist](#) and [metagreywacke](#).

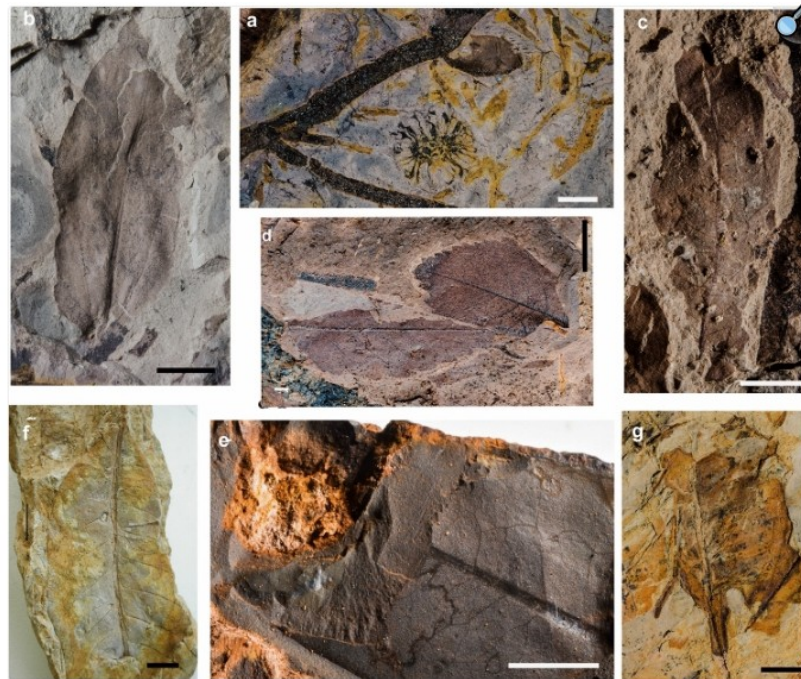
Younger still are the [sedimentary rocks](#) of the [Eocene](#) to [Oligocene](#) aged [Formation à charbon](#), the Eocene aged [Montagnes Blanches Nappe](#) and the [Bourail Flysch](#), the [Paleocene](#) aged [Koumac Terrane](#), and the [Late Cretaceous](#) to Paleocene aged [Koné Terrane](#).

Also from the Eocene are the [Poya Terrane](#), the [Peridotite Nappe](#), the [Pouebo Terrane](#), and the [Diahot Terrane](#). The Poya Terrane and Peridotite Nappe were formed by volcanism under in the ocean, then [obducted](#) onto the island during collision between tectonic plates. The Pouebo and Diahot terranes are made up of foliated metamorphic rocks formed by subduction zone metamorphism.

During the Eocene to Oligocene, intrusions of felsic to intermediate igneous rocks, [granitoids](#), formed [plutons](#) and [dykes](#).

Finally, in more recent [Neogene](#) to Quaternary times, are the sedimentary deposits of the lagoonal carbonate [Nepoui series](#) and the fluvial/lagoonal [Gwa N'doro Formation](#).

Paleontology



Fossil plants and insect activities. (a) cone of taxodiaceous Cupressaceae; (b-d) leaves; (c) insect activities on a leaf (Late Cretaceous, Haute Nessadiou); (e) insect activities on leaves (Late Cretaceous, Haut-Robinson); (f, g) insect activities on leaves (Nepoui, Early Miocene);

Copyright R. Garrouste. Scale bars = 1 cm.

Figure 4 – Fossil Plants from New Caledonia
Credit: Figure 2 in [Garrouste et al, 2012](#)

The geology of New Caledonia is not favourable for fossilization. While sediments ranging in age from Permian to the Quaternary exist, but many have either been either metamorphosed or covered by mantle peridotites. As a result, terrestrial fossil assemblages are rare and not well documented.

However, there are some examples. Figure 4, above, shows [plant fossils from New Caledonia](#): Late Cretaceous plant fossils from [Haute Nessadiou](#) and fossil leaves from the [Miocene](#) aged Nepoui series.

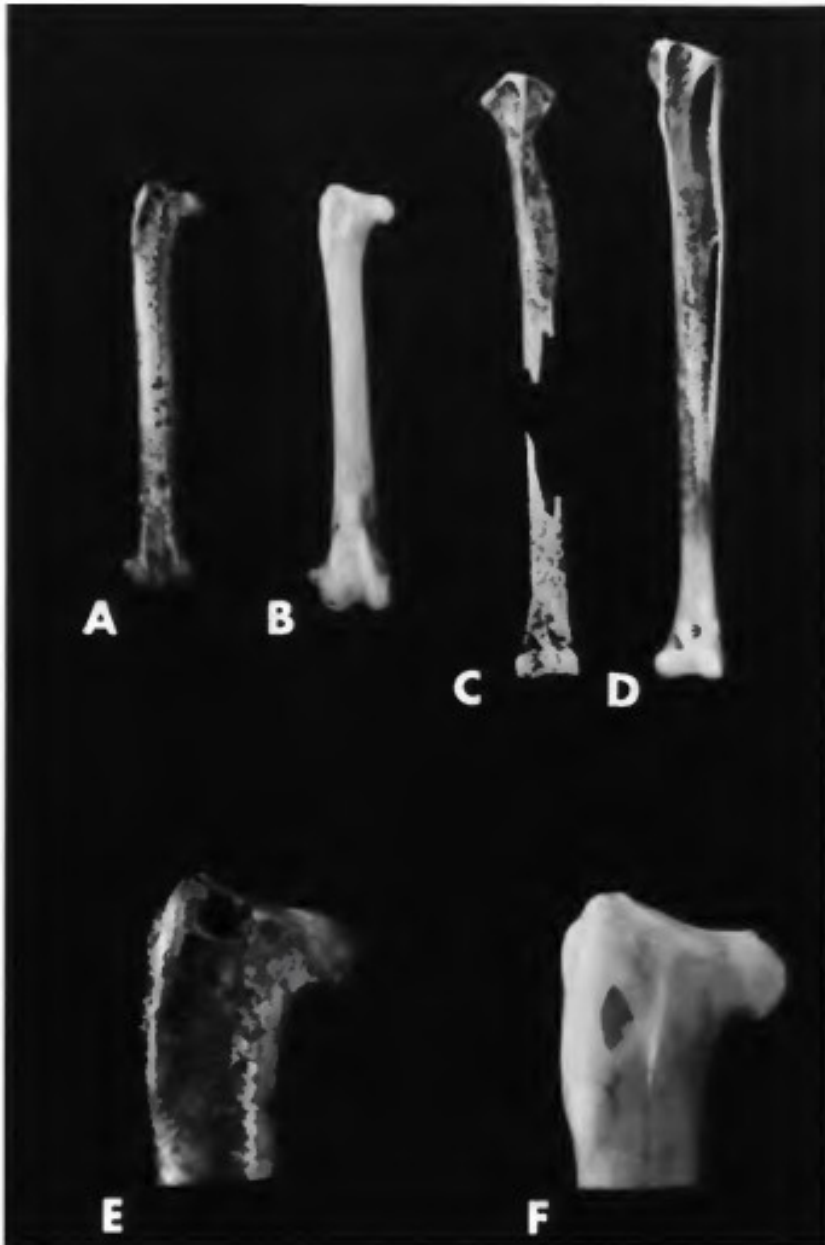


FIGURE 3.—*Accipiter quartus*, new species (A,C,E), compared with males (the smaller sex) of *A. haplochrous* (B,D,F). Femur: A,E, holotype, NCP 990; B,F, USNM 561514. Tibiotarsus in anterior view: C, proximal (NCP 991) and distal (NCP 992) ends; D, USNM 561515. (A-D, natural size; E,F, $\times 3$.)

There are also more recent fossils of vertebrates from New Caledonia. Figure 5 shows [fossils](#) of an extinct [goshawk](#) (*Accipiter quartus*) from the Quaternary that were found in the [Pindai Cave](#), Nepoui Peninsula, on the west coast of New Caledonia.

Figure 5 - *Accipiter quartus* fossils

[Credit: Figure 3 in Balouet & Olson, 1989](#)

Another source of Quaternary aged bird fossils is the [Gilles Cave](#), 5 km WSW of Boulouparis, west coast of New Caledonia; Figure 6 shows the fossils remains of a [barn owl](#) from that cave.



FIGURE 8.—*Tyto? letocarti*, new species (A,B: holotype, NCG 1000; D: NCG 1003), compared with bones of *T. alba* from the upper layer of Gilles Cave (C,E). Femur: A, anterior view; B,C, posterior view. Coracoid: D,E, ventral view. (B-E, $\times 1.5$; A somewhat larger.)

Figure 6 – Fossil remains of [Tyto letocarti](#)
Credit: [Figure 8 in Balouet & Olson, 1989](#)

The two papers referenced above have many other examples of fossils from New Caledonia, so if this interests you, follow up on them. Here are the official citations for those two papers:

- Garrouste, R., Munzinger, J., Leslie, A. et al., 2021, *New fossil discoveries illustrate the diversity of past terrestrial ecosystems in New Caledonia*. Sci Rep 11, 18388
<https://doi.org/10.1038/s41598-021-97938-5>.
- Jean Christophe. Balouet and Storrs L. Olson, 1989, *Fossil birds from late Quaternary deposits in New Caledonia*, Smithsonian Contributions to Zoology, Number 469,
<https://repository.si.edu/bitstreams/dd5989cb-269b-4230-a111-e030f5c40980/download>

Mineral Resources



**Figure 7 – [Garnierite](#) from the [Camps des sapins Mine, North Province, New Caledonia](#)
Credit: [Didier Descouens, Creative Commons Attribution 4.0 International](#) license**

According to the most recent USGS [Minerals Yearbook of New Caledonia](#), the main minerals [mined](#) in New Caledonia are nickel and cobalt, which occur together in the same deposits. The only industrial mineral produced is cement for construction.

New Caledonia's [nickel-cobalt laterite deposits](#) are [supergene deposits](#) and can be divided into two main types:

1. A lower [saprolite](#) layer formed from the of weathering silicate minerals; and
2. An overlaying layer of [limonite](#) (also known as yellow laterite) composed primarily of [goethite](#).

The nickel-cobalt mines in New Caledonia include:

- The [Goro Mine](#) operated by [Prony Resources New Caledonia](#).
- Five mining centres and six patchwork mines operated by [Soci t  Le Nickel](#) including the [Camps des sapins Mine](#).
- The ADA Mine, Graziella Mine and Mireille Mine operated by [MAI Kouaoua Mines](#), there is also continuing exploration at the Mireille Mine.
- The Bogota, Cap Bocage, Kaala, and Nakety Mines operated by [Soci t  des Mines de la Tontouta \(SMT\)](#)

- The Tontouta Mine operated by [Société Minière Georges Montagnat S.A. \(SMGM\)](#).
- The [Koniambo Mine](#) is operated [intermittently](#) and is currently closed.

The most recent statistics on mineral production in New Caledonia from the USGS can be found [here](#). Figure 8, below, links to an interactive mineral occurrence map for New Caledonia.

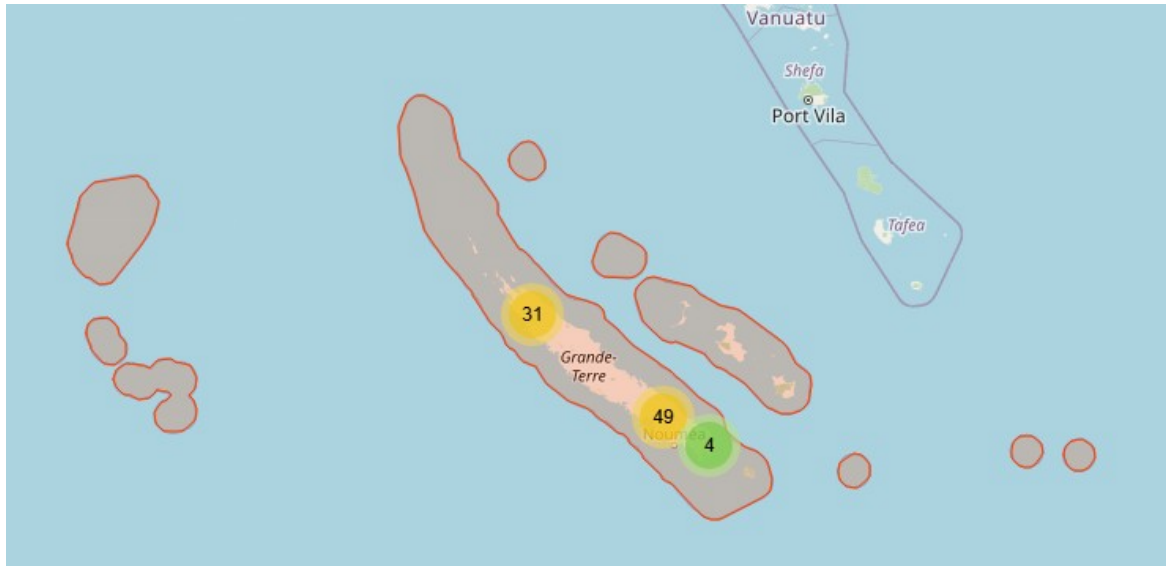


Figure 8 - Interactive Mineral Occurrence Map - New Caledonia
Credit: [Mindat.org](#)

Summary



Figure 9 - Route territoriale 1, New Caledonia
Credit: [gérard](#), [Creative Commons Attribution-Share Alike 2.0 Generic](#) license

New Caledonia looks like an [interesting place to visit](#) and may also have many opportunities for mineral exploration. A tropical country, New Caledonia is an ideal location for the creation of [supergene deposits](#), so if you plan to work there, you might want to [read up](#) on those kinds of mineral occurrences.

Another area that might be of interest is offshore. Sea bed mining might be interesting but New Caledonia has [banned it for the next 50 years](#) within their territorial waters. Also, there does not appear to be any interest in offshore oil exploration.

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.